MINISTRY OF HEALTH AND NATIONAL PUBLIC HEALTH INSTITUTE OF LIBERIA

NATIONAL TECHNICAL GUIDELINES FOR

Integrated Disease Surveillance & Response

Third Edition

Adapted June 2021

Ministry of Health and National Public Health Institute of Liberia National Technical Guidelines for Integrated Disease Surveillance & Response

Third Edition

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Foreword

More than ten years ago, the Ministry of Health (MOH) adapted a generic Integrated Disease Surveillance and Response Technical (IDSR) Guideline supported by World Health Organization-Regional Office for Africa (AFRO) in collaboration with the United States Centers for Disease Control and Prevention (CDC) in Atlanta. The guidelines served as a general reference for surveillance activities across all levels, as a guide for improving early detection and preparedness activities, improved and timely investigation and response and as a resource for developing training, supervision, communication of outbreak (information) and evaluation of surveillance activities. They provided a set of definitions for threshold levels that initiate action for responding to specific diseases.

During the last ten years, many changes have occurred in both Africa's health status, social, economic, environmental and technical enabling environment. The emergence and re-emergence of diseases such as yellow fever, other conditions and events such as climate change, and natural disasters have resulted in the need to review the evolving public health priorities for disease surveillance and response.

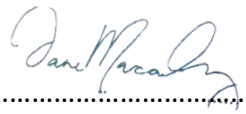
These guidelines incorporate priority emerging and re-emerging communicable and non-communicable diseases identified in 2015. They also address the International Health Regulations (IHR) (2005) and how to implement the requirements and build capacities to support them for disease surveillance and response. This document reflects national priorities, sets policies and standards for data management, sets thresholds for public health action and outlines responsibilities at all levels of the health system.

The guidelines are intended to be used by:

- health workers at all levels (including surveillance officers, clinicians and public health workers)
- county and district health teams
- data managers
- IHR National Focal Point (NFP)
- competent authorities at points of entry
- veterinary and wildlife health officers
- environmental health officers
- health training institutions
- media
- supply chain officers
- other public health experts, including NGOs

The guidelines are intended for use as:

- a general reference for surveillance activities at all levels
- a set of standard definitions for threshold levels that initiate action for responding to specific diseases
- a stand-alone reference for level-specific responsibilities
- a resource for developing training, supervision and evaluation of surveillance activities
- a guide for improving early detection of epidemic prone diseases
- a reference for preparedness and response in the event of a disease outbreak



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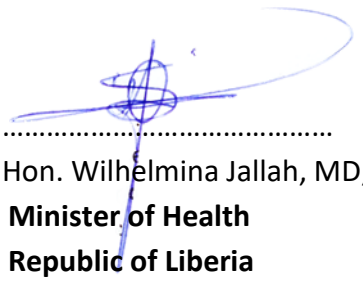
Hon. Jane A. MaCauley, MPH

Director-General

National Public Health Institute of Liberia



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Hon. Wilhelmina Jallah, MD, MPH, CHES, FLCCP, FWACP

Minister of Health

Republic of Liberia

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The core team involved in the authoring and adaptation of the document include:

Ministry of Health (MoH)
Minister. Chea Sanford Wesseh, MoH
Mr. Olasford Wiah, Director Community Health, MoH
Mr. Karsor Kollie, Director NTDs, MoH
Ms. Musand Kromah AEFI Coordinator, MoH
Mr. Chester A. Smith, Director Health Promotion, MoH

County Health Team
Dr. Augustine Fannieh, CHO, Grand Gedeh County
Dr. Joseph Topor, CHO, Rivercess
Dr. Sylvester O. Wheh, CHO, Grand Bassa County
Mr. Alpha Tamba, CSO, Lofa County
Mr. Jimmy Larwubah CSO, Grand Kru County
Mr. Dedesco Gweh, CSO, Maryland County
Mr. Janjay H. Glay, CSO, Grand Bassa County

Ministry of Agriculture
Mr. Eddie M. Farngalo, Director, Central Veterinary Epid Unit, MOA

National Public Health Institute of Liberia (NPHIL)
Mr. Thomas Nagbe, Director/DIDE, NPHIL
Dr. Ralph W. Jetoh, Deputy Director/DIDE, NPHIL
Mrs. Roseline N. C. George, Training Director, NPHIL
Mr. Advertus Nyan Mianah, Surveillance Coordinator, NPHIL
Dr. Momo Tegli, Technical Lead, Director General Office, NPHIL
Mr. Trokon Omarley Yeabah, Data Manager, NPHIL
Mrs. Phebe J. Thomas, POE Coordinator, NPHIL
Ms. Hawa Sherman, IDSR Lead, NPHIL
Mr. Jaygbah J. Mulbah, TA, Director General Office, NPHIL
Ms. Alberta B. Corvah, Field Epidemiologist, NPHIL
Mr. Emmanuel Dwalu, Epidemiologist, NPHIL
Mr. Nathaniel K. Dovillie, EPR Coordinator, NPHIL
Ms. Irene P. Pewu, Lassa fever Focal Person, NPHIL

Partners
Mr. Gabriel Boumen Kassay, Project Coordinator, Jhpiego
Mr. Mulbah M. Reed M&E Coordinator, US-CDC
Mrs. Mercy D. Blyden, Technical Advisor, GIZ
Mr. Augustine Koryon, Technical Advisor, GIZ
Mrs. Johanna Schulte, Junior Technical Advisor, GIZ
Dr. Maame Amo-Addae, Resident Advisor, AFENET
Dr. Peter Adewuyi, Field Coordinator, AFENET

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a) (a) World Health Organization (WHO)
b) U.S. Centers for Disease Control and Prevention (CDC)
c) Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
d) United States Agency for International Development (USAID)
e) African Field Epidemiology Network, Liberia

Abbreviations

AAR	After Action Review
ADR	Adverse Drug Reaction
AEFI	Adverse Events Following Immunization
AESI	Adverse Events of Special Interest
AFP	Acute Flaccid Paralysis
AFRO	WHO Regional Office for Africa
AMR	Antimicrobial Resistance
AVR	Analysis, Visualization and Reporting
AWD	Acute Watery Diarrhea
BCC	Behavior Change Communication
CAC	County Agriculture Coordinator
CAHSO	County Animal Health Surveillance Officer
CAHW	Community-based Animal Health Worker
CBO	Community Based Organization
CBS	Community Based Surveillance
CCS	County Clinical Supervisor
CDC	Centers for Disease Control and Prevention
CDO	County Diagnostic Officer
CDR	Crude Death Rate
CEBS	Community Event Based Surveillance
CEHS	County Environmental Health Supervisor
CFR	Case Fatality Rate
CHA	Community Health Assistants
CHSS	Community Health Services Supervisor
CHO	County Health Officer
CHT	County Health Team
CHV	Community Health Volunteer
CHW	Community Health Worker
CMR	Crude Mortality Rate
COVID-19	Coronavirus Disease 2019
CSO	County Surveillance Officer
DAHSO	District Animal Health Surveillance Officer
DBM	Dead Body Management
DHIS2	District Health Information System version 2
DHO	District Health Officer
DHT	District Health Team
DIDE	Division of Infectious Diseases and Epidemiology
DPC	Disease Prevention and Control Department

DRM	Disaster Risk Management
DSO	District Surveillance Officer
EBS	Event Based Surveillance
eDEWS	Electronic Disease Early Warning System
eIDSR	Electronic Integrated Disease Surveillance and Response
EOC	Emergency Operations Centre
EPA	Environment Protection Agency
EPI	Expanded Program on Immunization
EPR	Emergency Preparedness and Response
EVD	Ebola Virus Disease
EWAR	Early Warning and Alert Response
EWARN	Early Warning and Alert Response Network
FBO	Faith Based Organization
FDA	Forest Development Authority
FETP	Field Epidemiology Training Programme
GHSA	Global Health Security Agenda
GIS	Geographic Information System
GLASS	Global Antimicrobial Resistance Surveillance System
HCF	Healthcare Facility
HCW	Healthcare Worker
HIV/AIDS	Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome
HMER	Health Management Information Systems, Monitoring and Evaluation and Research Units
HMIS	Health Management Information System
IBS	Indicator Based Surveillance
ICT	Information and Communications Technology
IDP	Internally Displaced People
IDSR	Integrated Disease Surveillance and Response
IEC	Information, Education and Communication
IHR	International Health Regulation
ILI	Influenza Like Illness
IMC	International Medical Corps
IMS	Incident Management System
IOM	Institute of Migration
IPC	Infection Prevention and Control
IPD	Inpatient Department
IRC	International Rescue Committee
ITN	Insecticide-treated Nets
JEE	Joint External Evaluation
KAP	Knowledge, Attitude and Practice

LISGIS	Liberian Institute of Statistics and Geo-Information Services
MCH	Maternal Child Health
MDR/XDR-TB	Multidrug- and Extensively drug-resistant Tuberculosis
MEF	Monitoring and Evaluation Framework
MMWR	Morbidity Mortality Weekly Report
MNDSR	Maternal and Newborn Death Surveillance and Response
MOA	Ministry of Agriculture
MOCI	Ministry of Commerce and Industry
MOH	Ministry of Health
MPDSR	Maternal Perinatal Death Surveillance and Response
MR	Mortality Rate
MTI	Medical Teams International
MoU	Memorandum of Understanding
NDMA	National Disaster Management Agency
NEPRC	National Emergency Preparedness and Response Committee
NFP	National Focal Point
NGO	Non-Government Organization
NMCG	National Multisectoral Coordinating Group
NPHIL	National Public Health Institute of Liberia
NPHRL	National Public Health Reference Laboratory
NNT	Neonatal Tetanus
NSTCC	National Surveillance Technical Coordination Committee
OHCP	One Health Coordination Platform
OHSC	One Health Steering Committee
OIC	Officer in Charge
OIE	World Organization for Animal Health
OPD	Outpatient Department
PCI	Project Concern International
PoC	Point of Care
PoE	Points of Entry
PHEIC	Public Health Emergency of International Concern
PHEMC	Public Health Emergency Management Committee
PHEOC	Public Health Emergency Operations Center
PHERRT	Public Health Emergency Rapid Response Team
PPE	Personal Protective Equipment
PSS	Psychosocial Support
RDT	Rapid Diagnostic Test
RRT	Rapid Response Team
RTA	Road Traffic Accident
SARS	Severe Acute Respiratory Syndrome
SBCC	Social Behavior Change Communication

SCD	Standard Case Definition
SDGs	Sustainable Development Goals
SFP	Surveillance Focal Person/Point
SimEx	Simulation Exercise
SitRep	Situation Report
STI	Sexually Transmissible Infections
SOP	Standard Operating Procedure
ToR	Terms of Reference
TWG	Technical Working Group
UN	United Nations
UNICEF	United Nations Children's Emergency Fund
VHF	Viral Hemorrhagic Fever
VP	Vice President
VPDs	Vaccine Preventable Diseases
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

Glossary (Definitions of Terms)

Acute	Any disease having a rapid (sudden) onset and following a short course.
Alert	Alerts must be investigated further and verified as to whether they represent a true event or not.
Chronic	Any health condition that develops slowly or of long duration and tends to result in some functional limitation and need for ongoing medical care.
Cluster	A closely grouped series of events or cases of a disease or health-related condition in relation to time or place or both.
Disease	An illness or medical condition, irrespective of origin or source, which presents or could present significant harm to humans.
Elimination	The interruption of disease transmission in country, county or locality.
Endemic	A disease or condition regularly found among particular people or in a certain area.
Epidemic	Refers to an increase in the number of cases of a disease above what is normally expected in that population in that area.
Epidemiological link	When a patient has or had exposure to a probable or confirmed case.
Epidemiology	The study of the distribution and determinants of health-related states and the application of this information to controlling public health problems.
Eradication	The purposeful reduction of specific disease prevalence to the point of continued absence of transmission in the world.
Etiology	Refers to the cause, set of causes, or origin of a disease or condition.
Event	A manifestation of disease or an occurrence that creates a potential for disease.
Health Management Information System	A monthly routine reporting system for diseases, conditions, and risks that is reported to the MOH from every healthcare facility electronically or on paper.
International Health Regulations (2005)	International legal instrument that is binding in 196 countries, including Liberia. The regulations aim to help the international community prevent and respond to acute public health risks that have the potential to cross borders and threaten people worldwide.
Outbreak	The occurrence of more cases than expected in a defined geographic area or time.
Pandemic	An epidemic occurring worldwide, or over a very wide area, crossing international borders and usually affecting a large number of people.
Points of Entry	Any passage, via land, air or sea, for international entry or exit of travelers, baggage, cargo, containers, conveyances, goods and postal parcels as well as agencies and areas providing services to them on entry or exit.

Introduction Section

This document introduces the concept of Integrated Disease Surveillance and Response (IDSR), which incorporates indicator-based and event-based surveillance as integral parts of an Early Warning Alert and Response (EWAR) system. This section provides guidance on how IDSR works, its objectives, and how it can help to build and sustain the International Health Regulation (IHR) core capacities with support from National Public Health Institute of Liberia (NPHIL), Ministry of Health (MoH) and partners, thereby facilitating its implementation. It also introduces other aspects such as: the One Health approach; electronic IDSR (e-IDSR); the linkage between Disaster Risk Management (DRM) and IDSR; the core surveillance functions; how the subnational level (for example county, district) can use these guidelines to reinforce surveillance and response; the roles and responsibilities of the various at different levels; and the priority diseases, conditions and events recommended in IDSR.

It is important to emphasize from the outset that guidelines are to help build and strengthen surveillance systems for priority diseases, conditions, and all other public health events, whether they are known or unknown, whether they are disease events or other IHR hazards. These guidelines are NOT limited to only known diseases.

How to use these guidelines

These technical guidelines provide a summary of the key principles and core functions of IDSR. Each section summary provides details of key procedures that should be followed within each of the core functions. Each section also references annexes, which provide more detailed information on each of the key procedures, including reporting templates, data collection and reporting forms, case management and other standard operating procedures (SOPs).

Public health surveillance

Public health surveillance is the ongoing systematic identification, collection, collation, analysis and interpretation of disease occurrence and public health event data, for the purposes of taking timely and robust actions, such as disseminating the resulting information to the relevant people, for effective and appropriate action. Surveillance is also essential for planning, implementation, monitoring and evaluation of public health practice. The World Health Organization (WHO) Regional Office for Africa (AFRO) has decided to achieve its public health surveillance objectives through the implementation of the IDSR strategy.

Definitions of the different types/approaches of public health surveillance

a) **Passive surveillance.** A system whereby a health institution receives routine reports submitted from health facilities, such as hospitals, clinics and public health units, the

community or other sources. There is no active search for cases. This is the most common form of surveillance, which includes the surveillance of diseases and other public health events using routine surveillance; routine health management and information system or any other public health information system.

b) **Active surveillance.** It involves an ongoing search for cases in the community or health facilities. This may involve regular contacts with key reporting sources, by making telephone calls to health care workers (HCWs) at a facility or laboratory or physically moving to the source and carrying out record review of data. Examples include active search for cases of measles and polio, including during outbreaks, where mechanisms must be put in place for active finding of additional cases.

c) **Integrated disease surveillance.** It is an approach that aims at collecting health data for multiple diseases, using standardized tools. To ensure robust early warning and prompt response, the IDSR data collection and analysis system relies on two main channels of information or signal generation: Indicator-based surveillance (IBS); and event-based surveillance (EBS).

d) **Indicator-based surveillance**

IBS is the systematic (regular) identification, collection, monitoring, analysis and interpretation of structured data, such as indicators produced by well-identified, mostly health-based formal sources.

Common methods of indicator-based surveillance

a) **Facility-based surveillance**. All reporting units, such as health facilities, are required to report on a weekly, monthly, quarterly or annual basis to the next level, based on the categories of the diseases, conditions and events. Additionally, they are also required to report any epidemic-prone disease to the next level immediately.

b) **Case-based surveillance.** This involves the ongoing and rapid identification of identifiable cases for the purpose of case follow-up. It is the type of surveillance used for diseases targeted for elimination or eradication or during confirmed outbreaks. In these scenarios, every individual case identified is reported immediately to the next level, using a case-based form.

c) **Sentinel surveillance.** This type of surveillance is done for specific conditions in a specific cohort, such as a geographical area or population subgroup, to estimate trends in a larger population. A given number of health facilities or reporting sites are usually designated as sentinel sites for monitoring the rate of occurrence of priority events such as pandemic or epidemic events and other health events of public health importance, where they act as early warning and reporting sites. Sentinel sites are usually designated because they are representative of an area or are in an area of likely risk for a disease or condition of concern. Examples of sentinel surveillance include sentinel surveillance for influenza,

rotavirus, pediatric bacterial meningitis, and environmental sewage sampling for polio.

a) **Syndromic surveillance.** This is an active or passive system that uses Standard Case Definitions (SCD), based entirely on clinical features, without any laboratory diagnosis. Examples of these are: collecting the number of cases of Acute Flaccid Paralysis (AFP) as an alert for polio; acute watery diarrhea (AWD) among people aged two years and older as an alert for cholera; "rash illness" as an alert for measles; acute hemorrhagic fever as an alert for viral hemorrhagic diseases, or severe acute respiratory infection or influenza-like illness as alerts for influenza. Because of the lack of specificity of this system, reports require more investigation from higher levels.

b) **Laboratory-based surveillance.** This consists of surveillance conducted at laboratories to detect events or trends, which may not be seen as a problem at other locations or originate from laboratory testing, mainly done routinely or used when conducting sentinel surveillance. Laboratories can be the source of an initial alert for a specific outbreak or public health event that necessitates further epidemiological investigations. For example, the laboratory may be the first to detect the emergence of resistant strains, such as multi-drug resistant tuberculosis (MDR-TB), in the community. Other examples of laboratory-based surveillance are virologic surveillance for influenza and bacteriological surveillance under the antimicrobial resistance (AMR) surveillance system. Recently, WHO established a global antimicrobial resistance surveillance system (GLASS) for clinical specimens, which is focusing initially on priority human bacterial infections namely E. coli, K. pneumonia, S. aureus, S. pneumoniae, Salmonella spp., Shigella spp and N. gonorrhea. This type of laboratory surveillance provides information about AMR incidence, prevalence and trends.

c) **Disease-specific surveillance**. involves surveillance activities aimed at targeted health data for a specific disease for vertical surveillance. Examples include tuberculosis, malaria and HIV surveillance systems.

d) **Community-based surveillance (CBS).** is defined as the systematic detection and reporting of events of public health significance within the community-by-community members. CBS incorporates both IBS and EBS methods. Under CBS, focal persons are identified to report cases or events to the designated focal point at nearby local health delivery points. CBS strategies focus on two approaches to collect community information. The first one relies on identifying and reporting events based on agreed indicators (lay case definitions). For example, trusted community members are trained to identify diseases such as measles, cholera, polio and Guinea worm, using community (lay) case definition and use the standardized reporting system to the next level. The second strategy relies on reporting of unusual events (alerts) which can alert the early stages of an outbreak or any other public health threat in the community. Alerts may capture a wide variety of unusual events emerging at the community level, and information from these alerts may be incomplete and unconfirmed and as such, need to be triaged and verified. Information using this strategy can also come from people who have already been oriented on the agreed

indicators (lay case definitions), for example, the CBS volunteers, or any other representatives from community, who have been trained to detect events, such as unusual animal deaths and report them to the next level. Often, CBS focal persons would link the patient identified, through any of the strategies, to a nearby health facility and can help identify contacts.

Event-based surveillance

Event-based surveillance is the organized and rapid capture of information about events that are of potential risk to public health. Information is initially captured as an alert, considered by the early warning and response system as representing a potential acute risk (such as an outbreak) to human health. All alerts may not necessarily become real events, and as such, need to be triaged and verified before a response is initiated. Alerts which may signify potential risks include:

a) occurrence of disease in humans, such as unexplained clustered cases of a disease or syndromes, unusual disease patterns or unexpected deaths, as recognized by health workers and other key informants in the community;

b) events related to potential exposure for humans, such as to diseases and deaths in animals, contaminated food products or water, and environmental hazards, including chemical and radio-nuclear events;

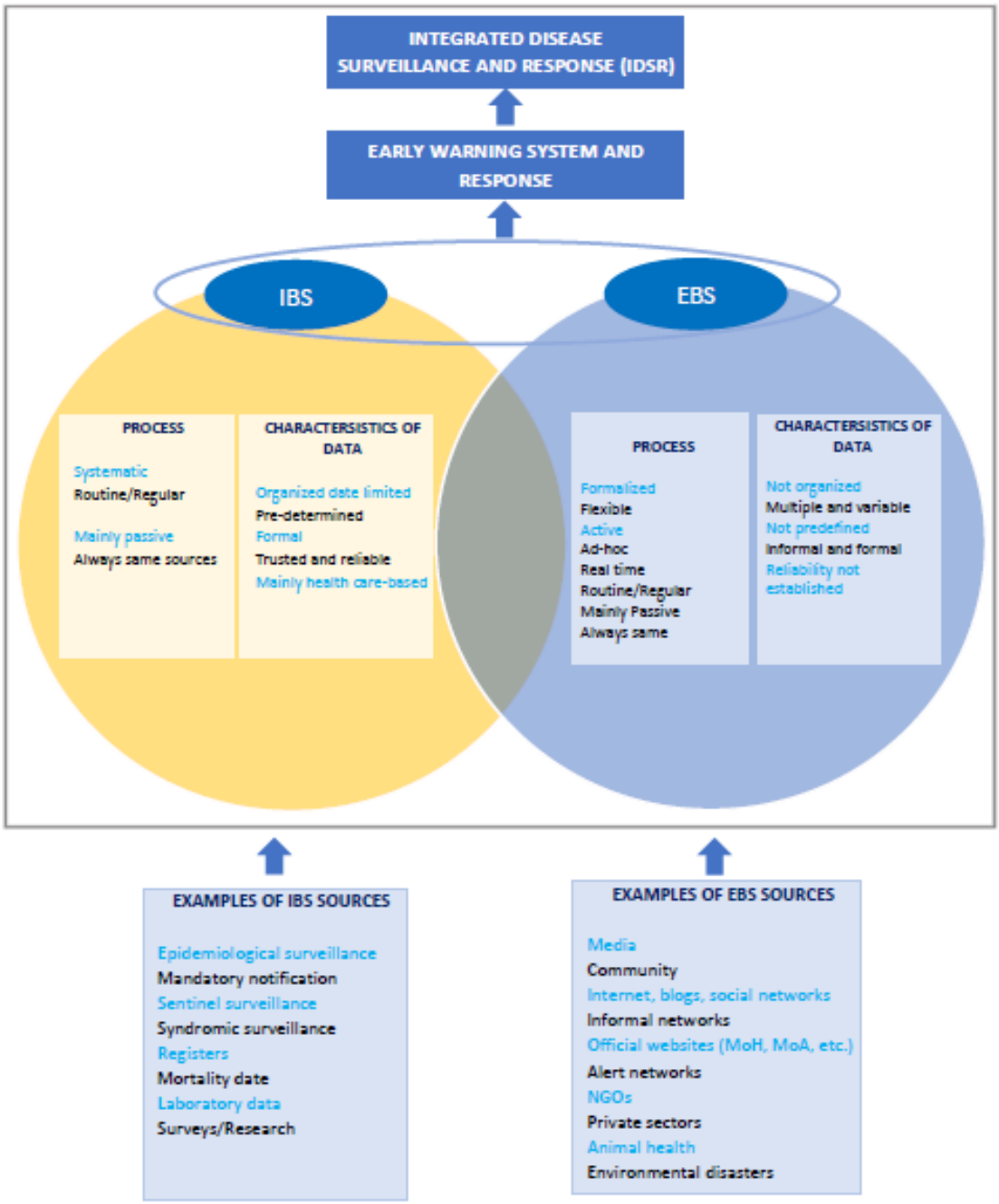
c) alerts of potential exposure of human beings by biological, chemical or radiological and nuclear hazards, or occurrence of natural or man-made disasters.

Event-based surveillance also involves media monitoring, which entails regular scanning of newspapers, internet sites and media alert systems, such as PubMed, blogs, social media, radio, and television.

The event-based surveillance system is very sensitive, and information received through it should be synchronized with IBS and rapidly assessed for the risk the event poses to public health and responded to appropriately (illustrated in Figure 1).

Unlike indicator based surveillance, event based surveillance is not based on the routine monitoring of indicators and automated thresholds for action, but rather on the screening of all available information to detect any event happening in the community (unusual disease or death in humans or animals, and unusual or clustering of cases, events/conditions in the community including environmental conditions).

Figure 1: Indicator-based and event-based surveillance for Early Warning Alert and Response (EWAR) for IDSR Strategy



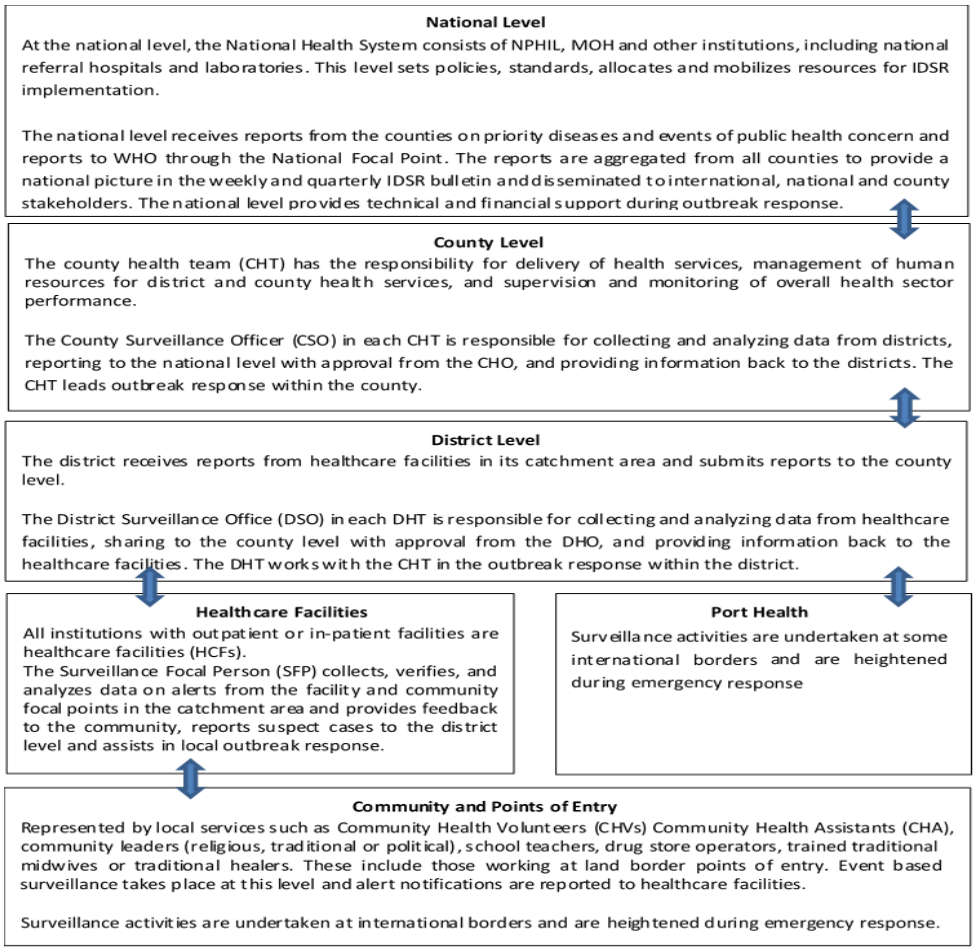
Intersection of IBS and EBS: All events detected in the EBS system that are investigated and meet the SCD should be captured in the IBS system and reported to the next level of the health care system.

Event-based surveillance and indicator-based surveillance as backbone to the IDSR strategy

Event-based surveillance and IBS are components of the early warning and response and epidemic intelligence, incorporated into the IDSR strategy. EBS and IBS complement each other, albeit with separate roles and purposes. EBS is most likely to pick up alerts to detect small outbreaks early, while IBS is better at monitoring disease trends overtime, and useful for signaling the start of regular seasonal outbreaks of endemic diseases, using alert and epidemic thresholds. IBS may not be useful for smaller events because they are either averaged out in large data sets or lost in smaller data sets. EBS is also better at picking up alerts indicating outbreaks in areas where access to healthcare is limited.

In the context of IDSR strategy, the flow of EBS information follows the same reporting lines as IBS, that is from community to health facility to district, to county and to national level. EBS and IBS are applied at all levels of the health system – community, health facility, district, county and national (illustrated in figure 2).

Figure 2: Flow of IDSR information at each level and reporting sites of Liberia's Public Health System*



*arrows indicate flow of information

Integrated Disease Surveillance and Response Strategy

The IDSR strategy was adopted by WHO AFRO Member States in September 1998 as the approach for improving public health surveillance and response for priority diseases, conditions and events at community, health facility, district, county and national levels. IDSR promotes rational and efficient use of resources by integrating and streamlining common surveillance activities and functions. The IDSR strategy makes surveillance and laboratory data more usable and helps public health managers and decision-makers to improve detection and response to the leading causes of illness, death and disability in African countries.

As part of improvement to the health care system, the IDSR strategy also assists countries to better monitor and track planned, time-bound targets.

Surveillance activities for different diseases involve similar functions (detection, sample collection, reporting, analysis and interpretation, feedback, and action), and often use the same structures, processes and personnel. As such, the principles of surveillance are the same whether applied to a single disease, condition or event or multiple diseases. What may differ is whether the target is elimination or eradication, which may require time-limited intensive efforts aimed at proving the absence of disease.

What takes place in an integrated system?

a) All surveillance activities are coordinated and streamlined. Rather than using scarce resources to maintain multiple surveillance systems with separate vertical activities, resources are combined to collect, manage and analyze information at a single focal point at each level.

b) Several activities are combined into one integrated activity, and take advantage of similar surveillance functions, skills, resources and target populations. For example, surveillance activities for AFP often address surveillance for neonatal tetanus, measles and other vaccine preventable diseases (VPDs) or any unusual events. Thus, health workers who routinely visit health facilities to search for AFP cases also review district and health facility records for information about other priority diseases in the area. Community focal persons interact with their community members on a regular basis and ask about a range of diseases, conditions and events. Communities know they can bring anything unusual to the attention of their focal persons.

c) The district level is the hub and focus for integrating surveillance functions. It is the first level in the local health system. It has dedicated staff for all aspects of public health, such as planning, supporting implementation of the National Health Strategy Plan, monitoring health events in the health facility and the community, mobilizing community action, seeking assistance at the national level, and accessing county resources for protecting at the district level. Similar functions also occur at the various

administrative levels.

d) United Nations Children's Emergency Fund (UNICEF) points at the district, county and national levels collaborate with emergency response committees at each level to plan relevant public health response actions and actively seek opportunities for combining resources.

e) The focus is on the creation of an overall public health surveillance system with sufficient capacity for detecting, confirming and responding to diseases, conditions and events. IDSR ensures that the information flow is bi-directional (horizontal and vertical), so that each level is informed promptly of potential outbreaks and response interventions. Information flow should also reach adjoining communities and districts.

Integration refers to the efficient use of human resources, and harmonizing different methods, software, data collection forms, standards and case definitions in order to prevent inconsistent information and maximize efforts among all disease prevention and control programs and stakeholders. Where possible, countries use a common reporting form, a single data entry system for multiple diseases, and common communication channels. Training and supervision are integrated, a common feedback bulletin is used, and other resources, such as computers and vehicles are shared. IDSR involves full-time coordination of surveillance activities and joint action (planning, implementation, monitoring and evaluation), whenever possible and useful.

Coordination refers to working or acting together effectively for the rational and efficient use of available, but limited resources, such as the Health Management Information System (HMIS) and various disease programs. Coordination involves information sharing, joint planning, monitoring and evaluation to provide accurate, consistent and relevant data and information to policy-makers and stakeholders at district, provincial/county and national levels.

Objectives of Integrated Disease Surveillance and Response

General objective: Improve countries' abilities to detect, report, confirm and effectively respond to high-priority communicable, non-communicable diseases and public health threats.

Specific objectives:

a) Strengthen the capacity of country to conduct effective surveillance activities: train personnel at all levels; develop and carry out plans of action; and advocate and mobilize resources.

b) Increase involvement of clinicians and other cadres of health staff in surveillance activities.

c) Integrate multiple surveillance systems so that tools, personnel and resources are used more efficiently

d) Improve the triangulation and use of information to detect changes in trend in order to conduct a rapid response to suspected and confirmed outbreaks; monitor the impact of interventions (for example, declining incidence, spread, and case fatality); and facilitate evidence-based response to public health events; health policy design; planning; and management.

e) Improve the flow of surveillance information between and within levels of the health system, using electronic tools.

f) Build strong laboratory systems and networks at national, county and district levels, to confirm pathogens and other hazards, monitor drug sensitivity and increase efficacy of point-of-care tests.

g) Trigger epidemiological investigations of reported public health problems and implementation of effective public health interventions.

h) Mount an effective response to public health emergencies.

i) Emphasize community participation in detection, reporting and response to public health problems, including case-based and event-based surveillance and response and risk communication in line with IHR (2005).

j) Strengthen coordination and collaboration among stakeholders involve in IDSR implementation

IDSR and IHR (2005)

The IHR (2005) is a binding and legal instrument, which urges all States parties to develop minimum core public health capacities.

IHR (2005) purpose and goal

The purpose of the IHR (2005) is to prevent, protect against, control and provide public health response to the international spread of disease in ways that are relevant and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade.

The scope of IHR has been expanded from three diseases (cholera, plague and yellow fever) to all Public Health Emergency of International Concern (PHEICs). They include those caused by infectious diseases, chemical agents, radioactive materials and contaminated food. Since the goal of IDSR is to strengthen the overall national system for the surveillance of diseases, particularly at the district level, and ensure continuous and timely provision and use of information for public health decision-making, IDSR provides the following resources for the implementation of IHR (2005):

a) An infrastructure for surveillance, investigation, confirmation, reporting and response.

b) Skilled human resources.

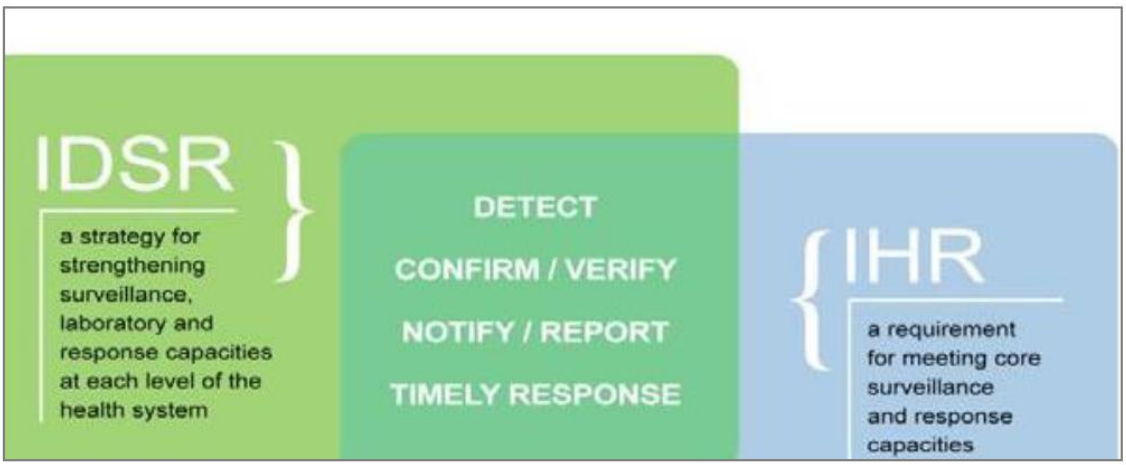
c) Defined implementation process (sensitization, assessment, plan of action, implementation, monitoring and evaluation).

d) Generic guides for assessment; plan of action development; technical guidelines training materials; tools and SOPs that incorporate IHR (2005) components.

Member States in the African Region have thus recommended that IHR (2005) should be implemented in the context of IDSR. IHR (2005) is therefore not a separate surveillance system, but rather, one that requires countries to put in place a "sensitive, reliable and flexible surveillance system that meets international standards". IDSR is such a system, which will ensure a reliable supply of information to the national level to fulfil IHR requirements. The IHR (2005) provides an opportunity to address the threat to international public health security and trade caused by emerging and re-emerging infectious diseases, including PHEIC. It also provides an excellent opportunity for strengthening surveillance and response systems and acting as a potent driver for IDSR implementation.

IDSR and IHR (2005) share common functions, as described in Figure 3 below (detection, notification, reporting, verification and confirmation, and timely response).

Figure 3: Implementing IHR through IDSR



[1]A guide for assessment teams. International Health Regulations (2005): Protocol for assessing national surveillance and response capacities for the International Health Regulations in accordance with Annex 1A of the regulations, February 2009.

The IHR (2005) guidelines have practical implications for IDSR. In the IHR (2005) guidelines, all PHEIC should be detected, assessed and responded to promptly, using an adapted response rather than pre-set measures. The IHR (2005) guidelines include the measures at points of entry (PoE) (airports, ports and ground crossings) and containment at source of public health events. The IHR (2005) guidelines also include capturing rumors of "unexplained illness or clusters" as an event category for reporting from lower levels. Because of the major role IHR (2005) plays for timely detection and verification of suspected

public health emergencies and events, event-based surveillance is now part of IDSR and the IHR.

Monitoring and evaluating the functional core capacity for implementation of IHR (2005)

Following the Ebola outbreak experience in 2015, several IHR 2005 review committees and various expert panels have recommended the use of other tools to monitor and evaluate IHR (2005) implementation, to complement its annual monitoring. Consequently, since 2016, WHO Member States and partners have adopted the combined approach to the IHR (2005) monitoring and evaluation process. The four components of the IHR (2005) monitoring and evaluation framework (MEF) are:

a) Mandatory annual reporting to the World Health Assembly

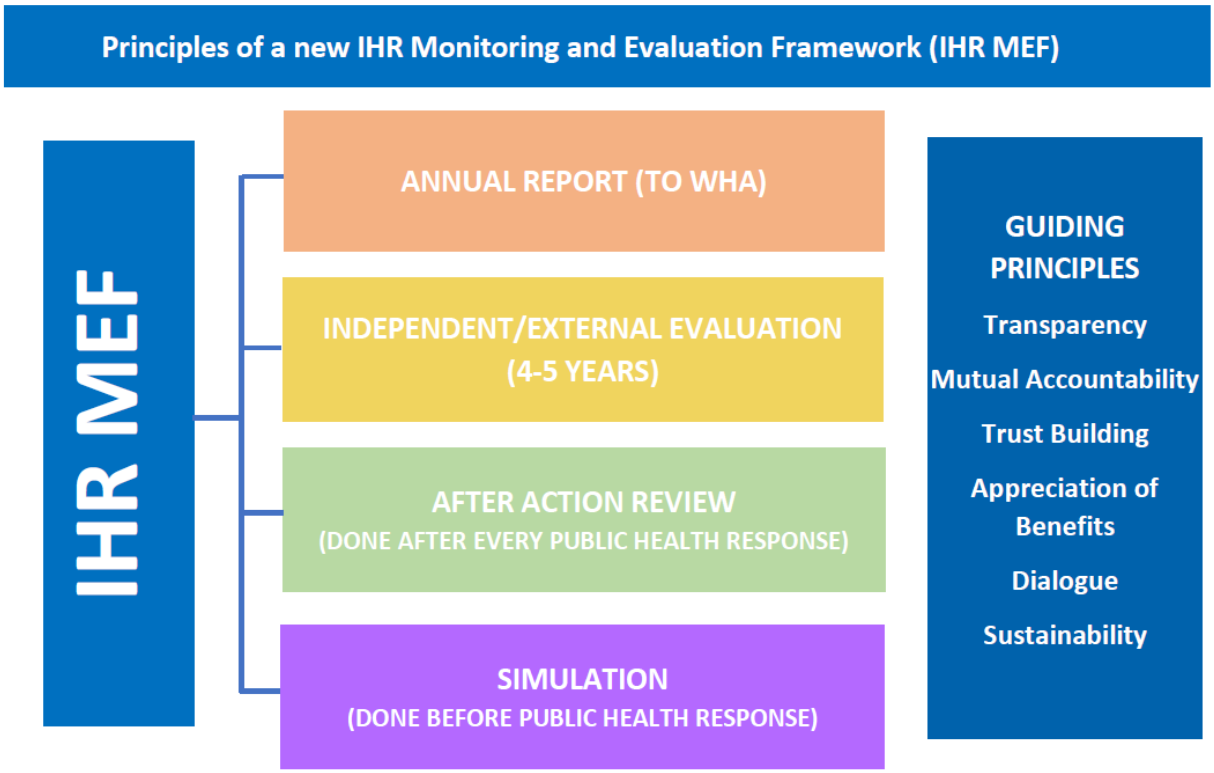
b) Joint External Evaluation (JEE)

c) After Action Review (AAR)

d) Simulation Exercises (SimEx)

The four components highlight a more functional approach to assessing IHR (2005) capacities and foster transparency and mutual accountability. This is illustrated in Figure 4 below.

Figure 4: IHR Monitoring and Evaluation Framework



One Health and IDSR

One Health is an approach to address a shared health threat at the human-animal-environment interface, based on collaboration, communication and coordination across all relevant sectors and disciplines, with the ultimate goal of achieving optimal health outcomes for humans and animals alike. The One Health approach applies to the local, county, national, and global levels. Humans and animals (domestic and wildlife) share the same eco-system and opportunities for spillover of diseases are increasing with modern trends in globalization, growing population pressures, climate change, economic development, mass urbanization and increasing demand for animal-sourced foods.

The One Health approach is intrinsic to and strongly reinforced by WHO's IHR (2005) and the IDSR strategy, as well as other global health frameworks. It is meant to improve indicator- and event-based surveillance, which is the cornerstone of the early warning function of the IDSR. Animal and human health workers as well as other relevant partners should be engaged at various levels, as information sources for IDSR, to further facilitate information sharing and joint rapid response activities. The One Health approach offers a comprehensive framework for IHR (2005) implementation and helps to address PHEIC of all sources. The key principles of the One Health approach include prevention and control of emerging infectious diseases (reference to IHR 2005 and the World Organization for Animal Health (OIE) international standards), and support for national public health services, building on existing structures.

The One Health approach principle also considers the role of changing environments, with regard to infectious and chronic disease risks affecting humans and animals. By utilizing data, expertise and management approaches in the environment, environmental health practitioners can assist in enhancing the understanding of the root causes of diseases, and better account for the complexity of environmental factors.

A strong functional IDSR thus requires improved communication, coordination and collaboration from all sectors, for the implementation of an effective One Health framework.

Governance and One Health Coordination Platform in Liberia

The One Health Coordination Platform (OHCP) of Liberia was established in June 2017 under the Office of the Vice President (VP). In October 2017, the first One Health Steering Committee (OHSC) meeting took place and was chaired by the Liberian VP. The event concluded with the signing of the communique by the Vice-President. It was also endorsed by MOH, MOA, Ministry of Commerce and Industry (MOCI), Forest Development Authority (FDA), Environment Protection Agency (EPA), National Disaster Management Agency (NDMA) (formerly under the Ministry of Internal Affairs) and NPHIL included funding the OHCP and designate OHCP secretariat members. The final structure of Liberia's OHCP

(Figure 5) was developed and provided Terms of Reference (ToR) approved by relevant authorities. Following its inaugural OHSC meeting, the OHCP developed governance documents and an annual work plan. Regular meetings of the five One Health Technical Working Groups (TWGs) were instituted under the guidance of designated chairpersons. National action plans and guidelines were developed under the Platform to reduce public health threats in Liberia.

In June 2018, following a change in the national political administration, the second OHSC meeting, also headed by the Liberian VP, concluded with the launch of three documents: (1) OHCP Governance Manual, (2) Joint National Action Plan for Health Security, and (3) National Action Plan on Prevention and Containment of Antimicrobial Resistance.

A national multisectoral coordinating group (NMCG) for multi-hazard and zoonotic diseases exists under the OHSC platform; this is headed by the VP's office with multiple ministries actively contributed to the platform (see Governance section for details). The One Health Technical Committee is buttressed by five TWGs; the TWGs meet on a regular basis and feeds back to the One Health Technical Committee on a quarterly basis. The AMR focal person leads the AMR TWG (see Figure 6). It is a strength that the OHCP has been established; it benefits from political support, is accountable to the government through its structure, has a secretariat, is supported by technical experts and has dedicated funding.

The county level One Health Platform has been established in all the 15 counties of Liberia, though with different members, based on the available stakeholders in each county (figure 5).

Figure 5: One Health Coordinating Platform Organigram in Liberia

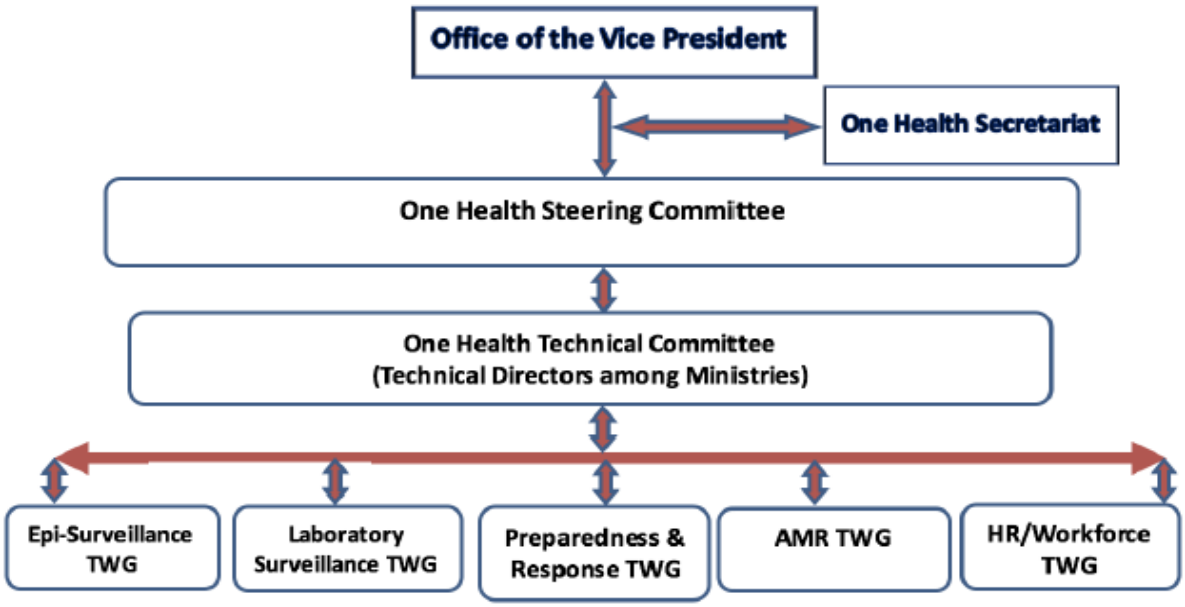
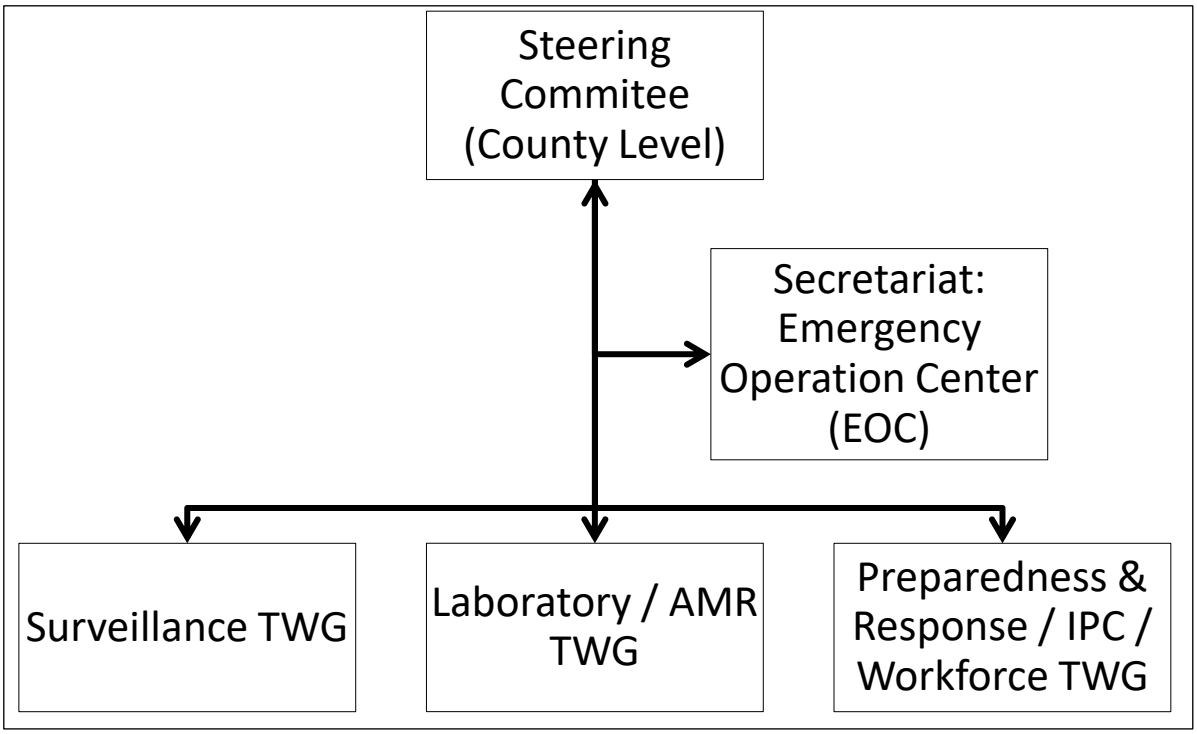


Figure 6: A guide to county level One Health structure



IDSR and Disaster Risk Management

Disaster is defined as the serious disruption of the functioning of a community or society, causing widespread human, material, economic or environmental losses, exceeding the ability of the affected community or society to cope, using its own resources. At its sixty-

second session held in November 2012 in Luanda, the county Committee for Africa adopted a paper entitled “Disaster risk management: a strategy for the health sector in the African Region”, in an effort to adopt a comprehensive approach to tackling DRM.

DRM is defined as the systematic process of using administrative and organizational directives, operational skills and capacities to implement strategies, policies and improved coping capacities, thereby lessening the adverse impact of hazards and possibility of disaster. In DRM, a hazard analysis is conducted, followed by an assessment of the level of vulnerability and available coping capacity. The ultimate objective of DRM is to lower risk by reducing vulnerability or improving the capacity to mitigate the impact of a hazard. IDSR is an important tool in the DRM, as it provides early warning information, which is crucial for risk assessment and ultimately, risk reduction. IDSR assists in identification of hazards, assessment, risk communication and monitoring of disaster risks, thereby enhancing the early warning component.

Implementing cross-border activities in the context of IDSR

Given the ecological distribution of communicable diseases and the porosity of international borders, it is imperative that countries in the region work together to control and contain the spread of these diseases. The free movement of people and goods across the region’s borders provides opportunities for cross-border spread of diseases. In addition, at urban centers located at border points, a disaster on one side of the border can easily affect the health of a large number of people on both sides of the border. It is therefore logical that countries in the region would coordinate and synchronize interventions, in an effort to control the spread of communicable diseases. Developing a cross-border framework will therefore provide an opportunity for countries to initiate and boost priority cross-border activities for disease control, including, but not limited to, disease surveillance, epidemic preparedness and outbreak control, as well as building core capacities to ensure compliance with IHR (2005).

a) Countries, in collaboration with WHO, should establish a cross-border surveillance and response framework with neighboring countries, using the existing IDSR systems in the respective countries.

b) Countries should establish procedures for data sharing within the framework of IDSR.

c) When outbreaks are detected through the IDSR system, the neighboring cross-border areas and districts should be notified, using the IDSR reporting tools. If they are reporting a similar outbreak, coordinate response efforts with the IDSR response structures as described in Sections 4, 5 and 6 of the third edition of the IDSR Technical Guidelines.

d) Ensure cross-border (district-district) coordination and collaboration on surveillance issues and provide notification of any outbreaks in the neighboring district. International or cross- border notification should also be given if needed.

e) Develop and organize SimExs with cross-border district teams.

f) Organize regular cross-border meetings.

g) Political leaders should assist districts to facilitate cross-border district surveillance and response initiatives.

e-IDSR as a platform for enhancing real time surveillance

The application of e-tools in the health sector has the potential to provide real-time validated data for public health surveillance, investigation and prompt outbreak response. eIDSR provides new opportunities for accelerating the achievement of the IHR (2005) core capacities. E-IDSR is the application of electronic tools to the principles of IDSR, to facilitate prevention, prediction, detection, reporting and response. It is based on:

a) standardized interoperable and interconnected information systems administered within the national context;

b) rapid collection, analysis, reporting and use of disease/events data in real-time for appropriate public health action.

While paper-based tools can also provide timely information, countries should aim to have electronic tools to facilitate timely data transmission and response to public health threats. Countries implement e-IDSR to:

a) fulfil the county committee recommendations on use of information technology, which is core to the achievement of IHR (2005) requirements by countries;

b) assist in standardization of data;

c) assist in improving timeliness and completeness of reporting;

d) assist in early detection, investigation, and response to outbreak or public health events;

e) reduce manual data entry, as it is prone to errors;

f) ensure systematic information sharing across levels and sectors;

g) enable better data transmission and management including data storage and easy access;

h) enhance virtual, near real-time disease monitoring capability;

i) improve data quality;

j) reduce system costs and easily generate automated alerts.

Description of surveillance functions in the context of IDSR

The guidelines assume that all levels of the health system are involved in conducting surveillance activities for detecting and responding to priority diseases, conditions and

events (even though the different levels do not perform identical functions). These activities include the following core functions:

Step 1—Identify and record cases, conditions and events. SCD is used for health service delivery points (human, animal and environment); simplified case definition is used at the community level to identify priority diseases, conditions, and alerts that may signal emerging public health events. Additionally, case identification can be done through other health service delivery points (animal and environment) using the formal health system, private health systems or community structures. Case definitions and a functioning alert and verification system are vital for detecting cases and outbreaks. After identification, all alerts, including true events, must be recorded in a recognized register, such as the line list register.

Step 2—Report suspected cases, conditions or events to the next level for action. If this is an epidemic-prone disease, a potential PHEIC or a disease targeted for elimination or eradication, respond immediately by investigating the case or event, collecting the necessary diagnostic sample, and submitting a detailed report. For events to be notified under IHR to WHO, the NFP is required to use the decision instrument (Annex 2 A of IHR) to identify any potential PHEIC.

Step 3—Analyze (person, place and time) and interpret findings. Surveillance data should be compiled, analyzed for trends, compared with data from previous periods and interpreted for use in public health actions.

Step 4—Investigate and confirm suspected cases, outbreaks or events. Case/outbreak confirmation involves the epidemiological investigation of suspected cases and capacity of the laboratory to make confirmation. Take action to ensure that the case and contacts, and the outbreak or event are investigated, and laboratory confirmed. The capacity for case confirmation is enhanced through improved referral systems, networking and partnerships. Gather evidence about what may have caused the outbreak or event, by including non-human (animals - domestic and wildlife), and environmental sources of information, and using this to select appropriate control and prevention strategies. Social, gender and behavioral factors should also be collected and used to produce locally appropriate responses and risk communication.

Step 5—Prepare. Preparedness refers to the availability of public health emergency preparedness and response (EPR) plans, including stockpiling (vaccines, drugs and laboratory reagents), designation of isolation facilities, setting aside resources for outbreak response, and training of relevant personnel. Take steps in advance of occurrence of outbreaks or public health events, to prepare teams to respond quickly, and set aside essential supplies and equipment to be used for immediate action. Ensure that a mechanism for coordinating response measures is set even before an outbreak occurs. Establishing pre-positioned 'outbreak response contracts and memorandums of understanding between

United Nations (UN) agencies and non-governmental organizations (NGOs) or civil society speeds up the process of sending logistical support to the lowest level for action. Use historical data from human health and other relevant sectors (such as meteorological, animal and environment) to assess vulnerabilities and risks to the population. The risk analysis can also be conducted through prediction models.

Step 6—Respond. When an outbreak, acute public health event or condition is detected, an investigation should take place to determine the cause of the problem, identify gaps and vulnerabilities, coordinate and mobilize resources and personnel to implement the appropriate public health response. The results of the investigation should guide the response. If needed, at national level, a public health emergency operations center (PHEOC) or similar coordination mechanism should be activated under the leadership of a government official with decision-making authority. At the subnational level, a similar coordination mechanism should be activated for response. A spokesperson should be identified, and a risk communication plan and coordination platform set up for all relevant communication stakeholders. Meet with community political and religious leaders and elders to ensure adequate community engagement for successful responses.

Step 7—Risk communication. Risk communication is an essential element for all surveillance systems, as well as for disaster and EPR. It is the real-time exchange of information, advice and opinions between experts, community leaders, or officials and people who are at risk. Encourage future cooperation by communicating with all levels, including communities that provided data and reported outbreaks, cases and events about the investigation outcome and success of response efforts. Acknowledge reporting by communities.

Step 8—Monitor, evaluate, supervise and provide feedback to improve the surveillance system. Assess the effectiveness of the surveillance and response systems, in terms of timeliness, quality of information, preparedness, (thresholds, case management) and overall performance. Provide feedback to reinforce health workers' efforts to participate in the surveillance system. Take action to correct problems and make improvements. Different evaluation procedures such as AAR, JEE, SimExs, and operational review may be used. Community representatives, the private sector and NGOs should be included in these evaluation activities.

Different levels where surveillance activities are performed

The levels are defined as follows:

Community—Represented by basic community-level services such as trained birth attendants, community or village health agents, or similar care providers, village or

community leaders (religious, traditional or political) or school teachers, health extension workers, locally identified CBS volunteers, veterinarians, chemical sellers and traditional healers.

Health facility—For surveillance purposes, all institutions (public, private, NGOs or faith-based organizations (FBO)) with outpatient and/or inpatient facilities are defined as a health facility.

District—Liberia has two intermediate levels, (district and the county). The district level is an intermediate administrative unit that generally serves a population of 35,000 to 175,000.

County—The county level is an intermediate administrative unit that generally serves a population of 150,000 to 300,000.

National level—In Liberia, the central level is where policies are set, and resources allocated. In relation to surveillance, this level reports on priority diseases and uses the IHR decision instrument in Annex 2A to report to WHO, all PHEIC.

In an integrated system, some laboratory services are available at each level described above. A description of laboratory functions by level is in Annex 5D. These guidelines focus on improving surveillance for all service delivery points (public and private).

How district and county can strengthen surveillance and response

Most countries have assessed their surveillance systems using the standard protocol for evaluating the surveillance system developed by WHO AFRO (Protocol for the Assessment of National Communicable Disease Surveillance and Response Systems WHO/CDS/CSR/ISR/2001.2).

District and county can also use a matrix of IDSR functions and skills to describe their role in the surveillance system. Such a matrix describes a complete system in which all the skills and activities are in place. Each level supports activities at other levels and reinforces the opportunity for successful decision-making at corresponding levels and functions. In an IDSR system under development, the matrix provides a systematic framework for improving and strengthening the system.

Practical uses of the IDSR matrix include:

a) Ensuring that all necessary functions and capacities have been identified
b) Establishing accountability to provide a basis for assigning functions to appropriate levels and determining what capacities should be present
c) Organizing activities and training for human resource development
d) Managing, monitoring and evaluating programs

e) Strengthening district laboratory capacity, including laboratory information system

f) Planning for resources (human, material/supplies and financial).

The IDSR matrix also illustrates several key assumptions that need to occur for the core functions of the surveillance system. If one or more of the elements at each level is not present or is being performed poorly, the risk of failure increases for the achievement of surveillance and control objectives. An effective system will be supported at each level from the levels above and below. A complete system minimizes delay in taking public health actions.

The functions of detection, reporting, analysis, investigation, response, risk communication, monitoring and evaluation and providing feedback are interdependent and should always be linked. The IDSR flow of information in Annex 1B, defines the surveillance functions and how they are achieved at each level of the health system including the role of WHO in relation to IDSR core functions.

Efforts by WHO in the African Region to strengthen IDSR

WHO AFRO provides technical support for implementation of surveillance and response at every level of the health system, including:

a) The development of comprehensive technical guidelines for each level.

b) A protocol for adapting the guidelines to every level within each country.

c) Training of human resources involved in surveillance and response system.

d) Advocacy for resources and resource mobilization.

e) Coordinating the monitoring, detection and control of diseases, conditions and events, epidemics and public health emergencies across countries.

f) Sharing public health information and promoting documentation of best practices.

Contents of the IDSR guidelines

Key people and entities that will use these guidelines

The previous edition of the guidelines has been revised in order to incorporate lessons learnt from previous epidemics, new frameworks or strategies, such as the country strategy for health security and emergencies, the revised IHR MEF, the initiatives for enhancing prevention, detection and response to public health events (Global Health Security Agenda (GHSA), One Health, DRM), key country strategies and rising non-communicable disease threats and road traffic injuries in the context of development of resilient health systems. The revised guidelines also aim to address implementation of the IHR (2005) requirements

and capacities for surveillance and response. These guidelines were adapted to reflect national priorities, policies and public health structures, and used in conjunction with other similar guidelines/strategies or initiatives. Overall, the revised guidelines incorporate the following:

a) Strengthening IBS with better analysis, reporting and use of routine data for decision making.
b) Strengthening event-based surveillance.
c) Improving CBS.
d) Improving cross-border surveillance and response.
e) Scaling up e-IDSR implementation.
f) Improving reporting and information sharing platforms.
g) Sharing improved data between sectors using one health approach.
h) Tailoring IDSR to emergency or fragile health system contexts.

The guidelines are intended for use as:

a) A general reference for surveillance activities across all levels.
b) A set of definitions for thresholds that trigger some action for responding to specific diseases or conditions.
c) A stand-alone reference for level-specific guidelines.
d) A resource for developing training, supervision and evaluation of surveillance activities.
e) A guide for improving early detection and preparedness for outbreak response.

These guidelines are to be used by HCWs at the Primary Health Care level (public and private), where illness is presented for the first time.

Additionally, these guidelines will be used by:

a) Disease surveillance officers at all levels
b) IHR NFPs
c) Health authority at PoE
d) Hospital managers, clinicians and infection prevention control officers
e) National laboratory directors
f) Veterinary and wildlife health officers
g) Environmental health officers and sanitarians
h) District health management teams
i) Physician Assistant/clinical officers
j) Public health staff
k) Medical doctors
l) Nurses
m) Pharmacists
n) Health facility Officer in Charge (OIC)

o) Medical and nursing educators
p) Other health educators
q) Communication officers
r) Logisticians
s) Laboratory personnel
t) Community leaders, and district/county political officers
u) Other public health experts and practitioners in specialized institutions
v) Public health training institutions
w) Other health partners including NGOs
x) Other line ministries

Priority diseases, conditions and events included in the IDSR

The WHO County Office for Africa suggests the following communicable and non-communicable diseases and conditions or events as priorities for integrated disease surveillance in the African Region. The diseases or conditions are recommended because they are:

a) required internationally under IHR (for example, smallpox, poliomyelitis due to wild-type poliovirus, human influenza caused by a new subtype, Severe Acute Respiratory Syndrome (SARS);

b) diseases with highly epidemic potential to cause serious public health impact due to their ability to spread rapidly internationally (for example, cholera, plague, yellow fever, viral hemorrhagic fever (VHF));

c) principal causes of morbidity and mortality due to communicable diseases and conditions in the African Region (for example, malaria, pneumonia, diarrheal diseases, tuberculosis, Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS), maternal deaths and injuries);

d) priority non-communicable diseases or conditions in the region (high blood pressure, diabetes mellitus, mental health and malnutrition).

Effective control and prevention interventions are available for addressing the public health problems they pose (for example onchocerciasis, trypanosomiasis). Intervention programs supported by WHO for prevention and control, eradication or elimination of the diseases exist. These include the Expanded Program on Immunization (EPI), the Integrated Management of Neonatal and Childhood Illness.

These IDSR priority diseases, conditions and events call for special reporting requirements, which are different from other routine reporting mechanisms for other diseases. Section 2, on reporting priority diseases, conditions and events, sheds more light on how to report priority diseases and conditions.

The list of priority diseases and public health events may vary from country to country depending on the local epidemiological situation, needs of the health system, and resources available. The list of priority public health events to be reported by healthcare facilities should be established by a group of relevant stakeholders from and related to the National Health Surveillance System. Countries are encouraged to keep the list as short as possible to ensure that adequate resources are available to carry out a response, and the list is manageable by the system.

WHO has developed a guide to assist countries in the adaptation of these technical guidelines, which should be used to assist in the selection of priority diseases. Table 1 below shows the list of priority diseases and conditions under IDSR in Liberia.

Table 1: Priority diseases, conditions and events, Liberia 2021

Immediately reportable epidemic prone diseases/conditions and events	Diseases or events of international concern that are notifiable under IHR 2005	Monthly reportable diseases or conditions of public health importance
Acute Bloody Diarrhea (*Shigella*) Acute Flaccid Paralysis (AFP) Burili ulcer Cholera (Severe Acute Watery Diarrhea (SAWD) Coronavirus Disease (COVID-19) Dengue fever Human Rabies Lassa Fever Maternal Deaths Measles Meningitis[1] Monkeypox Neonatal Deaths Neonatal Tetanus Tuberculosis Viral Hemorrhagic Fevers (including Ebola Virus Disease and Marburg Virus Disease) Yaws Yellow Fever Unexplained cluster of health events Unexplained cluster of deaths Adverse Events Following Immunization (AEFI)*	Guinea Worm (Dracunculiasis) Human Influenza (due to a new subtype) Severe Acute Respiratory Syndrome (SARS) Smallpox Other PHEIC include: infectious, zoonotic, food borne, chemical, radio nuclear, or due to unknown condition	Acute Watery Diarrhea Acute Viral Hepatitis Cataract Diabetes Diarrhea with dehydration in <5 years Encephalitis Epilepsy HIV/AIDS (new cases) Hypertension Hookworm Injuries (Road Traffic Accidents (RTAs), domestic violence) Malaria Malnutrition < 5 years Mental Health Onchocerciasis Pertussis (Whooping cough) Severe Pneumonia <5 years Schistosomiasis Sexual Assault Sexually Transmissible Infections (STIs) Trachoma Trypanosomiasis Tuberculosis Typhoid Refer to Health Management Information Systems monthly reporting tools (DHIS2)

Note: Disease specific summary pages are available in section 11 of this guide.

[1] Includes *Haemophilus influenzae* type b (Hib), *Neisseria meningitidis*, and *Streptococcus pneumoniae*)

Organization of the IDSR guidelines

The IDSR Technical Guidelines presents a comprehensive vision of a disease surveillance and response system. In the IDSR, all levels of the health system are involved in surveillance activities for responding to priority diseases and conditions. The sections in the guidelines are organized according to these core activities:

Section 1	Identify and record cases of priority diseases, conditions and events
Section 2	Report priority diseases, conditions and events
Section 3	Analyze and interpret data
Section 4	Investigate suspected outbreaks, and other public health events
Section 5	Prepare to respond to outbreaks and other public health events
Section 6	Respond to outbreaks and public health events
Section 7	Risk communication
Section 8	Monitor, evaluate, supervise and provide feedback to improve surveillance and response
Section 9	Electronic Integrated Disease Surveillance and Response (eIDSR)
Section 10	Tailoring IDSR to emergency or fragile health system contexts
Section 11	Summary guidelines for specific priority diseases and conditions

Each section has annexes which reference key functions highlighted in the guidelines. Each section is relevant for all levels of the health system and provides a perspective on how countries can carry out each function to attain the required level of surveillance and response. Furthermore, a section on eIDSR has been included to summarize and guide countries as they embark on establishing their eIDSR system.

1 Section 1: Identify and record cases of priority diseases, conditions and events

This section describes:

- Detection of priority diseases, conditions and events
- Use of SCDs for detection of priority diseases, conditions and events of public health concern
- The one health approach in identification of events
- IBS and EBS approaches used to detect disease, conditions and events
- Establishing EBS and using this approach for alerts detection, triaging and verification to detect public health events
- The role of CBS in IDSR
- Update procedures for surveillance and response
- The role of laboratory in surveillance and response

1.1 Detection of priority diseases, conditions and events

Health workers (human, animal, and environmental) conduct surveillance activities at all levels of the health system (public and private) so they can detect and respond to public health events of concern to their communities.

Community members also play an important role in surveillance by facilitating early detection and action to priority diseases, conditions and events. Community members should be oriented in surveillance so that they actively participate in detecting, reporting, responding to and monitoring health events related to humans or animals in their catchment area.

Various public health events and or risks may also occur at PoE; and these health events can be recognized before, during or after travel, often when travelers have already left the PoE. Staff at PoE must be vigilant in ensuring that these events are identified and reported on time to facilitate response.

Surveillance priorities may be communicable and non-communicable diseases, conditions or events that include national or local priorities such as acute outbreaks and deaths or events associated with human and/or animal health events which might have direct consequences to human health. An essential function of a public health surveillance system is to be vigilant in its capacity to detect not only known public health threats with established case definitions and formal reporting channels but also events or hazards that

are not specifically included in the formal reporting system. These may be events such as clusters of disease patterns or rumors of unexplained deaths.

These diseases, conditions and events may come to the attention of the health system in several ways. For example:

a) A person falls ill and seeks treatment from a health facility.

b) High rate of hospital admission for the same diseases or symptoms.

c) Community members report unusual events or occurrences at local levels such as a cluster of deaths or unusual disease pattern to the health facility, or perhaps a school might report unusual absences due to similar signs and symptoms such as an influenza-like illness (ILI).

d) Health staff who conduct routine record reviews to find cases for a specific disease observe that cases of another priority disease have not been reported. For example, an officer who normally reviews the clinic register for cases of AFP also sees that a case of cholera has also recently been recorded in the clinic register.

e) Health staff conduct routine record reviews of the laboratory register and observe recorded confirmed cases of priority diseases such as yellow fever or cholera.

f) Radio, television, newspapers, or social media (WhatsApp, Facebook, etc.) report a rumor of rare or unexplained events in the area with potential exposure for humans.

g) Vital events records show an increase in maternal deaths.

h) Unusual reports of illness among HCWs.

i) During analysis of the routine reports from all the facilities in the area, the district officer notices that other health facilities in the catchment area have also reported adult deaths due to bloody diarrhea which might signify that there might be an outbreak of *Bacillary dysenteriae* or *Escherichia coli.*

j) An unusual death or number of deaths among animals, such as livestock, birds or rodent species, or an unusually high number of sick animals presenting the same signs.

k) Environmental officers observed during assessment of water bodies, contamination which might be due to chemicals like lead, or due to other related chemicals due to mining activities, which might be an early trigger for public health interventions.

1.2 Indicator-Based Surveillance (IBS) and Event-Based Surveillance (EBS) approaches used to detect diseases, conditions, and events.

a) The IDSR strategy uses both IBS and EBS approaches to detect diseases, conditions, and events.

b) As part of efforts to increase the sensitivity of the surveillance system, there is already

an EBS system alongside the IBS at all levels of the health system, that is, at the national, regional/provincial, district, health facility and community levels

c) The IBS involves the use of SCDs to identify diseases, conditions, and events, whilst EBS uses alerts detection, triaging and verification to detect events

d) In contrast with case definitions that are narrow and disease-specific, EBS requires the detection and immediate reporting of alerts, which are broad and indicate the possibility of a serious public health event. Alerts that are verified are classified as events.

e) IBS and EBS are an integral component of the routine IDSR activities of the surveillance staff.

f) Both IBS and EBS should use existing resources and infrastructure set aside for routine IDSR strategy.

1.3 Use standard case definitions

A SCDs is an agreed-upon set of criteria used to decide if a person has a disease or condition. The definition specifies clinical criteria and limitations on time, place and person.

Why do we need standard case definitions?

a) To help decide if a person has a disease or condition or event, or to exclude other potential disease diagnoses.

b) To ensure that every case is diagnosed in the same way, regardless of where or when it occurred, or who identified it.

c) To initiate action for reporting and investigating quickly if the clinical diagnosis takes longer to confirm.

d) To compare the number of cases of the diseases, conditions or events that occurred in one time or place with the number occurring in another time or place.

Using the same case definition nationally allows the public health surveillance system to track priority diseases, conditions or events; and use thresholds for public health actions. When healthcare facilities and districts use different case definitions, tracking the trend of a disease, condition or event is very difficult. Urgent action, such as investigating the cause of the change in the trend is not possible. Health workers who analyze the data that has been provided using one definition will not know if the trends from another catchment area, which may have used a different case definition, are due to similar or different causes.

In describing SCDs, for health facility level, a three-tiered classification system is normally used – Suspected, Probable, Confirmed:

a) **Suspected case:** indicative clinical picture, that is, patient will have fewer or atypical clinical features without being a confirmed or a probable case.

b) **Probable case:** clear clinical picture (meets the clinical case definition) that is, patient will have typical clinical features of the illness or is linked epidemiologically to a confirmed case, but a laboratory sample cannot be taken because the case is lost or dead or a sample has been taken but was not available for laboratory testing or was not viable or sufficient for laboratory testing.

c) **Confirmed case:** a suspected case that is confirmed by laboratory analysis. The classification might vary according to the epidemiology of the individual diseases.

In all outbreak scenarios, a more sensitive case definition to identify all suspected cases should always be used. Identification of cases in these scenarios will use the Syndromic surveillance approach where case detection will be based on clinical features without any laboratory diagnosis (See Introduction chapter for the description of Syndromic surveillance). If in the middle of an outbreak, the cause of the agent has been established, cases may continue to be classified as either suspected cases or confirmed cases. An additional tier classification, that is, "*Probable case definition*", may be added if officials feel that conducting laboratory tests on every patient with a consistent clinical picture and a history of exposure (for example, measles) is unnecessary.

Case definitions at the community level are usually simplified and are used to facilitate rapid detection of priority diseases, events and conditions or other hazards in the community. Case definitions at this level use key signs and symptoms to help the community to recognize when they should refer a person with these signs and symptoms for treatment and notify the health facility.

The case definitions for the priority diseases and conditions that are reported for IDSR in Liberia are listed in Annex 4.For the community level and land border PoE a simplified version of the agreed case definitions is used. These are called alert triggers and are also shown in Annex 4.

All cases (suspected, probable and confirmed) should always be recorded in a recognized facility register or logbook, and the IDSR reporting forms.

IHR (2005) requirements in identification of cases

Using SCDs is important in implementing IHR (2005). At all levels, health workers should be aware of case definitions of priority diseases or events that may concern not only the local community but also have the potential for spread across geographic boundaries. The process of notifying the WHO of events under the IHR (2005) involves the use of the "IHR

Decision instrument" as well as the case definition, laboratory confirmation, data analysis, interpretation of the findings and reporting.

The IHR Decision Instrument is included in Annex 2A. The National IHR Focal Point is an office located within the Division of Infectious Disease and Epidemiology (DIDE) of the NPHIL. This is the only office that can notify WHO of an event that may constitute a PHEIC using the decision instrument.

1.3.1 One Health approach in identification of events

One Health aims at applying a holistic approach in jointly detecting events and conducting risk assessment in responding to possible public health events occurring at the human-animal-environment interface. Detection of events under the One Health approach thus requires all levels from community, district, and region to national to strengthen collaboration across sectors, and jointly share responsibility of detecting events which might have an impact on the health of humans, and their shared environment.

Examples of the One Health approach include detection of a rabid animal or reports of animal illness from the veterinary sector, which can facilitate investigations of human cases of disease or reports of human diseases which can be traced through exposure to chemical hazards within the environment.

Detection of events at PoE also requires a One Health approach and this requires involvement of all relevant sectors such as ministries responsible for health, agriculture, livestock, environment, immigration, and defense.

All events detected should be shared with relevant sectors as part of the One Health approach.

1.3.2 Distribute standard case definitions and registers to health facilities

Make sure that health facility personnel at all levels including PoE(s) know and have available SCDs (including those for reporting unusual events, disease patterns, or unexplained deaths) specified by the national level.

National level has prepared and disseminated case definitions for diseases under surveillance in the form of a poster or as a booklet. These tools reinforce the use of SCDs for detecting and reporting priority diseases, conditions and events.

Ensure that health facility personnel know the process for recording and reporting, including reporting sites. Also ensure that health facilities record rumors. The registers, which are normally used in most countries, are the Outpatient Department (OPD) or Inpatient

Department (IPD) registers. Surveillance officers should always liaise with the registrar / record room staff to extract the priority disease of IDSR from the register.

Proposed case definitions based on established disease-specific programmes are in Annex 4.

1.3.3 Distribute community level case definitions using key signs and symptoms

Provide information to community health workers (CHWs), traditional healers, birth attendants and community leaders on how to recognize and report priority diseases, conditions or events to the health facility. The case definitions for community level should be simpler than those used in health facilities. These simplified case definitions are referred to as community alert / triggers. A list of examples of case definitions for use at the community level is in Annex 7K.

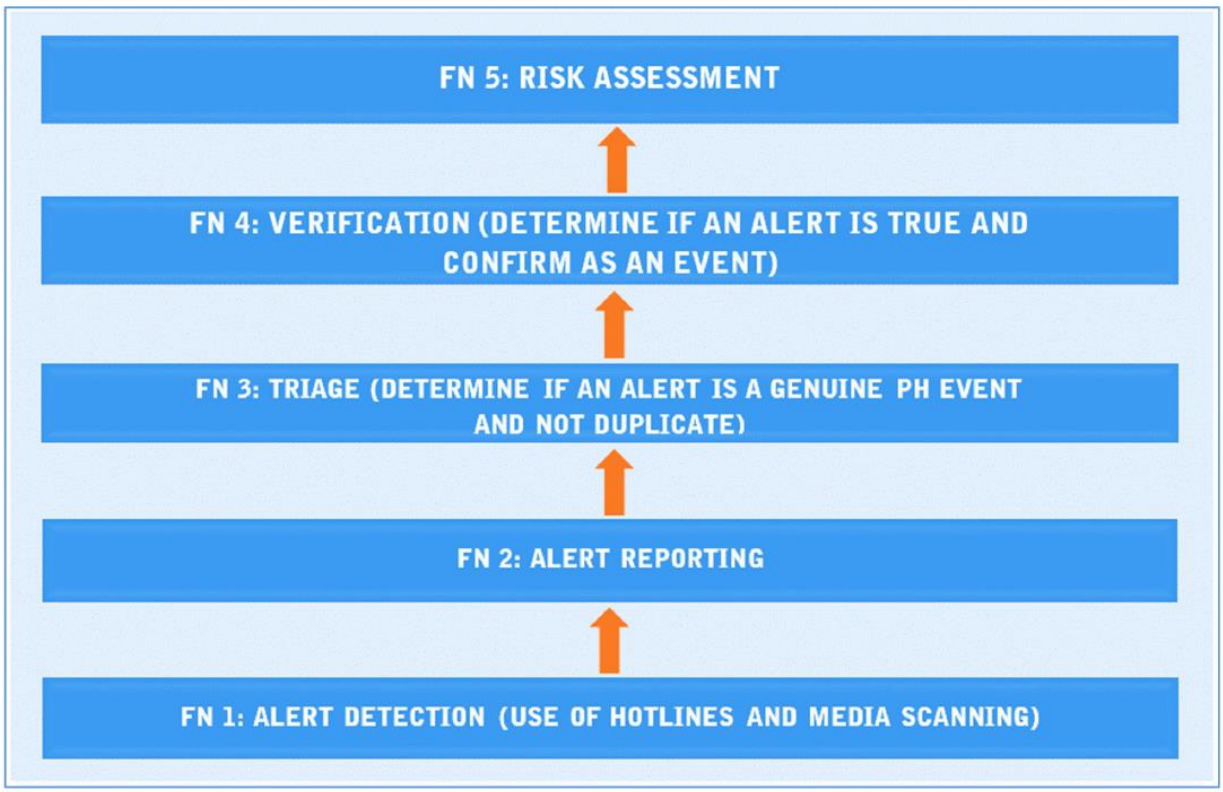
At the same time, emphasize the need to refer people with the suspected disease or condition for treatment. Provide them with procedures for reporting, including when and where to report; and ensure provision of necessary tools. Design simple community alert forms reporting events and tools (see Annex 9A) to enable them to refer a suspected case and show them how to fill information and those who are non-literate develop mechanisms of capturing information of events from them. Think of mechanisms like identifying someone from the family member who can assist with actual writing. Also, provide information to the community on priority diseases, using posters, newsletters and announcements during meetings. Provide feedback methods and how timely information will be made available to the community, considering that this will encourage community members to participate in surveillance and response activities and also to understand the people in their community and changes in their health.

1.4 Event Based Surveillance (EBS)

1.4.1 Establishing an EBS system

An EBS system should be established at all levels of the health system alongside the IBS system. The establishment of EBS involves taking into consideration the functions of EBS as illustrated in figure 7.

Figure 7: Functions of EBS at all levels of the health system



The following steps are followed in establishing and monitoring an EBS system:

- Step 1: Establish EBS Hotlines and Media Scanning for Alert Detection
- Step 2: Alerts Detection
- Step 3: Registration of EBS Alerts
- Step 4: Conduct triaging of EBS alerts
- Step 5: Conduct Verification of EBS Alerts
- Step 6: Conduct risk assessment and characterization

The steps for establishing EBS at the national, county, district and health facility levels are described in Annex 5A.

1.4.2 The role of Event Based Surveillance in detection of events

EBS is the organized and rapid collection of information of events that are potential risk to public health. EBS is an active process of community participation in detecting, reporting, responding to and monitoring health events. EBS encourages the creation of a sense of responsibility, urgency and ownership to ensure maximum coordination and cooperation at the community level. The goal is to use it at the community level for early detection and action to priority diseases, conditions and events. This is done through identifying and acting on community alerts of possible suspect cases. Further details are provided in Annex 5.

EBS is the foundation of IDSR. The engagement and participation of the community in surveillance ensures additional sources of information are engaged and linked to IDSR. This includes routine detection and reporting the occurrence of all suspected cases of priority diseases and events of public health concern as well as actively finding suspect cases in the community through household visits and rumor investigations. Increased surveillance may be required among certain groups of people including HCWs, school children, animal health workers and travelers coming from countries affected by a disease outbreak, communities along the borders, mobile fishing communities, palm plantation workers, motor bike riders and any vulnerable populations. Epidemic prone diseases and conditions within the IDSR system are listed in Annex 4 along with standard and community case definitions.

1.4.3 Alert Triggers for Event Based Surveillance

At the community level the case definitions are simplified to be a more practical guide for Community Health Assistant (CHAs)/Community Health Volunteers (CHVs), POE staff, and community members on how to recognize epidemic prone diseases, conditions or events. These simplified case definitions are referred to as community alert triggers. The Community Trigger and Referral form for reporting these alert triggers is in Annex 9K.

When any member of the community sees signs and symptoms of priority diseases, or notice unusual deaths or groups of illness, they are seeing alert triggers. These signs, symptoms and events are called alert triggers because when they are identified, action must be taken.

A CBS system relies on the community members' capacity to identify and report public health problems to the nearest health facility. In this system, CHV/CHA/POE identifies and report events in the community that have public health significance. Community members report to the CHV/CHA. When an alert trigger is identified by a community member, the CHV/CHA should immediately report this to the Community Health Surveillance Supervisor (CHSS) or to the OIC at the Healthcare Facility (HCF), by telephone or in person. The CHV/CHA/POE should also complete the community trigger fererral form (Annex 9K.) and submit this to their supervisor. The suspected case should be referred to the nearest HCF so more information can be taken, and laboratory tests organized if necessary. It is critical that the alert triggers reported by the community are verified by either their supervisor, the OIC at the health facility or a surveillance focal point (SFP). Once the alert trigger is verified, it is reported to the District Surveillance Officer (DSO). The District Health Team (DHT) will determine what further action is necessary.

The roles and responsibilities at each level of the health system in the successful implementation and ongoing support of EBS and IDSR are part of the SOPs for EBS is in Annex 9K and provide details on all aspects of EBS.

1.5 Describe the catchment area and maintain updated information

1.5.1 Update description of the catchment area

At least annually, data about the catchment areas (health facilities, PoE, laboratories) should be regularly reviewed and updated for planning and reporting purposes. This activity should be part of the health planning at the district, regional and national levels. Make a description of the local population characteristics in the catchment area, what activities are happening, what risks should be accounted for, and what surveillance assets and gaps exist.

Risk mapping should extend to all public health hazards as specified by IHR 2005, including chemical, zoonotic, radiological and nuclear hazards. It is important to also include results from the risk mapping. WHO has developed an integrated risk profiling tool for assessment of public health threats, and this can be used within the broader framework of DRM. (Strategic Tool for Assessing Risk Star, WHO, Draft Version, 3.3.1, July 2017).

Examples of potential risks include sources of contaminated water, lack of urgent transportation to a referral facility for women in childbirth, or potential hazards such as inadequate safety precautions in mining or occupational sites or slums where there is a public health risk, especially during heavy rains or poor latrine coverage.

When updating data about the catchment area, you should have updated information about:

a) The size of key target populations at all levels such as number of children less than 5 years of age, school-aged children, women of childbearing age, all children and adults from ages 1 through 30, people living in refugee settlements, internal displaced persons settlement, youth out of school, etc.

b) Other risk factors including significant changes in land use, industrial development and other economic activities that can lead to social disruption or economic migration. Sources for this information may include the Department of Community Health Services, the EPI program, nutrition, Maternal Child Health (MCH), and Liberian Institute of statistics and Geo-Information Services (LISGIS).

c) Major public health activities in the area including public, private, and NGO, immunization activities, clean water projects, family planning clinics, feeding centers for

undernourished children, information related to risk factors for non-communicable diseases.

d) EBS activities and previous numbers and types of notifications. This information may show where any gaps in community surveillance may be.

e) Updating the number of reporting sites, and checking the details on record, in each catchment area of the district – including PoE for districts with an international border. This includes ensuring details of the contact persons listed for surveillance activities are still current.

A sample worksheet to create a listing of the reporting sites and surveillance contact person at each site is in Annex 5B.

In updating the district profile, you can use several methods among which is the creation of a forum with key health stakeholders at all levels, where there will be discussion on surveillance and response activities related to priority health events at the district level, and this can facilitate getting updates from stakeholders on various key areas in surveillance and response in which they are involved. This could be done through a monthly or quarterly meeting. Take the opportunity also to provide feedback about surveillance data which is reported from their institutions to the district. Involve officials from other relevant sectors in the forum to address health matters in a One Health approach.

Management of data in the catchment areas also involves managing the supply of data collection forms, reporting tools and guidelines to reporting sites in order for them to undertake effective surveillance. Check that reporting sites have an adequate supply of forms or other means for reporting surveillance data to the district (such as radio phones, mobile phones, or email connections). Include updates about forms and procedures for reporting, investigating and responding to public health events in quarterly district meetings with HCFs and other reporting sites.

Assess the feedback and supervision to HCWs at subnational levels since it is the single most important driver of reporting completeness and integrity. Supervision checklists are found in Annex 7Aof this guideline.

1.5.2 Update list of reporting sites and the names of surveillance officers in the district

Identify all the health facilities, PoE, and any other locations in the country including community focal points required to report surveillance data or events to the next level. Create relationships with private facilities and NGOs, including the faith-based sites in the country, and involve them in surveillance activities. In the event that there might be separate laboratory facilities (regional), these should be recorded as reporting sites.

Record (update as needed) health facility and PoE locations and names of staff who are responsible for surveillance activities. Also update the records for community focal points which may include CHWs, trained birth attendants, community leaders, public safety officials etc. Ensure that telephone and email contact information is recorded. Ensure that also in recording or updating the focal persons, identification is done of whether the focal persons have been trained in surveillance or not in order to plan for either new training or orientation to update their skills. A sample worksheet for listing the reporting sites and the contact focal person at each site is in Annex 5B..

1.5.3 Identify potential community representatives that can be engaged in community-based surveillance

Keep an updated inventory of the selected people with their contact information, including the corresponding health facility. Ensure they have a list of simplified community case definitions to facilitate case detection and reporting.

1.5.4 Distribute updated data collection forms, reporting tools, line list, registers and technical guidelines

As you conduct updates of the catchment area description, check to see that all reporting sites have an adequate supply of surveillance reporting tools (forms, line list, registers or other means for reporting surveillance data to the district). This must also be done during regular supervisory visits. Include updates about forms and procedures for reporting, investigating and responding to public health events in quarterly district meetings with health facilities and other reporting sites. Ensure you keep and update an inventory of all information to assist you in necessary follow-ups.

1.6 Laboratory capacity for detection of priority diseases, conditions and events

Several diseases or conditions have the same or similar signs and symptoms. For example, a child with fever and rash over the entire body might be diagnosed with measles; even though there could be several other causes for the child's clinical presentation (such as scarlet fever, rubella).

Laboratories should be used as early warning alerts to detect pathogens and other hazards that have potential to spread, for example, emergence of resistant strains like MDR-TB in the hospital or the community.

Laboratory confirmation of diagnoses of diseases, conditions and events under surveillance is essential to:

a) accurately diagnose illness in an individual patient, and

b) verify the cause (or etiology) of a suspected outbreak.

The functions of the laboratory at each health system level are in Annex 5D. A list of national laboratories used to confirm diseases is in Annex 5E.

1.6.1 Specimen collection and transportation

Specimens may be collected at the HCF level or, if necessary, in the field during an outbreak investigation. The type of sample collected and its packaging (storage media) depends on the suspected disease. All specimens must be triple packed, labeled correctly and accompanied with the correct laboratory forms in order to arrive at the laboratory in good condition. Only specimens that arrive at the laboratory in good condition can be processed to provide reliable results. Minimize delays between collection of the specimen and processing in the laboratory.

Ensure that health facilities have trained personnel, equipment as well as adequate reagents and consumables to enable sample collection and testing. A clearly defined transportation process is required to enable health facilities to understand where to send samples.

Many factors can affect the reliability of results and interpretation. For example, results are difficult to interpret when:

a) A specimen is collected inappropriately, for example, a blood specimen has hemolyzed.

b) Delay in transportation and/or processing may result in bacterial contamination in a collected specimen such as urine.

c) Use of wrong transport or storage media or container may cause reduced viability of the suspected organism.

d) Given antibiotics before specimen for cultures are collected.

e) Wrong temperature is used for storage of specimen.

Reliable specimens must be:

a) collected correctly and within the time of disease onset specified;

b) transported to the lab in a timely manner; and

c) transported to the lab in correct packaging (storage media).

If these conditions are not met the specimen may not be able to be tested, or if tested the result may be indeterminable due to bacterial overgrowth or the viability of the suspected organism.

The disease-specific reference tables in section 11 list recommended laboratory procedures for confirming priority diseases and conditions including:

a) The diagnostic test for confirming the disease or condition;
b) The type of specimen to be collected;
c) The appropriate precautions and Personal Protective Equipment (PPE) for sample collection;
d) When to collect the specimen;
e) How to prepare, store and transport specimens to the lab;
f) When to expect the results; and
g) Sources of additional information.

It should be noted that public health measures can be undertaken even before laboratory confirmation has been received for example in the case of VHF, the patient should be contained based on signs and symptoms, and case management should be initiated immediately even prior to laboratory results.

1.6.2 Establish a laboratory network

The local surveillance and the laboratory focal persons at each level of the health system should maintain an updated list of the laboratories that have the capacity to perform required laboratory testing. A sample worksheet for listing national laboratories for confirming priority diseases and conditions is in Annex 5E. Provide information to all health facilities about the methods for transporting specimens including how to prepare, handle, store and ship the specimens. Make sure to disseminate information about packing and shipping infectious material as directed by national policy.

At HCF, district and county levels, the focus is on safe collection, handling, transportation and processing of specimens as well as giving prompt feedback. The local surveillance or laboratory focal person should establish or strengthen routine communication with identified laboratories that receive specimens from your health facility or district. The purpose of this routine contact is to strengthen communication between the health facilities in the district that will be sending specimens, and the laboratory that will be receiving them. Develop procedures so that each entity understands their roles and responsibilities. Ensure that the procedures for specimen collection, transportation, confirming the disease or condition through laboratory testing and reporting the results are clear and can be reliably carried out.

To support regional or county level laboratories within the network, the national level health authority will establish a Memorandum of Understanding (MoU) with laboratories

outside the area or network that have the capacity for specific diagnostic procedures not available locally. The national level should also support the laboratory through advocacy with high decision-makers in putting the mechanisms and structures in place to procure and enable quick access, when needed, to the necessary supplies to collect, handle, store, and ship specimens safely through the network.

In addition, it is also crucial to improve collaboration between human and veterinary and other relevant public health laboratories in line with the One Health approach.

1.6.3 Update inventory of supplies, reagents and equipment used for confirmation of diseases from laboratories performing the test

Surveillance activities should actively work with the laboratories regarding supplies, reagents and equipment to avoid duplication and maintain an updated list of supplies, reagents and equipment available in each laboratory.

1.6.4 Responsibilities at each health facility level

A Laboratory Focal Person should be established at HCF, district, county and national level. At HCF, district and community levels, the focal person should communicate with the referral laboratory before collecting the specimen to ensure safe collection, handling, transportation and processing of specimens.

At the county level the County Diagnostic Officer (CDO)/County Surveillance Officer (CSO) is the laboratory focal person but at the other levels it is often the surveillance officer who takes on the responsibility of laboratory focal person. The CDO/CSO should keep an up to date list of county reporting sites and contact information.

2 Section 2: Report priority diseases, conditions and events

This section describes:

- IDSR reporting lines in the Liberia's public health system
- Immediate reportable diseases, conditions and events
- Weekly reportable diseases, conditions and events
- Monthly and quarterly reporting of all priority diseases, conditions and events of public health importance through HMIS
- Ongoing improvement of reporting practices.

2.1 Objectives of reporting

Every level of the health system has a role in carrying out ongoing surveillance for priority diseases, conditions and events. If a disease is identified at a local level, for example, but the information is not reported to the next level, an opportunity for timely response is lost. Therefore, it is important to report in order to:

a) Identify emerging problems or conditions and plan appropriate responses, including informing relevant staff or levels.

b) Take action in a timely way.

c) Monitor disease trends in the area.

d) Evaluate the effectiveness of the response.

2.2 Reporting Structure in Liberia's public health system

IDSR is a strategy with the potential to ensure a reliable supply of epidemiological information to all levels of the surveillance system in Liberia. This strategy is geared toward fulfilling the IHR 2005 requirements and ensuring reliable reporting of surveillance data throughout the system. Reliable reporting provides information for surveillance officers at the county, district, and HCF levels as well as epidemiologists, and all competent authorities at PoE including program managers, national IHR focal point, WHO contact point and other health staff.

The routine flow of surveillance data is usually from each reporting site to its immediate supervisor (usually the higher level within the health system) as follows:

a) CHA, CHV, Port Health Officers, and Environmental Health Officers report to the SFP

(normally the OIC) at the HFC

b) The SFP at health facilities report to the DSO

c) The DSO provides district level data to the CSO or other identified member of the County Health Team (CHT) e.g. data manager or Monitoring & Evaluation Officer

d) The CHT provides County level data to the MoH and NPHIL

National level collates and analyzes all data to show what is happening with morbidity and mortality in Liberia for the reporting period (weekly, monthly, quarterly or annually) and provides evidence for planning and response activities. Feedback should be provided to all sites that report data, or should report data, for their own information and planning purposes. In addition, the CHT should also provide analysis of the situation within the county to the districts and HCFs. The routine flow of surveillance data is shown in figure 2.

This section describes how to report priority diseases, conditions and events within the required timelines. In IDSR, data collection and data reporting follow different timelines for different purposes:

a) **Immediate** reporting of case-based information allows for early detection of unexpected or highly pathogenic/lethal public health events. All the diseases and conditions under immediate reporting should also be reported under aggregated weekly report in the IDSR Weekly Summary Reporting Form.

b) **Weekly** aggregated reporting provides data for monitoring trends of diseases, conditions or events to early detect outbreaks.

c) **Monthly/quarterly** aggregated reporting provides data for monitoring the health status of the population and impact of disease specific programs, and for planning allocation of resources.

Paper-based tools are the most commonly used tools for reporting these diseases, events and conditions. While paper-based tools can provide timely information, Liberia is currently rolling out the use of electronic tools aimed at facilitating the rapid transmission of data to enable timely response to public health threats (See section 9). The potential benefits of using electronic reporting tools for eIDSR include:

a) More timely reporting, investigation, and response to outbreaks;

b) May also improve data quality;

c) enhance virtual, near real-time disease and events monitoring capability;

d) may lead to reduced system costs and easily generate automated alerts;

e) Information can be easily stored and accessed.

The targeted public health workforce for IDSR are primarily staff at all levels of the health system (for both human and animal sector). It is important that the surveillance system aims at having an interoperable approach of strengthening eIDSR by creating systematic linkages and information-sharing platforms. This links the MoH and the NPHIL Units that is, HMIS, IDSR, Maternal and Newborn (MNDSR), Health services delivery information system, National and regional public health reference laboratories and laboratory networks, Surveillance units and Veterinary facilities/institutions at the Ministry of Agriculture (MoA), FDA and EPA.

2.3 Immediate reportable diseases, conditions, and events

Immediate reporting is indicated when an epidemic-prone disease or other potential PHEIC is suspected or is otherwise required under the IHR (2005). Immediate reporting should also be done for diseases and events considered priorities at the national level which may not necessarily be PHEICs. The diseases, conditions and events requiring immediate notification to the next level are listed in Table 1. Immediate reporting allows timely action to be taken to prevent the re-emergence or rapid transmission of epidemic prone diseases or events or their propagation, especially those due to highly virulent infectious, chemical, biological or radio nuclear agents.

Information that is reported immediately, such as single cases or clusters of reportable events, will generate an alert and initiate a case-based reporting system. This means that, specific information about that suspected case, or, if it is a cluster, specific information of each of the cases identified, will be collected thoroughly and reported to the next level (Figure 2). At the same time, an initial investigation will be initiated. For events reported at PoE, information is reported to the next level (district in which the PoE is situated) as well as simultaneously to the IHR NFP. Reporting units with no diagnostic capacity, will use the suspected case definition given to identify and report diseases, conditions and events. Additionally, information of contacts will be collected. Section 4 describes how to conduct contact tracing, and also, how to report contacts.

For conditions like maternal and perinatal deaths, the circumstances leading to the death need to be gathered and analyzed, and health providers should use the national Maternal Perinatal Death Surveillance and Response (MPDSR) in consultation with the relevant focal points.

In IDSR, there are two types of thresholds used to initiate response: an alert threshold and an epidemic threshold. These thresholds are normally expressed in terms of the number (or proportion) of cases of a disease and the critical point (threshold) beyond which action must be taken. Trained health-care personnel should always determine the alert and

epidemic thresholds. Thresholds for alerts and action for epidemic-prone diseases, conditions or events are shown in section 11.

NB: Please refer to Section 11 for disease-specific information including surveillance case definitions, alert and epidemic thresholds for reporting suspected cases or events.

Table 2: Diseases, conditions or events requiring immediate reporting in Liberia, 2021

Acute Bloody Diarrhea (*Shigella*)
Acute Flaccid Paralysis (AFP)
Adverse Effects Following Immunization (AEFI)
Cholera (Severe AWD)
Coronavirus Disease (COVID-19)
Buruli Ulcer
Dengue fever
Human exposure to Rabies (Human Rabies)
Lassa Fever
Maternal Deaths
Measles
Meningitis[1]
Monkeypox
Neonatal Deaths
Neonatal Tetanus
Perinatal Death
Stillbirth
Tuberculosis
Unexplained cluster of health events*
Unexplained cluster of deaths*
Viral Hemorrhagic Fevers (including Ebola Virus Disease and Marburg Virus Disease)
Yaws
Yellow Fever

Note: Disease specific summary pages are available in section 11. of this guide.

[1] Includes *Haemophilus influenzae* type b (Hib), *Neisseria meningitidis*, and *Streptococcus pneumoniae*)

* Examples of clusters can be:

- Any of cluster of illness or deaths among people living in the same community within a specific time period (for example, one week)
- Unexplained cluster of deaths of animals/birds within a specific time period (for example, one week)
- Illness or death among people after exposure to animals
- HCW illness after exposure to patients with similar illnesses

- Unexpected increases in admission to health care facilities of persons with similar severe symptoms
- Sudden illness in a person who has travelled out of the country in the past 14 days
- Any unusual illness or sudden death in the community within a specific time period (for example, one week)
- Unexpected large numbers of children absent from school due to the same illness in the same seven-day period
- Unexpected large numbers of sales at pharmacies of many people buying medicines for same kind of illness

Note: Ensure that adequate information is collected for events which are reported. Some of the events might have a link with the Agricultural or Livestock/Wildlife sector or Food or Environment or other sectors, ensure information is also sought from these sectors.

2.3.1 Report case-based information to the next level

If an immediately reportable disease, condition or other public health event is suspected, the health facility must report case-based information to the next level within 24 hours. Information obtained through preliminary investigation of suspected case includes:

a) Patient's geographical location

b) Health facility or facilities that managed or handled the patient or referred the patient

c) Patient's identification and demographic information

d) Information about signs and symptoms, including date of onset, history of vaccination (where applicable) and information about any relevant risk factors including contacts

e) Laboratory results (if available)

f) History of travel

g) History of contacts (human or animal)

Any maternal or perinatal death should be reported immediately within 48 hours of occurrence. A sample reporting form for both is given in Annex 9H. . Reference should be made to the national integrated MPDSR guidelines.

a) Make the initial report by the fastest means possible (telephone, e-mail, 2-way Radio, text message, social media). The health facility should contact the DSO immediately and provide information about the patient or event.

b) Follow up the initial verbal report with a written report using a standardized case-based report form. A sample case-based reporting form for recording case-based information is in Annex 9H.. If a computer or other electronic device is available for surveillance or case management, complete and submit the form electronically to the next level. On electronic platforms, ensure that you protect the patient's privacy by encrypting patient ID data so only few health staff can access the detailed information, or you can also set up appropriate user rights such as creating a password for your use when using a common office computer.

c) If a laboratory specimen is requested at this time, make sure that the patient's

identifying information on the specimen collection kit is accurate and accompanied with the appropriate IDSR Case Alert and laboratory Submission form. Specimen collected should be adequate and properly packaged to ensure reliable results. A sample laboratory form is included in Annex 9J.

d) Disease-specific case-based reporting forms for particular diseases and conditions of concern (for example, AFP, cholera, VHF, maternal death, and Multidrug- and Extensively-drug resistant Tuberculosis (MDR/XDR TB) are in the Annex 9 the end of Section 12. These forms may be used to begin gathering initial information for the case investigation.

   Note: Some epidemic-prone diseases or conditions like Maternal or Perinatal deaths have specific reporting requirements, depending on national or regional policies. Please refer to disease-specific conditions and requirements in Section 11 of this guide.

e) Ensure that adequate information is available for events which are reported, as some events might have a link with the agricultural or livestock, wildlife sector or food or environment or other sectors including the community. Such information sharing is crucial and should start at the community level, health facility and subsequently at the district and region. At the National level, the IHR NFP should notify WHO of an event that is a potential PHEIC using the decision instrument in the IHR 2005 (Annex 2A). .

f) For all events, establish a line listing of suspected cases or events or conditions reported as part of initial and ongoing investigation and ensure it is always updated, while at the same time maintaining the link with relevant sectors, depending on a particular disease or event. Copy of the line list should be kept where there is a suspected outbreak and where an isolation unit has been opened, but if several isolation units have been opened, the district should maintain a combined line list. Refer to Annex 6F for a sample line list.

2.3.2 Notifying a potential Public Health Emergency of International Concern under IHR 2005

If a potential PHEIC is suspected (as defined in Annex 2C the IHR 2005), the County SFP should report to the National IHR Focal Point immediately using the fastest means of communication and at the same time notify the DSO and CSO. If a potential PHEIC is detected at PoE, immediate reporting should also be made to the National IHR Focal Point, while at the same time notifying the district and county (See Annex 2A. for a framework of reporting).

The process of notifying WHO of events under IHR 2005 involves the use of the "Decision instrument in the IHR". This is a national level function coordinated by the IHR NFP with the support of appropriate experts, depending on the emergency. (IHR decision instrument should be inserted below)

2.3.3 Reporting events from community sources

Any suspected event occurring in the community, including maternal and neonatal events, should be reported immediately. The trigger mechanisms of reporting must be clearly defined and the information must be immediately notified to a CHWs (CHA/CHV) or to a nearby health facility. Minimum information collected should include:

a) Date of event and date of report
b) Suspected disease, condition, or event
c) What happened?
d) When did this happen? (day, month, year)
e) Where did this happen? (exact location, village, town, district, county,)
f) Who is affected? (age, gender, occupation, etc.)
g) How many have been affected?
h) Has anyone died? If yes, how many?
i) Is the event ongoing?
j) Are there any animal deaths/exposures?
k) Recent history of travel to an affected area
l) Other information you have.
m) Name and contact number of the person reporting
n) Any action taken

See Annex 2D for a reporting format when an event is identified, monthly summary and reporting structure for community alert and verification of events from community sources.

2.4 Summarize immediate and weekly reportable diseases

After an initial case has been detected or an outbreak is suspected or confirmed, summary data are important for analysis and monitoring. For example, at the health facility or district, the SFP can draw an epidemic curve to see if and when the epidemic thresholds for specific diseases have been crossed. Additionally, these data from epidemic investigation can be used to check whether the case-fatality rate is below, at or above the expected target. The weekly data analysis of the suspected or confirmed epidemic should also help point out possible high-risk groups with regard to a patient's case location or residence, age group, sex, and exposure during social events (for example, a funeral), occupational hazards (for example, butchering), consuming game meat, or exposure to a contaminated food or beverage.

At the district level, weekly data analysis includes verification of the quality of the data coming from the reporting sites and the completeness and timeliness of these reports. For eIDSR, an identified person should be responsible to ensure that data verification is done and approved for further transmission. Additionally, an in-depth analysis of individual immediate case-based reporting forms received from the reporting sites will also be performed. This is usually followed by a weekly aggregated data. The incidence and case-fatality rates should be calculated and compared with the set alert and epidemic thresholds to determine if it is increasing or decreasing. Epidemic curves should be updated regularly to monitor the trends or evolution of epidemics occurring in the districts/counties.

I. Weekly reporting of immediate notifiable diseases, conditions and events:

Weekly reporting provides data for monitoring trends of diseases conditions or events for early detection of outbreaks. It is important to ensure that the national weekly reporting format is adhered to across all health facilities and districts to facilitate comparison within and between the facilities and districts.

After immediately reporting to the next level about notifiable diseases, conditions or events, collect and report weekly summary information including other weekly reported priority diseases, conditions and events, as listed in Table 1. See Annex 9E for format for developing a weekly summary form which is an aggregate of case-based forms.

With e-IDSR (see section 9), weekly reports are updated automatically in the database, while paper-based reporting is done manually and entered into a computer. This aggregation is important to understand the trend of the immediate reportable diseases and plan for effective intervention. For early detection of outbreaks via weekly aggregated reporting, it is recommended to keep the number of variables at a minimum, ideally reporting only the number of cases and deaths, to avoid unnecessary burden on the health care facilities and maximize reporting efficiency.

Based on epidemiological evidence, the list of priority public health events to be reported by health-care facilities will be established by a group of relevant stakeholders from and related to the National Public Health Surveillance System.

II. Zero reporting

If no cases of an immediately reportable disease, conditions or events have been diagnosed during the week, record a zero (0) on the reporting form for that disease, condition or event. If the space is left blank, the staff that receives the report will not be able to develop information from a blank space. Submitting a zero report for each immediately reportable

disease, conditions or events when no cases were detected during the week, this tells the staff at the next level that a complete report has been filled.

2.5 Report immediately, weekly and monthly information for other diseases of public health importance

At a minimum, report summary data about other endemic diseases to the next level each month. This information is valuable to disease-specific programs and can be used when monitoring progress with prevention and control activities as well as for detecting any emergent, unexplained or unusual events or disease patterns.

Routinely, report the total number of cases and deaths seen in a given period (for example, monthly or quarterly) for other diseases of public health importance. All health facilities including referral or zonal or teaching hospitals should report summary totals to the district under their catchment area. Districts should aggregate reports from all reporting sites and provide summary totals to the county and national level. Each level should observe any unusual increases or events seen during analysis of monthly summary reports. The summary results should be analyzed and the results used to monitor progress towards disease control targets, measure achievements of disease-prevention activities in the district or counties and identify hidden outbreaks or problems so that a response action can be taken.

See Table 1: Diseases, conditions and events requiring immediately, weekly and monthly Reporting (kindly Insert a table of priority diseases, conditions and events, Liberia, 2021)

Note: Based on risk mapping and disease burden, national may decide to categorize any other diseases, conditions or events into immediate, weekly or monthly or quarterly report.

Each month, the health facility should calculate the total number of cases (suspected and laboratory-confirmed) and deaths due to priority diseases, conditions and events seen in the health facility. Separate totals are calculated for outpatient cases and inpatient cases. The summary totals are recorded on a form (see Annex 9E) and sent to the district level. The district aggregates the totals from all the health facilities that reported and submit district summary totals to the county or national level.

Special effort should be made to obtain from the health information system, the total number of outpatients and inpatients seen for any health condition (including those not in the IDSR list) during the reported period. On a regular basis (weekly or monthly), review the overall HMIS to ensure that data has been well captured. At least once every month, data validation needs to occur, and periodic edits should be conducted before transmission to the next higher level.

In cases where a computer is available for surveillance or case management, patient records can be analyzed to generate the daily, weekly and monthly reports. This information is important for producing national and county situation reports (SitReps). All datasets should be shared with the health authorities with a copy to the respective disease prevention and control program at national and county.

This is important for coordination at the national level, and for the building or strengthening of a national IDSR database system.

Depending on each level of laboratory services, laboratory data should be organized in a register so that it can generate monthly summaries. During outbreaks, submission of the weekly summaries of the specimen processed, the types of specimen and the results should be done to assist in completion of the variables in the line list register. Efforts should be made to also update the laboratory component of the IDSR data and link epidemiological/clinical data. Monthly summaries can include the core tests done for which national has selected as indicator pathogens on the basis of major PHEIC. This is important, as the analysis can produce important trends which can necessitate further investigations.

2.6 Improve routine reporting practices

In some health facilities, more than one person may be responsible for recording information about patients seen in the facility. For example, the clinician records the patient's name and diagnosis in a clinic register. Later in the day, a nurse tallies the number of cases and deaths seen in an outpatient service. The ward nurse tallies the number of admitted cases.

Each day, week or month, a records clerk or statistician calculates summaries for all the diseases and records them in a standard form. Events should be aggregated separately from diseases. In case the health facility is equipped with computers, individual patient records should be entered, from which the IDSR priority diseases or conditions subset will be extracted and analyzed to get the required daily, weekly or monthly compilations.

In outbreak scenarios, isolation units that are separate from health facilities can be opened, and they will use a different register to record diseases or events. It is important that this information be captured in the overall IDSR daily, weekly, or monthly summaries.

2.6.1 Review the flow of information at the reporting site

During supervisory visits to reporting sites, ensure that:

a) All reporting sites including secondary and tertiary hospitals in the catchment area of your district are visited.

b) Clinicians record legibly information in the patient registers using the recommended case definitions so that health workers who tally the cases at the end of the day can reliably record the required diagnoses on the tally sheet.

c) Clinicians, ward nurses or other responsible staff should complete the case-based reporting form preferably while the patient is still present.

d) Clinicians record laboratory results in the patient registers.

e) In health facilities with laboratories, laboratories should record results of IDSR priority diseases in the laboratory registers with linkage to epidemiological data.

f) Integration of laboratory results into the IDSR reporting forms should be conducted at the health facility level.

g) Records clerks or statisticians have summary forms that contain spaces for recording cases and deaths due to the priority diseases or conditions according to the SCDs.

h) Health staff reviews the weekly, monthly and quarterly IDSR data summary totals and provide comments on the forms about results seen during data analysis. (See section 3).

i) Health workers record the summary totals on a recommended weekly, monthly and quarterly IDSR summary reporting form (See Annex 9E).

2.6.2 Keeping records and procedures for managing reporting forms

Keep a record of IDSR forms, notifications and reports received at your level. The record you keep is an essential data source for calculating indicators for the national IHR report and monitoring performance of the IDSR indicators. A sample IDSR Reports and Data Sharing Log Book form is in Annex 9F.

Periodically check with reporting sites that you supervised (community, health facility, district and county) to ensure that the correct forms and procedures are available to staff so that they can record and report the required cases of priority diseases and conditions:

a) Take steps to ensure that all health workers know or have access to the SCDs recommended by national policy. Establish or modify existing procedures so that all health workers are able to apply the SCDs in detecting and reporting priority diseases, conditions, outbreaks or events.

b) Sensitize staff on diseases or conditions that require immediate reporting for case-based surveillance, including potential PHEIC and other priority diseases or events of national and regional concern. For example, all the health staff should be aware of epidemic-prone diseases for which a single suspected or probable case is a suspected

outbreak requiring immediate action, and of any unusual or unexplained event with potential for affecting human health.

c) Review with health staff the role that case-based data plays in determining risk factors and the means of disease transmission or exposure to health risks in a public health event. Make sure the staff has access to a standardized form for reporting case-based information.

d) Ensure that the surveillance unit has access to fast communication means (facsimile, internet connection, telephone, text message, electronic mail, telegrams, personal messages, or other rapid communication means). For the district, specify how the district should notify the county or national levels and who should be contacted at these levels.

2.6.3 Perform periodic checks on data quality

While each provider may have some preferred methods for filling in forms, describing diseases, or abbreviating terms, it is important for every level of reporting (facility, district, county or national) to use a standard approach to recording and reporting, as data that are not comparable, will lead to inappropriate decisions.

Some factors which may affect data quality that needs to be periodically checked include:

a) Poorly completed forms (missing values, limited information, etc.);

b) Incomplete forms (for example, presence of blanks);

c) Under-reporting or over-reporting of cases;

d) Duplicate reporting;

e) Unsystematic data collection and reporting;

f) Untruthful reporting, (for example, reporting zero, while there is an ongoing outbreak of epidemic prone diseases);

g) Inconsistent reporting formats (forms);

h) Late submission or reporting;

i) Inconsistent reporting periods;

j) Calculation errors on aggregate reports;

k) Lack of documentation and source data or files are lost.

During supervision, stress the importance of data quality and surveillance; that correct data will lead to analysis, interpretation, and the information that will be communicated may lead to action and evaluation. It is recommended that counties conduct regular data quality audits at the reporting sites. (See Annex 9G for checklist on key elements to assess in data quality audits).

2.6.4 Enhance linkages to strengthen community-based surveillance

A CBS system relies on the community members' capacity to identify and report public health problems to the nearest health facility or to the district health office. In this system, CBS focal persons identify and report events in the community that have public health significance. CBS focal persons act as community informants, and they report to the health facility, or in the case of a serious event, directly to the district authorities.

Community representatives that can be members of CBS team

Any community member acceptable by the community can be a CBS focal person. Representation could be from basic village-level services such as trained birth attendants, drug distributors or similar care providers, CHWs or CHVs, village leaders (religious, traditional or political) or school teachers, veterinarians, health extension workers, chemical sellers, and traditional healers. Once selected, the CBS focal persons should receive training and carry out supportive supervision on how to recognize certain diseases or health conditions for the purpose of reporting suspected cases.

Example: *CBS focal persons hear of several cases of AWD with vomiting in the community. The informant suspects cholera and reports the alert to the local health facility and to the district level health officer by text messaging. Members of the public health emergency rapid response team (PHERRT) travel to the community to verify and investigate the possible outbreak, and, based on the investigation results, implement control and prevention measures. The outbreak is quickly contained. Thanks to the early warning from the CBS liaison.*

District staff may identify sources in the community with opportunity to know about the community's health status. Examples of community sources include:

a) Chemical Sellers
b) School teachers
c) Staff at private clinics
d) Community leaders
e) Religious leaders
f) Traditional healers
g) Birth attendants.
h) CHWs
i) Community animal health workers (CAHWs)
j) Community Based Organizations (CBOs)
k) Other societal leaders
l) Veterinary health workers

m) Transport union

n) FBO

o) Any individuals involved in neighborhood watch or other active surveillance approaches

p) Other community resource persons

Depending on the event, resource availability and the context, national may choose their source of information. The district can organize CBS focal points by:

a) Working with community leaders to identify members of the community to receive relevant training.

b) Train and provide job aids (for example, Community Registers, leaflets of case definitions, etc.) on priority diseases and public health events or hazards to community health informants. Give enough information about the disease so that the community source can refer cases to the health facility, or notify the health facility when unusual or unexplained health events occur in the community.

c) Involve CBS focal persons in risk mapping, emergency SimEx and risk communication during outbreaks.

d) Ensure that the CBS gives regular and timely feedback of diseases/events reported from the community level. Districts need to ensure that there is sustained commitment by CBS and hence to continuously engage them.

e) Disseminate alert and epidemic thresholds.

Please refer to the list in Annex 7K of key signs and symptoms to use in case definitions for community surveillance.

2.6.5 Strengthen linkages between Laboratory and Surveillance information

Public health laboratory system complements the syndromic disease surveillance.

a) In case of a public health event, the laboratory where confirmation took place should immediately report confirmed results to the respective CSO, and simultaneously to the national level. The CSO will report confirmed laboratory result to the district and health care facilities.

b) To strengthen the linkages between epidemiological and laboratory data, the case reported and the laboratory samples should have the same unique ID.

c) Submission of the weekly summaries of the samples processed, and the types of samples, as well as the results, should be done whenever there is an outbreak, to assist in completion of the variables in the line list register.

d) During supervision at reporting sites, liaise with the Laboratory Focal Person to ensure

that the laboratorians record correctly data for diseases under surveillance and also that there is an established register.

e) Make sure that the test results are linked with IDSR data at national, county, district and health facility levels.

f) The laboratory component of the IDSR Weekly or Monthly Summary Reporting Forms should be updated immediately after the respective disease laboratory results are ready.

g) Liaise with the animal sector, to ensure that a comprehensive report is available from the veterinary laboratory, especially if they have recorded any animal information which might have risks to public health.

2.6.6 Promote a multisectoral One Health approach with effective involvement from human, animal, and environmental health sectors as wells as other relevant sectors to strengthen reporting

Ensure implementation of the One Health approach to improve reporting of public health risks across all levels, with emphasis also at the community level. Lay emphasis on strengthening the technical and community capacities of staff for all relevant sectors (including human physicians/nurses, veterinarians for livestock or wildlife) and environmental inspectors.

Interoperable and interconnected platforms with emphasis on strengthening information systems within and between the human, animal, and environmental sectors would be ideal in enhancing real time information sharing. There should be a conscious effort to formalize the system of sharing information with other sectors, that is, human health, animal health, environmental health, etc.

The other multisectoral key actors to foster collaboration in reporting and assessment of public health risks include: private sector, civil society, FBO, defense and security forces, prisons, Internally Displaced Persons (IDP) and refugee camps, technical and financial partners and academic institutions and research institutions. Ensure that they are also included to strengthen routine reporting and analysis of public health risks and events.

2.7 Data protection and security to protect patients confidentially

The public health community recognizes that there might be risks to both individuals and communities, if one uses name-based reporting of private health-related information.

To ensure protection of patient confidentiality and privacy, when reporting, use unique identifiers such as numbers instead of names and this will prevent identities from being inadvertently disclosed. The identifiable data should be however maintained where public

health surveillance interventions occur and it is usually at the health facility level. Counties and districts need to have guidelines on privacy and security of health data, which should be guided by the national level guidelines.

Note: Use of names may be required during an outbreak on infectious diseases for the purpose of contact tracing. Refer to Section 4.

3 Section 3: Analyze and interpret data

This section describes how to receive surveillance data and analyze it by time, place and person. The analysis may be done electronically or manually. Methods for carrying out the analysis and steps for interpreting and summarizing the findings are also included. Information in this section can be applied at the national, district, health facility and community levels.

It is not enough to only collect, record and report numerical information about illness, death and disability from the catchment area; the data must also be analyzed at each level where it is collected. Organizing and analyzing data is an important function of surveillance. Analyzing data provides the information that is used to take relevant, timely and appropriate public health actions. Analysis of surveillance data allows for:

a) Observing trends over time and alerting health staff and relevant stakeholders about unusual patterns and emergent events.

b) Identifying geographical areas and persons at higher risk.

c) Characterizing personal variables such as age, gender or occupation that place a person at higher risk for the disease or event.

d) Monitoring and evaluation of public health interventions on the progress of the event.

In general, analyzing routine surveillance data should address the following questions:

a) Have any priority diseases or other public health events of concern been detected during the reporting period (this week, for example)? Is an outbreak or unusual public health event suspected?

b) Of the cases, deaths or events detected, how many were confirmed?

c) Where did it occur? Who is affected and when did it occur?

d) How does the observed situation compare to previous observation time periods last week, previous months, this year or the previous year? For example, when compared to the start of the reporting period, is the problem increasing?

e) Are the disease trends stable, improving or worsening?

f) Is the reported surveillance information representative enough of the reporting site's catchment area?

g) Out of all the sites that should report, what proportion has actually reported?

h) How timely were the data received from the reporting sites?

i) What period (seasonality) is it occurring?

j) Who is affected? Which occupational groups are most at risk?

Each site that collects or receives data should prepare and follow an analysis plan for analyzing routine surveillance information (refer to Annex 6).

3.1 Receive, handle and store data from reporting sites

The routine flow of surveillance data is usually from the community and HCF to district to county level and then to the national level (MoH/NPHIL) as indicated in the IDSR flow diagram (Figure 2). At the HCF level, both in-patient and outpatient areas are surveillance sites. The information collected from these sites is compiled, analyzed and forwarded to the DSO who aggregates data to send to the CSO. CSOs will merge, aggregate and send their reports to the DIDE of NPHIL.

3.1.1 Receive data

At each level of the health system officers who receive data must make a careful record of all data received at that site. This will enable reporting on the completeness of data received (if any fields were missing or blank) and also the timeliness of the data (if it was received within 24 hours). Data may be received as excel spreadsheets, word documents, paper records, or information over the telephone or through the eIDSR platform. Each reporting site (or receiving health officer) should:

a) Acknowledge receipt of the data/report and provide feedback.

b) Log into an appropriate logbook any data set or surveillance report received from any reporting site (Refer to Annex 9F).

c) Record in the log the date the data was received, what is the report about and who is the sender and receiver.

d) Verify whether the data set arrived on time or was late.

e) Check the completeness of the data set or reports, that is, the number of data sets/reports as against the number of expected data sets or reports

f) Review the data quality:

    a. Verify whether the form (hard copy or electronic file) is filled out accurately.

    b. Ensure that the form is filled completely (for example, no blanks).

g) Check to be sure there are no discrepancies on the form. Verify from the reporting site (by phone, e-mail or text message) and correct any discrepancies.

h) Merge the data and store them in a database.

i) For electronic surveillance refer to (section 9).

When implementing eIDSR system in the country, data is entered using a mobile phone at the health facility, and the district health management team using a computer to access and compile information received (*Refer to Section 9*

3.1.2 Enter and clean the data

At each level where data is received (health facility, district, county or national), the surveillance team should always liaise with the Health Information System focal person to extract the priority IDSR diseases from the register and enter correctly into aggregated IDSR reporting forms while listing data from all the reporting sites. Troubleshooting and cleaning data prior to analysis is an important data management practice. Disease trends and maps will not be accurate if information about number of cases, time of onset, or geographical location of cases is missing. Use opportunities during supervisory visits to sensitize clinicians and laboratory staff about the importance of quality practices for recording patient information in patient logbooks/register or reporting forms. Emphasize that patient logs are sources of data for reporting public health information and may play a role in detecting an unusual event or otherwise undetected public health problem.

Ensure that health facility personnel know the algorithm for reporting including reporting levels. Also ensure that there are appropriate recording logbooks, including that of rumors. The registers which are normally used in health facilities are the OPD and IPD registers, and the surveillance officer must always liaise with the SFP, to extract the priority disease of IDSR from the registers.

Data may be recorded and aggregated either manually or electronically if a computer is available. Regardless of the method, use the following practices:

a) Update aggregate totals for each week or month that data was received.

b) Record a zero when no cases were reported. If a space which should have been filled in is left blank/dash/not applicable, the next level may have an incorrect picture of the situation. They will not know if data is missing or if no cases were reported. Zero reporting allows the next level to know that surveillance did not detect a case of the particular disease or condition.

c) Ensure that weekly totals include only those cases or deaths actually reported for that epidemiological week (Monday to Sunday). Late reports from previous weeks should be entered with the relevant week and totals updated accordingly.

d) Avoid duplicate entries by using the report or case record unique identifier to prevent, and also check for, multiple entries of the same records.

e) Establish frequent contacts with the reporting sites in order to clarify issues of missing information/errors and address inconsistencies detected in the reporting.

f) Ensure consistency and harmonization of data.

g) Ensure that update of information on laboratory results is done by linking to the respective case record unique identifier.

Once the data has been received and entered into the aggregate forms, review it carefully to ensure that no mistakes were made during entry. Since surveillance data informs decisions about disease control and prevention actions, there are important ethical, social and economic consequences if data is not entered and managed correctly or on time. During an outbreak, ensure that data is collected using a line list.

3.2 Analyze data by time, place and person

Data should be analyzed in terms of time, place and person so that conclusions can be drawn and the results can be used to guide public health actions. Analyzing data in this way allows for:

a) Observing trends over time.

b) Identifying geographic areas of high risk.

c) Characterizing personal variables such as age, gender, and occupation of persons at high risk for the disease or event.

d) Table 3shows type of analysis, objectives and some examples of tools and methods that may be applied to the data and provides details on how to undertake time, person, and place analysis.

Table 3: Types of analysis, objective, data display tools and methods

Type of analysis	Objective	Method	Data Display Tools
Person	Describe reasons for changes in disease occurrence, how it occurred, who is at greatest risk for the disease, and potential risk factors.	Depending on the disease, characterize cases according to the data reported for case-based surveillance such as age, sex, place of work, immunization status, school attendance, and other known risk factors for the diseases.	Extract specific data about the population affected and summarize in a table or a bar chart or a pie chart
Place	Identify where cases are occurring (for example, to identify high-risk area or locations of populations at risk for the disease).	Plot cases on a map and look for clusters or relationships between the location of the cases and the health event being investigated. (for example, cases near a river, cases near a market)	Plot cases on a spot map of the district or area affected during an outbreak. Dot density analysis can also be used to depict the number of cases by geographical location. NB: The information can also be presented in a table or a bar chart, but plotting cases in a map will assist in quick assessment and allow prompt
Time	Detect abrupt or long-term changes in disease or unusual event occurrence, how many occurred, the seasonality and the period of time from exposure to onset of symptoms.	Compare the number of case reports received for the current period with the number received in a previous period (days, weeks, months, quarters, seasons or years).	Record summary totals in a table or on a line graph or histogram or sequential maps.

3.2.1 Analyze data by time

Data from this type of analysis is usually shown on a graph. The number or rate of cases or deaths is placed on the vertical or y-axis. The time period being evaluated is placed along the horizontal or x-axis. Events that occurred that might affect the particular disease being analyzed can also be noted on the graph.

Graphs can show how many cases and deaths have occurred in a given time. It is easier to see changes in the number of cases and deaths by using a graph, especially for large numbers of cases or showing cases over a period of time.

Graphs are made with lines (a trend line) or bars (a bar graph or histogram) to measure the number of cases over time. How to *make a graph* is described in Annex 6A. .

Figure 8: Example of line graph showing trend of suspected Cholera cases, Liberia, 2016-2020

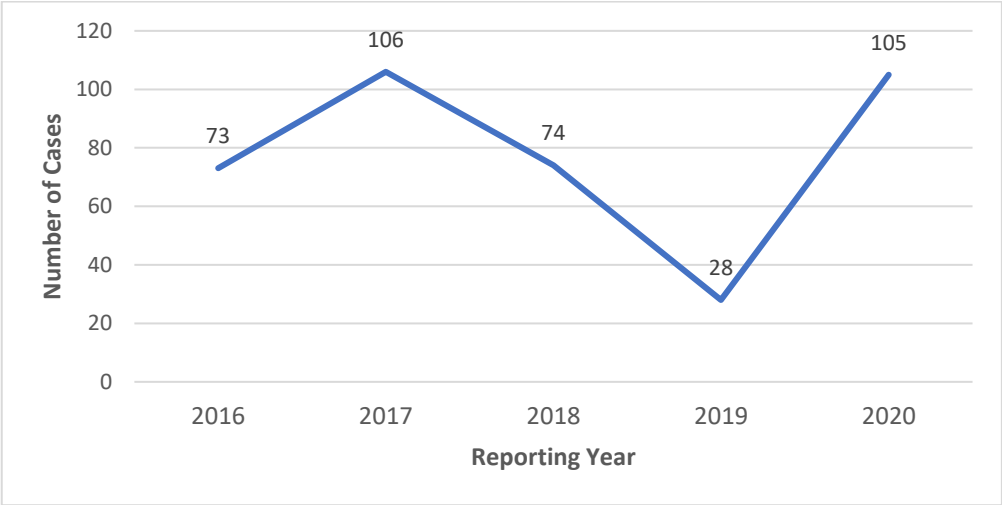


Figure 9: Example of line graph: Weekly trend of reported Cerebrospinal Meningitis cases, Gondwana County, Epidemiological weeks 1-9, 2017

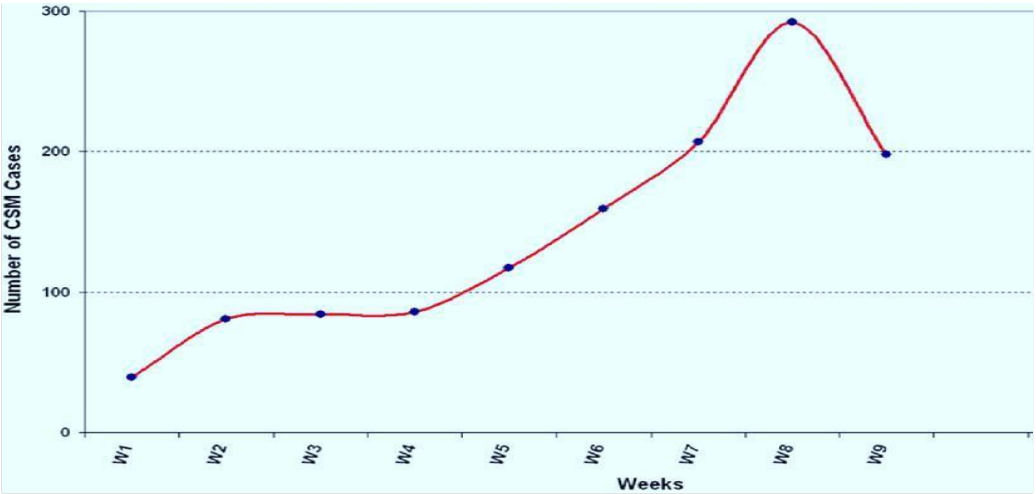


Figure 10: Trendline by week, Burkina Faso

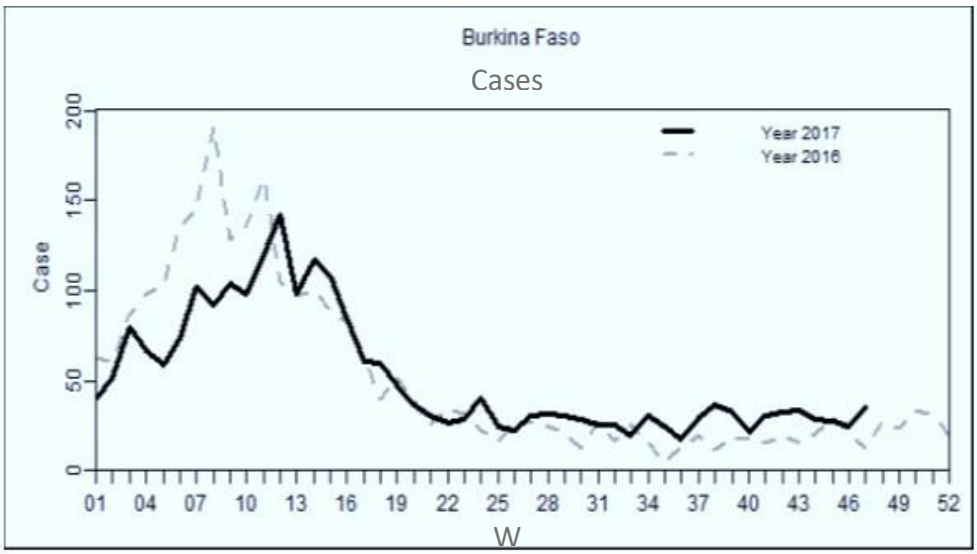
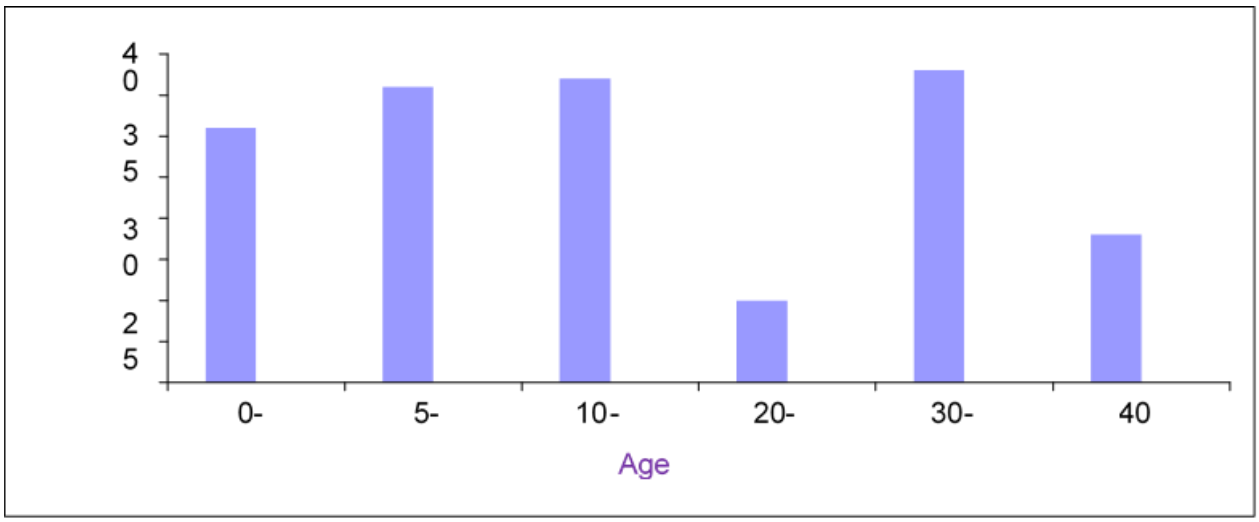


Figure 11: Example of a bar graph: Age distribution of diarrheal cases during an outbreak in Town X, 2004



Using a histogram

Prepare a histogram using data from the case reporting forms and line lists. Plot cases on the histogram according to the date of onset. As the histogram is developed, it will demonstrate an epidemic curve. The title of the graph should include the name of the geographical location being described.

Highlight significant events on the histogram with arrows. For example, review the log of reported outbreaks to highlight the dates when:

a) Onset of the first (or index) case occurred

b) The health facility notified the district

c) The first case was seen at the health facility

d) The district began the case investigation

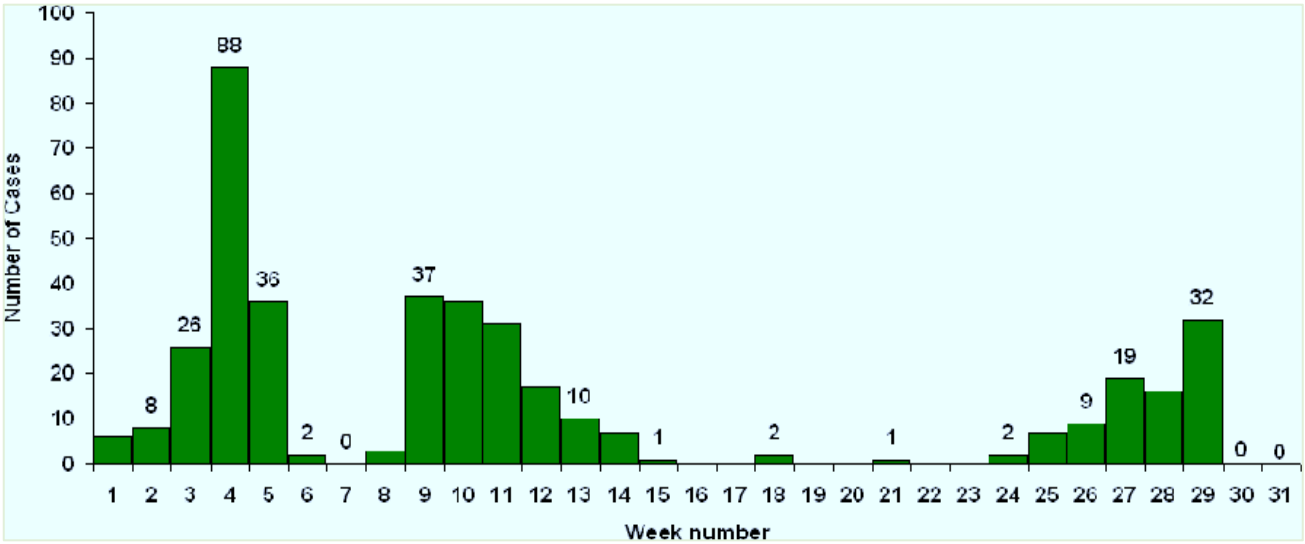
e) The laboratory confirmed the outbreak

f) A response was initiated

g) The district notified the higher level

The results of this analysis allow users of this information to look back at the outbreak and answer questions such as when patients were exposed to the illness, the length of the incubation period, type of the source, duration between detection and confirmation of the outbreak and transmission pattern of the illness and likely time of exposure to the causative agent.

Figure 12: Example of histogram (epidemic curve): Reported Cholera cases, District A, Epidemiologic week 1-31, 2016



3.2.2 Analyze data by place

Analyzing data by place provides insight about where a disease is occurring. Establishing and regularly updating a spot map of cases for selected diseases can give ideas as to where, how, and why the disease is spreading. The dot density will give the total number of cases per defined geographical area.

Use the place of residence on the case reporting forms or line list to plot and describe:

a) Clusters of cases occurring in a particular area.

b) Travel patterns that relate to the method of transmission for this disease.

c) Common sources of infection for these cases.

Use manual methods or open source Geographic Information System (GIS) software, such as Health Mapper, QGIS, or GIS to create maps to use as part of routine analysis of disease surveillance of data. On a map of the area where cases occurred, mark the following:

a) Roads, water sources, location of specific communities and other factors related to the transmission risk for the disease or condition under investigation. For example, a map for neonatal tetanus includes locations of traditional birth attendants and health facilities where mothers deliver infants. Location of the patients' residences or most relevant geographical characteristic for this disease or condition (for example, by village, neighborhood, work camp, or refugee settlement). Another example is when mapping young patients during a meningitis outbreak; remember to locate the school that the patients attend or other locations as appropriate to the disease or condition being investigated. Please see section 11, for disease-specific guidelines for specific

recommendations for analyzing data by place.

Figure 13: Geographical distribution of conformed Lassa Fever cases by health district, Liberia January – July 2021

Figure 14: Example of district spot map showing location of suspected and confirmed cases

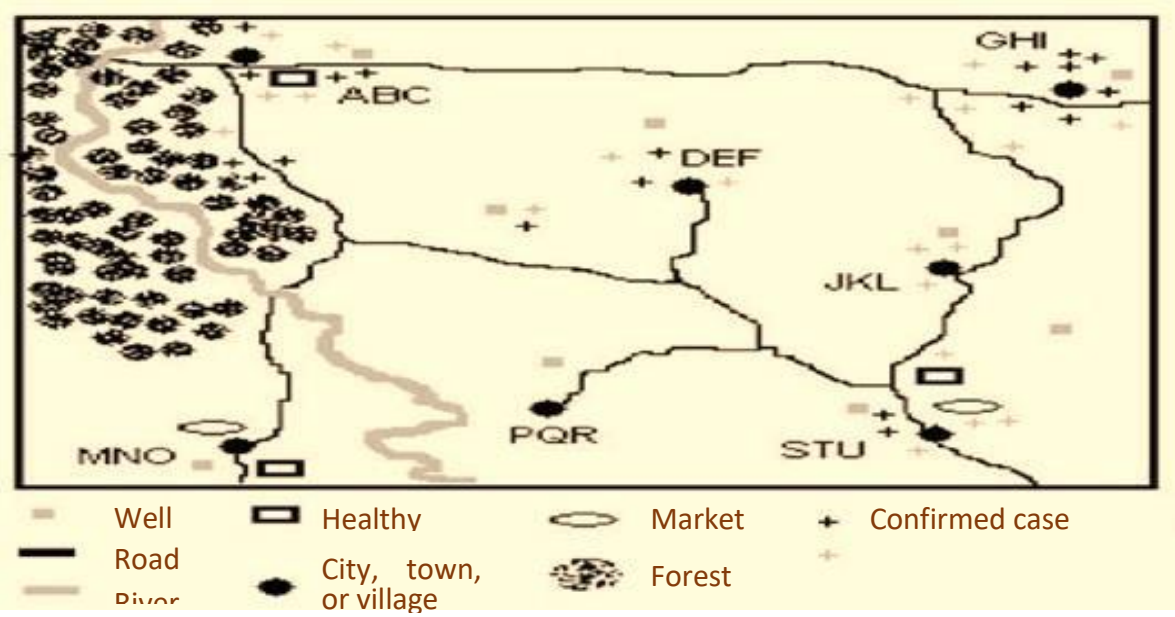
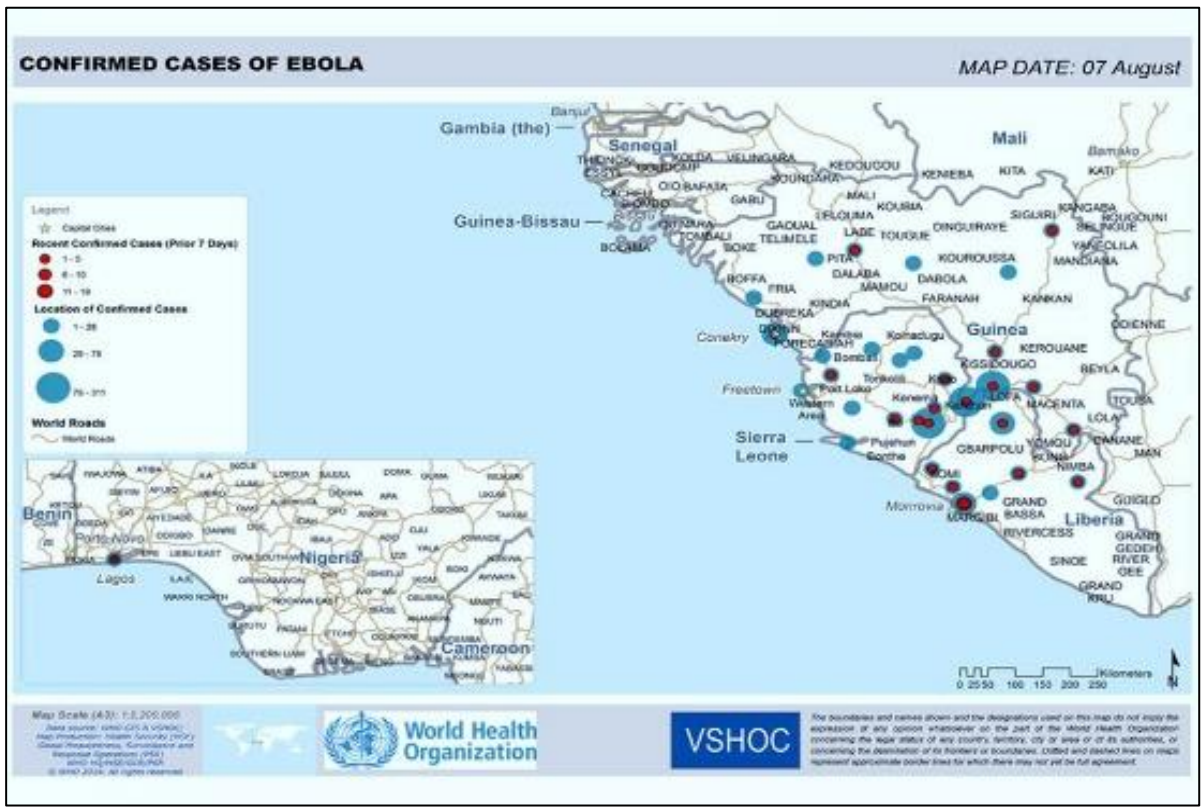


Figure 15: Example of a spot map using GIS software showing concentration of cases along one particular area



3.2.3Analyze data by person

Analysis by person describes the population with the condition as well as those at risk of contracting the condition or being exposed to factors associated with it. These factors may reveal important clues to understanding the disease, why it occurred and how to control it, thus preventing further spread. Make a distribution of the cases by each of the person variables in the reporting form. For example, compare the total number and proportion of suspected and confirmed cases by:

a) Age group

b) Sex

c) Occupation

d) Urban and rural residences

e) Vaccination status

f) Risk factors

g) Outcomes

h) Final classification

Use disease-specific information to decide which variables to compare. For example, if information has been collected about a malaria outbreak, specify the age groupings that are targeted by the National Malaria Control Program. Compare the age groupings of cases detected in young children (aged 2 months to 59 months) cases in older children (aged 5 to 14 years) and cases in adults (age 15 and over).

Analysis by person is usually recommended for describing the population at risk. This analysis is easiest when the data is case-based.

Identifying numerators and denominators

A simple count of cases does not provide all of the information needed to understand the impact of a disease on the community, health facility or district. Simple percentages and rates are useful for comparing information reported to the district. The first step in analyzing data by person is to identify the numerator and denominator for calculating percentages and rates.

a) The **numerator** is the number of specific events being measured (such as the actual number of cases or deaths of a given disease, for example the number of cases of measles that occurred during the year in school-aged children).

b) The **denominator** is the number of people in the population in which the cases or deaths of a given disease occurred, or the population at risk.

Using simple percentages

Simple percentages can be calculated to compare information from populations of different sizes. For example:

Health facility	Number of measles cases this year in school-aged children
A	42
B	30

By looking only at the number of reported cases, it appears that a higher occurrence of measles cases occurred in health facility A. But when the number of reported cases at each health facility is compared to the total number of school-aged children living in each catchment area, then the situation becomes clearer.

Health facility	Number of school-aged children living in the catchment area
A	1 150
B	600

By calculating the incidence (that is, number of new cases) of measles cases during the last 12 months in school-aged children, the district officer can compare the impact of the illness on each facility. The numerator is the number of new cases that occurred over one year. The denominator is the number of school-aged children at risk in each catchment area. The measure obtained is called incidence rate or attack rate. In this example, the incidence rate is higher in health facility B than in health facility A.

Health facility	Incidence of measles per 100 school-aged children during last 12 months
A	4%
B	5%

3.2.4Make a table for analysis by person

For each priority disease or condition under surveillance, use a table to analyze characteristics of the patients who are becoming ill. A table is a set of data organized in columns and rows. The purpose of a table is to present the data in a simple way. For surveillance and monitoring, use a table to show the number of cases and deaths from a given disease that occurred in a given time.

To make a table:

a) Decide what information you want to show on the table. For example, consider analysis of measles cases and deaths by age group.

b) Decide how many columns and rows you will need. Add an extra row at the bottom and an extra column at the right to show totals as needed. In the example, you will need a row for each age group, and a column for each variable such as age group or cases and deaths.

c) Label all the rows and columns, including measurements of time. In the example below, the analysis is done yearly. Analysis by person is also recommended for analysis of outbreak data.

d) Record the total number of cases and deaths as indicated in each row. Check to be sure the correct numbers are in the correct row or column.

Age group	Number of reported measles cases per year	Number of deaths per year
0–4 years	40	4
5–14 years	9	1
15 years and	1	0
Age unknown	28	0
Total	78	5

3.2.5 Calculate the percentage of cases occurring within a given age group

When the summary totals for each age group are entered, one analysis that can be done is to find out what percent of the cases occurred in a given age group. To calculate this percentage:

e) Identify the total number of cases reported within each age group from the summary data for which time or person characteristics are known. (For example, there are 40 cases in children 0 - 4 years of age.)

f) Calculate the total number of cases for the time or characteristic being measured. (In this example, there are 78 cases whose age is known.)

g) Divide the total number of cases within each age group by the total number of reported cases. (For example, for children aged 0 -4 years, divide 40 by 78. The answer is 0.51.)

h) Multiply the answer by 100 to calculate the percent. (Multiply 0.51 X 100. The answer is 51%.).

Age group	Number of reported cases	Percentage of reported cases in each age group
0–4 years	40	51%
5–14 years	9	12%
15 years and	1	1%
Age unknown	28	36%
Total	78	100%

3.2.6 Calculate the attack rates

The attack rate is the measure of frequency of morbidity, or speed of spread, in an at-risk population. An attack rate describes the risk of getting the disease during a specified period, such as the duration of an outbreak. Attack rate is defined as the frequency with which an event (such as a new case of illness) occurs in a population at risk over a specified period, and is usually calculated in an outbreak scenario. It is expressed per population at risk; for example: 4.5/100 000 population.

$$\frac{\text{No. new cases during specific}}{\text{Size of population at risk at start of that}} \times \text{constant (such as 100\% or}$$

Example:

16 cases of cholera in a village with a population of 800. Attack rate =16/800 =0.02

0.02 x 100 = 2.0, that is, 2 cases per 100 populations = 2.0%

During an outbreak, this data will need to be updated frequently (often daily) to see if the information being received changes the ideas regarding the causes of the outbreak.

3.2.7 Calculate a case-fatality rate

A case-fatality rate helps to:

a) Know the proportion of deaths among cases.

b) Indicate whether a case is identified and managed promptly.

c) Indicate any problems with case management once the disease has been diagnosed.

d) Identify a more virulent, new or drug-resistant pathogen.

e) Indicate poor quality of care or no medical care.

f) Compare the quality of case management between different catchment areas, cities, and districts.

g) Assess health seeking behaviors.

h) Identify underlying conditions to severe diseases, for example, immune deficiency.

i) Public health programs can impact the case-fatality rate by ensuring that cases are promptly detected and good quality case management takes place. Some disease control recommendations for specific diseases include reducing the case-fatality rate as a target for measuring whether the outbreak response has been effective.

To calculate a case-fatality rate:

a) Calculate the total number of deaths. (In the example of the measles data, there are a total of 5 deaths.)

b) Divide the total number of deaths by the total number of reported cases. (For example, the total number of reported cases is 78. The number of deaths is 5. So divide 5 by 78. 5 ÷ 78 is 0.06.)

c) Multiply the answer times 100 (0.06 X 100 equals 6%).

Age group	Number of reported	Number of	Case-fatality
0–4 years	40	4	10%
5–14 years	9	1	11%
15 years and	1	0	0
Age unknown	28	0	0
Total	78	5	6%

Please see the disease-specific guidelines in section 11 for recommendations about the essential variables to compare for each disease.

3.3 Compare analysis results with thresholds for public health action

Thresholds are markers that indicate unusual situation and require that something should happen or change. They help surveillance and program managers answer the question, "When should I take action, and what will that action be?" Information on establishing thresholds is in Section 4 of this guide.

Thresholds are based on information from two different sources:

a) In some instances, there might already be a situation analysis which has been done to describe the risks for occurrence of a particular disease, and who the people at risk might be and there is already a described action that needs to be done once the risks have been identified to prevent a wider outbreak.

b) International recommendations from technical and disease control program experts.

These guidelines discuss two types of thresholds: an alert threshold and an epidemic threshold. Not every disease or condition uses both types of thresholds, although each disease or condition has a point where a problem must be reported and an action taken.

An **alert threshold** suggests to health staff and the surveillance team that further investigation is needed. Depending on the disease or condition, an alert threshold is reached when there is one suspected case (as for an epidemic-prone disease or for a disease targeted for elimination or eradication) or when there is an unexplained increase for any disease or unusual pattern seen over a period of time in weekly or monthly summary reporting.

Action **(epidemic) threshold** triggers a definite response. It marks the specific data or investigation finding that alerts an action beyond confirming or clarifying the problem. Possible actions include communicating laboratory confirmation to affected health centers, implementing an emergency response such as an immunization activity, community awareness campaign, or improved infection control practices in the health care setting. Several thresholds have been proposed for action based on disease surveillance findings. For rare diseases or diseases targeted for eradication, detection of a single case suggests an epidemic. In such situations, one case is unusual and is a serious event. This is because these rare or targeted diseases have the potential for rapid transmission or high case-fatality rates.

In other situations, a number of cases will trigger a response. For example, the epidemic threshold for Lassa fever in Liberia is one confirmed case and the alert threshold is one suspected case (section 11)

In practice, the national level is responsible for communicating the thresholds for immediately priority reportable diseases to all reporting sites in the health system. This facilitates use of surveillance information for action at the level where it is collected. Periodically, surveillance thresholds are assessed and reset at national or international levels according to the observed trends of the diseases, events or conditions under surveillance.

Suggested thresholds for taking action in specific diseases or conditions are discussed under section 11.

3.4 Draw conclusions from the findings to generate information

a) Routinely (weekly, monthly or quarterly) gather or present the graphs, maps and tables and meet with the DHT or relevant stakeholders to review analysis results and discuss the findings.

b) Systematically review the findings following the analysis plan (see Annex 3A) if one has been prepared.

c) Make sure you also correlate the analysis you have done with other data sources, like from animals (domestic or wildlife), or the environment to assist in correct interpretation of your findings. For example, if you have seen a number of human rabies cases, it will be important to get information from the animal sector on the status of any current bite investigations, quarantined animals, or dogs vaccinated.

d) Consider quality of the data when interpreting results for example:

    i. missing data values (completeness per month, per event).
    ii. inconsistencies (between linked data elements — validation).
    iii. arithmetic errors (in correlation and aggregation).
    iv. obvious fluctuations (sharp increase or decrease per month, per event).

It is important in a system where eIDSR has been established to ensure that there are features to improve data quality and these might include:

a) Data input validation

b) Maximum and Minimum values

c) Validation rules

i. At a minimum, review the findings to:

- Assess whether the situation is improving or not, and
- Make a comparison of the observed data to the expected data

- Consider possible explanations for an apparent increase in cases
- Has there been a change in the number of health facilities reporting information?
- Has there been a change in reporting procedures or surveillance system?
- Has there been any change in the case definition that is being used to report the disease or condition?
- Is the increase or decrease a seasonal variation?
- Has there been a change in screening or treatment programs, or in community outreach or health education activities that would result in more people seeking care?
- Has there been a recent immigration or emigration to the area or an increase in refugee populations?
- Has there been any change in the quality of services being offered at the facility (for example, lines are shorter, health staff are more helpful, drugs are available, clinic fees are charged)?
- Is there an increase or improvement in laboratory testing/diagnostic procedure?
- Is there an increased awareness of disease in the public? For example, mass vaccination campaign and awareness of a particular disease will lead to an increase of cases presented to the facility
- Backlog of cases being reported which were supposed to be reported earlier?

3.5 Summarize and use the analysis to improve public health action

Prepare and share with all stakeholders including affected communities who need this information, a concise action-oriented summary reports of the surveillance findings. Use simple tables, graphs and maps, with clear and short description, interpretation, comments and recommendations.

Make statements that describe the conclusions you have drawn from the surveillance data analysis results. Use them to take action to:

a) Conduct an investigation to find out why there is an increase/decrease in the number of cases.

b) Collaborate with specific disease reduction programs to intensify surveillance if an alert threshold has been crossed.

c) Carry out advocacy with political leaders and the community for more resources if a lack of resources is identified as a cause for the increased number of cases.

Information sharing is an important surveillance function and a powerful mechanism of coordination. It motivates the staff who send reports and builds partnership through the transparency that information-sharing displays. Thus, it is important to share analysis results and provide feedback on time. Please refer to sections 7 and 8 of these guidelines for information and examples about communication and sharing feedback.

4 Section 4: Investigate suspected outbreaks and other public health events

4.1 Investigate and confirm suspected outbreaks and other public health events

This section presents the steps that should be taken when conducting an outbreak investigation.

An outbreak is defined as an increase in the number of cases of a disease or an event above what is normally expected within the population in a given area over a particular time period.
When an outbreak or any public health event or condition is detected and notified, several steps need to be followed when conducting outbreak investigation (See Figure 16).

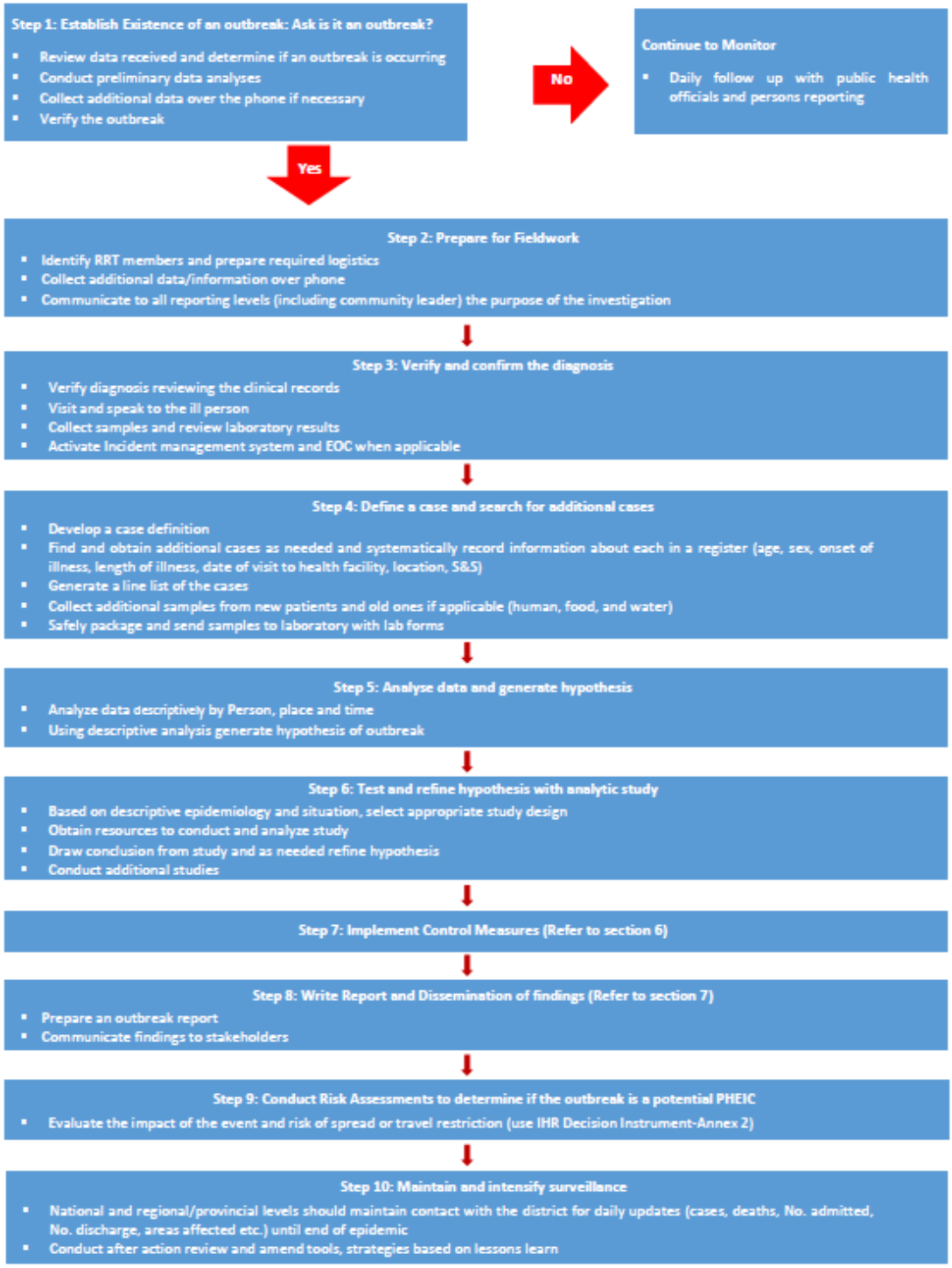
Although these steps are usually listed in order, their implementation is often non-sequential. Knowledge of these steps is crucial to proper investigation of the outbreak, using common sense and logic to determine when, how often and to what extent the different steps should be implemented in a real investigation. These steps can also be followed to investigate other public health problems in the district such as a detected increase in chronic or non-communicable diseases.

The results of an investigation targeting an outbreak or other public health event leads to identification and assessment of persons exposed to an infectious disease or affected by an unusual health event. The investigation provides relevant information needed to take immediate action and improve longer-term disease prevention activities.

The purpose of an investigation is to:

a) verify the outbreak or the public health event and risk;
b) identify and treat additional cases that have not been reported or recognized;
c) collect information and laboratory specimens for confirming the diagnosis;
d) identify the source of infection or cause of the outbreak;
e) describe the epidemiological situation in time, place and person;
f) describe how the disease is transmitted and the populations at risk;
g) select appropriate response activities to control the outbreak or the public health event; and
h) strengthen prevention activities to avoid future re-occurrence of the outbreak.

Figure 16: Steps in outbreak investigation



Key points to consider when conducting an outbreak investigation

I. Decide to investigate a reported outbreak or public health event

In Liberia, outbreak investigation is the responsibility of the district, county and national levels following notification. This depends on the magnitude, type of outbreak and

resources available. For some communicable diseases (e.g. Ebola Virus Disease (EVD)), a single suspected case is a trigger for taking action, reporting the case to a higher level and conducting an investigation because these are dangerous. Diseases with the potential for rapid transmission or high rate of fatality. The trigger for other diseases is when cases reach a defined threshold (e.g. meningitis) within a given community, geographical area or season. Sometimes a single case of a communicable disease long absence from a population or caused by an agent (e.g. bacterium or virus) not previously recognized in that community or area, or the emergence of a previously unknown disease or event, may also constitute an outbreak and should be reported and investigated.

Health personnel should promptly investigate the problem and respond to immediate cases. Preparations for taking a wider public health response should also be made. Alert and epidemic thresholds are also described in Section 11 in detail.

Note: *The threshold for some diseases will not change between districts or health facilities because these thresholds trigger immediate notification and are set by national policy.* Still, some urgent health events require the immediate commencement of investigations.

Regardless, county should aim to investigate suspected outbreaks and events within 48 hours of notification from the lower level.

Conduct an investigation when:

a) the district receives a report on the suspected outbreak of a disease targeted for immediate notification;

b) an unusual increase in the number of cases or deaths is noted during routine data analysis;

c) alert or epidemic thresholds have been reached for specific priority diseases;

d) the initial trigger for a new epidemic-prone disease could be the laboratory, communities or social media report rumors of deaths or a large number of cases that are not brought to the health facility;

e) a cluster of illnesses or deaths occurs for an inexplicable or unusual reason (e.g., adult death due to bloody diarrhea, a cluster of illness among HCWs, a cluster of (domestic and/or wild) animal deaths (e.g., widespread death of birds due to avian influenza, livestock deaths due to anthrax, unusual abortion events in livestock).

II. Verify the reported information

Outbreak investigation requires human, logistic and financial resources. When a suspected outbreak or event is reported, promptly verify that the information is accurate and reflects

conditions that suggest a true outbreak or event. This will help to ensure that resources are used effectively. To verify the information, consider the following factors:

- Source of information (e.g., is the source of the rumor reliable? Is the report coming from a health facility, a community or social media?);
- Severity of the reported illness and use of SCD for reporting;
- Number of reported cases and deaths;
- Age and gender dis-aggregation of reported cases or deaths;
- Mode of transmission of suspected pathogen and risk of wider transmission;
- Political or geographical considerations;
- Importance of maintaining good partnership and community relations;
- Available resources; and
- Determining whether it is an event of national or international concern.

Considering the above factors could reveal that the situation requires a more urgent response than expected. For example, reports on a suspected case of VHF are treated with greater urgency than reports of a less virulent disease because of the potential for high case fatality rates (CFR) and rapid transmission.

Regardless of the factors, all suspected outbreaks or events (including immediately notifiable diseases or events) reported from health facilities need to be reported to the next level within 24-48 hours.

III. Record reported outbreaks, public health events and rumors

Prepare a method for tracking the reporting of suspected outbreaks, events and rumors to the district. The purpose of tracking reported outbreaks is to ensure that the report of each suspected outbreak or rumor is followed by some action and resolution. The rumor ledger should be available at health facility, district, and the county PHEOC. Keeping such a record is necessary to collect the information needed to evaluate the timeliness and completeness of the outbreak investigation and response process.

4.2 Prepare to conduct an investigation

4.2.1 Mobilize Public Health Emergency Rapid Response Team

Before embarking on an outbreak investigation, take the necessary preparatory measures. These include providing the team with appropriate information and data on the suspected disease so that everyone knows what to look for and what precautions to take. If the disease is known, the team needs to pay particular attention to symptoms, case definitions, modes of transmission, diagnostic tests, control measures, etc.

Mobilize the district PHERRT and make arrangements for investigating the report. The PHERRT is a technical, multidisciplinary team that is available for quick mobilization and deployment to support the field response to a suspected or confirmed outbreak or event. Include the DSO for the disease or event being investigated and any other relevant staff members who have already been identified and trained to be part of the rapid response team (RRT) in the investigation. (Note: periodically review and update the immunization status of personnel who take part in infectious diseases outbreak investigation and response activities). It is advisable to have a database of trained public health workers who can rapidly be mobilized to fulfil the following functions:

a) coordination;
b) surveillance;
c) laboratory confirmation;
d) clinical case management;
e) Infection Prevention and Control (IPC);
f) environmental health and sanitation;
g) social mobilization and risk communication;
h) Psychosocial;
i) data management;
j) animal health (as applicable); and
k) logistics.

In resource constrained settings, experts that can fulfil more than one function may be co-opted into the PHERRT.

The composition of the PHERRT should include at least the following:

a) coordination team leader;
b) clinician – to oversee case management including IPC;
c) surveillance officer;
d) epidemiologist;
e) data manager;
f) laboratory scientist;
g) environmental health officer/scientist;
h) veterinary/livestock officers/wildlife officers;
i) social mobilization and risk communication officer;

j) psychosocial support (PSS) officer;

k) logistics officer;

l) others based on the specific characteristics of the outbreak (e.g., water sector expert in the case of a cholera outbreak; an expert in chemicals or radio-nuclear sciences or even the Food and Drugs Authority in case of suspected poisoning from mines).

Section 5 will describe in detail the composition of other teams when responding to an outbreak and other public health events.

Work with the team to develop ToRs that define the objectives of the investigation so that the essential information will be gathered for investigating the outbreak and implementing the most appropriate and relevant response. Also discuss with the stakeholders or parties involved. The national and county may deploy staff to support the districts in the investigation and response to outbreaks/public health emergencies as per the national policy.

Include standard guidelines and SOPs/methods that are relevant to the disease or condition being investigated (e.g., SOPs for collecting the correct laboratory specimen, case management guidelines, case investigation forms, line-listing forms, etc.).

4.2.2 Specify the respective tasks and expected roles of PHERRT team members

Inform health staff about the tasks they will be expected to carry out during the investigation and the functions they will support. Specify tentative timelines for the work. Contribute to the positive motivation for conducting the investigation. For example, make sure that the investigation team understands the link between the investigation results and the selection of response activities for preventing additional cases and saving lives. Ensure that all health and non-health staff in the team have access to and know how to use the required PPE and the universal precautions that should be taken to forestall the possible cause of the suspected outbreak or event.

4.2.3 Define supervision and communication lines

Make a plan for how the teams will communicate during an investigation. Prepare a diagram showing who will report to whom and how information will move both within the investigation team and between the district and other levels, including the most local level. For example, define who will communicate with MoH, NPHIL, MoA, NDMA, the media and the community. State the methods for communicating and how often it should be done during an outbreak to keep officials informed. Methods may include daily updates by base-radio, mobile phone, electronic mail or conference calls. Show on the diagram the lines of

authority and the roles of each staff member on the team. Define the role of non-health workers and how they should be supervised.

It is essential to institute a procedure for communicating with the community and key partners. This is important for ensuring the sharing of critical information about identifying and responding to risks associated with the outbreak or event.

4.2.4 Decide on the area where the investigation will take place

Review information already known about the suspected illness, including its mode of transmission and risk factors. Use this information to define the geographical boundaries and target population of the investigation. Begin the investigation in the most affected place. Contact nearby health facilities to determine whether they have received similar cases or recorded an increase in cases with the same diagnosis. Involve the community and local health facility staff in the planning and conduct of the investigation. Listen to and seek out information about local customs, culture and routines that could affect the success of the outbreak investigation.

4.2.5 Obtain the required authorizations

Observe the appropriate authorizations, clearances, ethical norms and permissions that are required to do the investigation. In addition to official authorizations, make sure to include agreements with local persons of influence in the community.

4.2.6 Finalize forms and methods for collecting information and specimens

Select those variables needed to identify, record and analyze the disease being investigated. Depending on staff responsibilities, review how to:

a) record case information on a line list for later use in summarizing variables for use in person, place, and time analysis;

b) fill the appropriate request forms, label laboratory samples properly and use a unique ID;

c) number for a given case;

d) prepare and update as needed, an epidemic curve;

e) construct a spot map showing the location of geographical variables, such as location of cases and deaths; and

f) develop analysis tables for risk factors, age group, sex, immunization status and so on.

4.2.7 Arrange transportation and other logistics

Make travel arrangements for getting to and from the site of the investigation and for travelling during the investigation. Ensure that transport arrangements for moving specimens to the

appropriate laboratories have been made prior to the team's departure. Other logistics such as medical supplies, vaccines and PPEs should also be available.

4.2.8 Gather supplies for collecting laboratory specimens

Counties and districts may already have in place a rapid response kit that contains supplies and equipment for carrying out an investigation (including laboratory supplies). If a kit is not available in your county and district, look at the disease-specific program guidelines and talk to laboratory specialists to find out the requirements for laboratory supplies needed for the proper collection, storage, and transport of relevant specimens (See Annex 46C). Use of PPE and disinfection materials is strongly recommended (See Annex 6D).

Refer to the disease-specific guidelines in Section 11 for laboratory requirements.

4.3 Verify and confirm the outbreak or event

Review the clinical history and epidemiology. Examine the patient or patient's records to confirm that their signs and symptoms meet the case definition. (Do not forget to use the risk appropriate PPE) Ask the patient or a family member who can speak for the patient, the following questions:

a) Where do you live?

b) When did the symptoms begin?

c) Who else is sick in your home, school, workplace, village, neighborhood?

d) Where have you travelled to recently?

e) Where have you been living recently prior to the onset of symptoms (residence at time of infection)?

f) Were you visited by anyone recently?

g) Who took care of you when you started feeling sick?

h) Have you been in contact with sick or dead animals (both domestic and wildlife) recently (for zoonosis)?

i) Have you been in contact with any sick or dead person?

j) Has anybody died in the community you live recently?

k) Did you participate in the burial ceremony? (What role did you play?)

l) For suspected AEFIs, what vaccines have you received recently?

Collect laboratory specimens and obtain laboratory results to confirm the diagnosis. If the disease can be confirmed by laboratory testing, refer to the laboratory requirements in Section 11 to determine the diagnostic test and the specimen that is required. The disease-specific laboratory requirements also describe how to collect, store and transport the relevant

specimen, and how many specimens to collect to confirm an outbreak for that particular disease. See Annex 6I. for how to pack samples using a triple package technique. Note that some diseases may require additional food or environmental samples to aid in diagnosis and ensure that these samples are also collected; e.g. water samples for cholera outbreaks and food samples for foodborne outbreaks. Review laboratory results with the investigation team, clinicians and laboratory persons at the health facility. Are the laboratory results consistent with the clinical findings? Seek additional assistance from national level program managers or technical experts if you have any questions about the laboratory results.

4.4 Define and search for additional cases

4.4.1 Define a case

After establishing that an outbreak is occurring, and verifying the correct diagnosis, a crucial step is to define what constitutes a case in this investigation. In Section 4 a list of SCDs for most IDSR priority diseases is already available. Even in situations where a case definition might be available, specific outbreaks may require the inclusion of other details in the case definitions such as: geographical location, attendance at an event or travel to a certain location. In some circumstances, you might encounter a new disease not listed in Section 11 and you will then have to develop an operational case definition. The common elements of a case definition include information on symptoms, date of onset of symptoms, laboratory results and the essential elements of person, place and time. Isolate and treat cases as necessary.

Use the case definition to isolate cases. Isolation is a critical step in limiting the spread of the disease and keeping health care facilities open and HCWs available. Depending on the suspected disease immediate isolation may be required to protect staff, patients and community members. Ensure the cases in isolation units have access to facilities like water and toilets. Use the National IPC guidelines, National guidelines on the management of isolation facility (IN-SITU) and specific case management guidelines to strengthen infection prevention and control (including isolation of patients if indicated) and case management. Provide the health facility with advice, support and supplies. Use standard precaution with all patients in the health facility and in the community, especially during an outbreak of a disease transmitted by contact with contaminated supplies and body fluids.

4.4.2 Search for additional cases

Once the initial cases have been clinically confirmed and treatment has begun, actively search for additional cases.

i. Search for suspected cases and deaths in the health facility records

In the health facilities where cases have been reported, search for additional suspected cases and deaths in the registers. Look for other patients who may have presented with the same or similar signs and symptoms as the disease or condition being investigated. The team should request health workers to search for similar cases in the neighboring health facilities and in those through which the person may have passed during travel.

See Annex 6E for instructions on how to conduct a register review. Make sure to follow up any cases that have been allowed to go home.

ii. Search for contact persons and suspected deaths in the community

Identify all areas of likely risk where the patients have lived, worked or travelled like parties, family outside the country, visiting zoo, poultry farm, laboratory or hunting sites. Also talk to other informants in the community such as chemical sellers, school teachers, veterinarians (to know about the animal health situation), farmers and community leaders.

The areas for the search may be influenced by the disease, its mode of transmission and factors of risk related to time, place and person. Visit those places and talk to people who had, or were likely to have had, contact with the patient. Ask if they or anyone they know has had an illness or condition like the one being investigated. Find out if anyone else in the area around the case has been ill with signs or symptoms that meet the case definition. Find out if there have been any recent deaths. If such recent deaths have occurred, find out the signs and symptoms experienced by the person(s) who died. Enquire about the persons who took care of these people when they were sick and about preparation of the dead before and during the burial ceremony. Collect information that will help to describe the magnitude and geographical scope of the outbreak.

Refer newly identified cases to the health facility for treatment. See Annexes 6 and 6H for examples of forms for recording and following-up on contacts for additional cases.

4.5 Develop a line list and record information about the additional cases

For each new case found in the health facility register or through searches in the community and which fits the surveillance case definition, record the collected information on a line list register and in the case-based reporting form or other recommended form. Where possible, include geo-mapping. A line list register will keep track of pertinent basic data for cases and potential cases as they are identified (See Annex for a sample line list register). Record any contacts on the contact listing form and ensure that they are monitored daily for signs and symptoms 6F of the disease over the required time period (See Annex 9N and 9O).

Record information for all cases on a "case reporting form" (See sample Annex 9D). At least record the following:

a) Patient's name, address, and village or neighborhood and locating information: If a specific address is not available, record information that can be used to contact patients if additional information is needed or to notify the patient about laboratory and investigation results.

b) Patient's age and sex: This information is used to describe the characteristics of the population affected by the disease.

c) Date of onset of symptoms and date the patient was first seen at the health facility.

d) Status of the patient, whether dead or alive: If dead, record date of death.

e) Relevant risk factor information such as immunization status if the disease being investigated is a vaccine-preventable disease; or occupation if you suspect that the outbreak targets a particular occupation.

f) Name and designation of the person reporting the information: Some diseases have their own more detailed case investigation form. Detailed forms outlining particular information for investigating specific diseases are found in Section 11.

g) Complete the case investigation form for any new cases and record the details on the line list (Annex 9).

4.6 Analyze data about the outbreak

Outbreak data analysis is similar to the analysis of summary data as described in Section 3. Data on the outbreak is analyzed and re-analyzed several times during the course of the outbreak.

During the initial analysis, summarize the outbreak or events and look for clues about where the outbreak or event is occurring, where it is moving, the source of the outbreak (from a single
source such as a well or a funeral), and the persons at risk of becoming ill (for example, young children, refugees, person living in rural areas, and so on). Present the data, taking into account time, place and person analysis (refer to Section 3) as follows:

a) Draw a histogram representing the course of the disease (an "Epi" curve);

b) Plot the cases on a spot map;

c) Make tables of the most relevant characteristics for cases (e.g., age group relative to vaccination status, sex ratio, case occurrence relative to type of occupation, etc.);

d) Calculate CFR (refer to the steps in Section 3);

e) Apart from calculating the CFR in outbreak situations, you may also wish to calculate the attack rate. See **Section 3** on how to calculate the attack rate.

4.6.1 Interpret analysis results

Review the analysis results while identifying potential risk factors about the outbreak. For example:

a) What was the causal agent of the outbreak?

b) What was the source of infection?

c) What was the transmission pattern?

d) What control measures were implemented and to what effect?

i. Interpret the time analysis results

Look at the histogram and observe the shape of the epidemic curve. Draw conclusions about when exposure to the agent that caused the illness occurred, the source of infection and related incubation period.

- If the shape of the curve suddenly increases to develop a steep up-slope, and then descends just as rapidly, exposure to the causal agent was probably over a brief period of time. There may be a common source of infection.
- If exposure to the common source was over a long period of time, the shape of the epidemic curve is more likely to be a plateau rather than a sharp peak.
- If the illness resulted from person-to-person transmission, the curve will present as a series of progressively taller peaks separated by periods of incubation.

ii. Interpret the place analysis results

Use the map to:

a) describe the geographical scope of the problem and identify high-risk areas; and

b) identify and describe any clusters or patterns of transmission or exposure. Depending on the organism that has contributed to this outbreak, specify the proximity of the cases to likely sources of infection.

iii. Interpret the person analysis results

Information generated from the person analysis is essential for planning the outbreak response because it describes more precisely the high-risk group(s) for transmission of this disease or condition. For example, if yellow fever cases occurred in patients less than 15 years of age, then the immunization response might need to target children who fall within that age bracket.

Below is an example of data analysis by person (age) which shows how the results could be used to plan for interventions. The table shows highest rates of disease among persons aged 15 years and above.

Table 4: Cholera attack rate by age group, Mankhowkwe Camp, Malawi, March-May 1988

Age group (years)	Number of cases	Population	Attack rate (%)
<5	131	5303	2.5%
5–14	261	12351	2.1%
>15	392	12091	3.2%
Total	784	29745	2.6%

Source: Reproduced with permission of the publisher, from Moren et al., 1991

iv. Analyze data and generate hypothesis

a) Conduct a descriptive analysis of the data (person, place and time).

- From the observations gathered during the descriptive process, a hypothesis can be generated about the causes of observed patterns and the factors that increase risk for a given outbreak. For instance, in Table 4 above, one might hypothesize that the older the patient, the more likely he/she will fall ill. Hence, you might want to determine if age is associated with illness.

b) Using descriptive analysis, generate a hypothesis of the outbreak.

- To test a hypothesis, use the analytic epidemiology process to answer questions on how and why the population was affected.

v. Test and refine hypothesis with an analytical study

a) Select the appropriate study design based on descriptive epidemiology and the situation.

b) Obtain resources to conduct and analyze the study.

c) Draw conclusions from the study and, as needed, refine the hypothesis.

Various study designs can be used to conduct analytical studies. These include case control studies, cohort studies and experimental studies. One example of an analytical study (case control) to test hypothesis can be found in annex 6J4. Refer to the references for further guidance on how to conduct analytical study designs.

4.7 Report writing and dissemination of findings

All reports (preliminary, interim and final) should always be disseminated, even if no conclusive risk factors have been identified for a given outbreak. Prepare also SitReps of the given outbreak and share with relevant stakeholders. Section 7 describes various channels of communication during outbreak. If risk factors are already known, formulate conclusions and recommendations about the outbreak:

a) Confirmation of the situation as an outbreak or public health problems
b) Population affected and at risk;
c) Possible causes of the outbreak/ public health problem, laboratory results, source of infection, mode of transmission, attack rate, CFR and possible risk factors;
d) Measures already initiated to contain the outbreak;
e) Recommendations: For controlling the situation further investigation/studies may be recommended. The district investigation team should then immediately prepare an outbreak investigation report. This detailed outbreak investigation report should be prepared and disseminated immediately to the health facility where the outbreak occurred and to the district, county and national who share with WHO under IHR.

A suggested outline for writing an investigation report is presented in Annex 7J.

- To understand the spread of the disease, you should draw a transmission tree starting with the index case. Moreover, the transmission tree facilitates understanding of the relative contributions of different settings to the spread of the disease in a given geographical area and is thus crucial for regulating infection transmission and adopting control measures. Reconstruction of a transmission chain or tree is possible provided the information is obtained from a line list, and a review is conducted on the timeline of dates of illness or contact with other cases, field investigations and rapid risk assessment. The transmission tree is highly relevant as it facilitates documentation of the routes of transmission in a given geographical area and thus makes it easier to plan interventions. The tree needs to be updated frequently and if a new cluster of cases starts in any part of the district try to ask questions to know if there is any linkage.

4.8 Implement prevention and control measures

Once an outbreak is identified, control measures are important for interrupting disease transmission and or limiting exposure to the source of infection. If a pathogen or other suspected source of the outbreak is identified, control measures should target specific agents, sources or reservoirs of infection. Section 11 provides a description of some of the control measures for each priority diseases and references for further reading.

Outbreak control measures are intended to:

a) control the source;

b) control of secondary transmission; and

c) prevention future outbreaks.

NOTE:

- Control measures should be implemented at the first available point in the investigation and should occur concurrently with other investigation steps. Often, nonspecific control measures can be put into place regardless of the type of disease or source.
- Ensure multisectoral engagement throughout response; i.e., at the community level and with other non-health stakeholders who might be crucial to the management of particular outbreaks. Examples if you want to enforce the public health law to the benefit of the public, engage key stakeholders and if necessary, Law enforcement agency.
- At some point during the outbreak, the public health response might include testing new potential countermeasures including vaccines and therapeutics. Thus, biomedical research can be an important and discrete component of the response. Public health efforts must always remain at the forefront of the overall outbreak response. The research conducted must be scientifically and ethically sound in order to reach definitive conclusions on efficacy and safety as expeditiously as possible. It is the role of the National Level to liaise with the Ethical Committees within the country to provide a useful guide for analogous principles in outbreak situations in such settings.

4.9 Conduct an assessment to determine if the event is a potential public health emergency of international concern

Risk assessment should be initiated as soon as possible by the designated investigation team to address the following questions:

- Is the public health impact of the event serious?
- Is the event unusual or unexpected?
- Is there a significant risk of international spread?
- Is there a significant risk of international travel or trade restrictions?

The national level may be called upon to participate in the risk assessment at the end of which the decision will be made on whether the event is a potential PHEIC, hence warranting its notification *(IHR decision instrument, http://www.who.int/ihr/revised_annex2_guidance.pdf).*

4.10 Maintain and intensify surveillance

The national and county levels should maintain contact with the district for daily updates (cases, deaths, number admitted, number discharged, areas affected, etc.) until the end of the epidemic.

Ensure that the same IDSR mechanism is used to enhance surveillance of events, and that the system is flexible enough to allow adaptation of additional variables to be collected using the existing system. This will avoid parallel reporting which can lead to confusion on the progress of the outbreak.

- Periodically, report on progress of response, and prepare daily SitReps which can be used to evaluate the response.
- Update the line list, conduct data analysis by time, person and place.
- Monitor effectiveness of the outbreak response activity.

During investigation, it is important also to intensify surveillance with neighboring counties to ensure that the outbreak does not spread to another district. It is important to share information and also plan for joint surveillance and response activities. Neighboring counties may also initiate the establishment of cross-border disease surveillance and response committees so that there is sharing of surveillance data, epidemiological and other related information during the outbreak.

4.11 Conducting regular risk assessment after the outbreak has been confirmed

As soon as the outbreak is confirmed, it is important to conduct regular assessment at each stage of the outbreak. The assessment is needed to orient and focus interventions. The risk assessment should include:

a) evaluating the susceptibility of the population and potential for spread of the event both in the affected and in neighboring areas;

b) evaluating the risk of further transmission, morbidity and mortality. To that end, the factors that can be considered include population characteristics such as size, density, movement, and setting; Under-five Mortality Rate (U5MR); period of the year (considering potential for seasonal outbreaks) and plans for any festivals or other social events that will result in increased opportunities for spread; access to health services etc.

Risk assessment should be repeated as new information becomes available. It may also be repeated on a regular timetable. For some events, different risk assessment teams may be required to work collaboratively to assemble the information for a composite picture of the risk (e.g. clinical severity, transmission dynamics and control measures). At the conclusion of the event, all the risk assessments should be formally reviewed. The systematic analysis of well- documented risk assessments identifies where improvements can be made in the management of acute public health events in future.

5 Section 5: Prepare to respond to outbreaks and other public health events

Rapid and effective response to a public health emergency such as a suspected outbreak or other public health event not only calls for an immediate response but is also one of the core capacities required by IHR (2005). Being prepared to detect and respond to such an event is an essential role of the district, regional and national levels.

Preparations for public health events include:

a) establishment of the Public Health Emergency Management Committee (PHEMC);

b) development of functional PHEOC that will act as a command and control center for coordination of public health emergencies or events/incidents at least at the national level as well as a similar coordination structure at the subnational level;

c) development of policies, plans and procedures for conducting operations, mapping available resources, estimating and procuring the required supplies and conducting SimExs to test systems; and

d) identification and training of key members of Public Health Emergency Management Subcommittees and PHERRT.

This section describes steps for organizing the preparedness activities. The IDSR surveillance matrix (Annex 7B) shows the role undertaken at all levels of the health system in Liberia with regards to the IDSR focus area of “Prepare”. These are the roles that are allocated in the EPR plan at any level.

5.1 Establish a permanent public health emergency operations center (command and control center) for oversight of public health emergency preparedness and response activities

Response to public health events would be successful if there is a more, coherent, effective and efficient coordination of various actors representing a multi-sectoral team within the context of the One Health approach. Ultimately, this will also help to reduce the impact of the event in the community.

The PHEOC should be established at least at the national and county levels, to act as a command and control center that enhances coordination and oversees public health EPR activities. To establish the PHEOC, a legislation was developed to allow the NPHIL to establish and manage the PHEOC. The PHEOC acts as a command and control center and is

a hub for the coordination of information and resources to support incident or event management activities, thus ensuring a coordinated response to emergencies that involve health consequences and public health threats.

The PHEOC will require the following essential elements so as to be fully functional in its support to EPR:

a) plans and procedures for operations;
b) telecommunication technology and infrastructure to enable timely communication;
c) information system to support informed decision-making; and
d) trained human resources.
e) other logistics as required

The PHEOC will monitor events using various sources of data; facilitate and improve communication between public health and emergency management personnel; and facilitate coordination with multiple response partners. The PHEOC feed into the National DRM Emergency Operations Center (EOC) to manage escalated events of national magnitude. It is highly recommended that the PHEOC is positioned at the highest level where there is already an organ mandating the coordination of public health emergencies. The PHEOC reports to the Director General of NPHIL who then reports to the Minister for Health.

During public health emergencies, the PHEOC, which is the command and control center guided by the National Emergency Preparedness and Response Committee (NEPRC), is activated and functions as a center for decision-making and the coordination of information and resources for strategic management of public health events and emergencies. The PHEOC uses the Incident Management System (IMS), which is a standardized approach to managing and coordinating the response by providing a common hierarchy for staff response. In the context of IDSR, the IMS is represented by the PHEMC at strategic level, which will assemble during activation of PHEOC; as well as the National Public Health Emergency Management Subcommittees which are also present at the operational level. The IMS outlines the specific roles and responsibilities of responders during an event, while providing a common framework for government, the private sector and NGOs to work seamlessly together. In IMS, each person is assigned a specific role and follows a set command structure. It can be staffed with additional teams of subject matter experts, analysts, logisticians and support staff depending on the situation at that particular time. The operational structure of PHEOC (command and control center) can also be scaled up, which is essential for maintaining its effectiveness and it can be modular (i.e. can be partially or fully activated) depending on situational needs *(See WHO Framework for a Public Health Emergency Operation Center/the National Public Health Emergency Operation Center Handbook).*

Most importantly, IMS should be functional at all levels of health system delivery (national, county and district). Once the IMS is activated during public health emergency, it is important for the PHEMC to meet regularly (at least daily) to facilitate coordination, communication and information-sharing; adopt containment measures; and facilitate the activation and deployment of the PHERRT. During activation, the PHEOC will also help to ensure the flow of information to the respective departments, relevant sectors and partners, thus facilitating relief operations.

Having a command and control center is essential for preparedness and response to public health events. Counties will need to have PHEOCs, with basic facilities that support the direct coordination of preparedness and response to public health emergency, facilitate real-time communication and information sharing between various stakeholders at their levels and, ensure that there is a mechanism for sharing information with the national-level PHEOC. However similar existing coordinating structures or mechanisms currently exist at the subnational level (county) which also acts as command and control centers; i.e. the county PHEMC and the associated management subcommittees, which also use the same IMS structure of the PHEOC during public health emergency. Such structure should be used to continue supporting the coordination of preparedness and response activities, ensure real-time communication and information-sharing between various actors at all levels.

When inactive, the PHEOC (command and control center) usually reduces in size and respective members under various Public Health Emergency Response Management Subcommittees return to their respective working stations. The few staff remaining at the center will then liaise with respective sections or departments to continue maintaining plans and procedures; conducting training and SimExs as well as routine and event-based surveillance activities; and maintaining the systematic database of the resources available, such as important phone numbers, names and addresses of important government and non-government officials, international bodies and NGOs.

5.2 Establish a district, county and national public health emergency management committee

The PHEMC should be established at district, county and national levels. PHEMC members across these levels should work closely with their counterparts to plan and monitor the implementation of public health emergency plans. These coordinating committees should operate at their respective levels and are composed of technical and non-technical members from the health and other sectors. The role of PHEMC is to develop and oversee the implementation of emergency preparedness strategies, action plans and procedures.

The PHEMC can also be referred to as a policy group. At the national level, the PHEMC provides policy direction on the implementation and operation of the national PHEOC and also provides oversight, policy and strategic guidance on the implementation of functional PHEOCs or similar coordination structures or mechanisms at the subnational levels.

The PHEMC committee also mobilize funds for PHEOC development and sustainability. The PHEMC committee will provide oversight for PHEOC operations and, in the absence of pre-established mutual aid arrangements with other jurisdictions, it may also be the authority that handles requests for external material or financial assistance, particularly in complex, multi-sectoral or multijurisdictional emergencies.

5.2.1 Identify functions of the Public Health Emergency Management Committee

a) Ensure coordination and integration of surveillance and response activities across all levels.

b) Develop a national/regional/district EPR plan to manage all potential emergencies including disease outbreaks and detection of other emerging public health events or hazards; and clearly stipulate surge capacity to respond to public health emergency at district, regional or national level.

c) Map available human and material resources: experts, logistics including distribution, finance etc.

d) Periodically review and update the plan in response to any changes in technical, managerial or epidemiological situation or any other risk identified.

e) Liaise with NDMA to ensure multisectoral preparedness and response.

f) Establish a community communication plan for sharing information with communities before, during and after any public health emergency. The plan should include mapping of all communication channels-community radio, data on cellular and internet penetration, NGO/FBO networks, prearranged agreements with cellular companies, other platforms (women's groups etc.) that can be leveraged for reaching the public. The plan should also include liaison activities with relevant partners in multiple sectors including PoE and other required reporting sites.

g) Coordinate community risk mapping activities within the district and ensure that all reporting sites are aware of the use of thresholds for reporting acute outbreaks or events.

h) Identify and mobilize resources for emergency prevention and control including procurement of response and communication supplies. There should also be a mechanism to monitor the use of resources before, during and after the emergency event.

i) Ensure that emergency material stockpiles at the district/regional/national levels are procured, monitored, and updated regularly.

j) Enhance linkages with CBS focal persons to ensure flow of data for early detection of public health events.

k) Coordinate training of community, health facility, and district/regional/national personnel in EPR.

l) Ensure that there is periodic organization of emergency response simulation activities at the national, regional, district and community levels.

m) Coordinate the post-emergency evaluation and plan to disseminate findings with the affected communities.

n) Ensure provision of efficient administrative and financial management support including human resources; cash flow by estimating, tracking and approving response-related expenditure; monitoring and coordination of funding from all sources.

o) Ensure that the facilities' communication technology and information system is ready to support any type of emergency.

p) Oversee the activation of the national PHEOC and similar coordination structures at the subnational level (county and district), during public health emergencies. Furthermore, activation of the IMS structure; i.e., formation of Public Health Emergency Management Subcommittees and deployment of the PHERRT.

q) Hold regular meetings to strengthen preparedness capacity (e.g., training HCWs) during periods when there are no public health emergencies.

5.2.2 Identify members of the Public Health Emergency Management Committees

Organize the PHEMC to include a mix of representatives from the public, NGO and private sectors to match the functions listed above. For example, in the county level committee, participants from the public sector may include:

a) County administrator (superintendent);

b) County police commissioner;

c) County civic or community representative, district chief executive, mayor;

d) County Health officer (CHO);

e) Hospital Medical Director;

f) County director of veterinary/agricultural services or equivalent;

g) Public health specialist / officer;

h) County disease control officer or equivalent (CSO);

i) County environmental health officer or equivalent;

j) County education officer;
k) County water officer;
l) County engineer;
m) Wildlife officer;
n) Natural resources and veterinary experts;
o) Laboratory technician or laboratory technologist from the district laboratory (for both human and animals);
p) County development officer;
q) Immigration officer;
r) Officer responsible for risk communication;
s) Legal officer;
t) Senior military / national security officer;
u) Influential leaders - Members of parliament, tribal chiefs, religious leaders, etc.

NB: At the national and county levels, an equivalent of the above should be used in order to ensure a more comprehensive multi-sectoral structure. At the national level, consider including directors from other key relevant ministries, heads of agencies, national health research institutes (human and animal). Members of the IHR NFP should always be part of the national team.

From NGOs with health care activities in the area, include representatives from:
a) Community health programs and faith-based health facilities;
b) Red Cross, Red Crescent or similar agencies working in the area;
c) Local/International NGOs;
d) Civil society organizations; and
e) UN organizations.

From the private sector, include representatives from:
a) Private health facilities;
b) Private laboratories;
c) Pharmacists or chemists;
d) Business community;
e) Research and training institutions; and
f) Professional associations.

NB: The Committee should have a chairperson; e.g., someone holding the highest political position in the district.

5.2.3 Public Health Emergency Management Committee meetings

When there is no outbreak or any other public health event, the PHEMC should meet regularly, on a monthly or quarterly basis, in order to:

a) review the national public health EPR plan;

b) exchange information on risk monitoring. It should be emphasized that other relevant health sectors can equally benefit from information provided by the human health sector and vice versa. In some events, human cases can be the first indication of a threat to other sectors. For example, animal health services will be impacted by cases of Crimean-Congo hemorrhagic fever, as cases in humans constitute the primary indicator for viral circulation in animals as infection is asymptomatic in livestock. For instance, vaccination among livestock might be crucial if human cases of anthrax or rift valley fever have been detected as a signal of asymptomatic diseases among animals;

c) review disease trends and updates on preparedness steps;

d) review the level of preparedness at the beginning of each epidemic season (e.g., before the period when cases of meningitis increase);

e) monitor stocks of equipment for event investigation and response;

f) share the conclusions and recommendations of these meetings with respective committees at all levels; and

g) organize SimExs/drills to test the effectiveness and efficiency of the EPR plans.

It should be noted that the PHEOC if already established will serve as a hub for coordinating these activities. If not, a similar coordination structure or mechanism will serve the same purpose.

During an *emergency or outbreak response*, the PHEMC should:

a) meet as soon as the outbreak or event is established;

b) conduct situational analysis and grade the level of the event;

c) activate the PHEOC or similar coordinating structures at the national and subnational levels and deploy PHERRT to the field to investigate and respond to the event. It will also activate the Public Health Emergency Management Subcommittees (See Annex 7 for a detailed description of part of the technical teams with their roles and responsibilities);

d) assess the need for and request support from the higher level, if need be. For example, a district will request support from the regional or national EPR PHERRT when necessary;

e) meet at least daily at the beginning of an outbreak or event and weekly as the response

continues;

f) regularly review the outbreak response and take action to improve outbreak control actions as indicated;

g) document and communicate outbreak response actions to the next higher level; and

h) conduct an after-action review.

5.3 Establish Public Health Emergency Management Subcommittees at all levels

The Public Health Emergency Response Subcommittees are formed by the PHEMC to oversee the daily management of the public health emergencies. They consist of technical and non- technical teams, tasked with oversight of the daily management of the event/incident and provide feedback to the PHEMC committee for decision-making.

They are subdivided into technical and non-technical teams depending on their functions as shown in Annex 7

5.3.1 County Epidemic Preparedness and Response Committee

The role of the county-level EPR Committee is to develop and oversee the implementation of epidemic strategies, action work plans and procedures working closely with county partners and national colleagues. The county level EPR Committee works closely with their county and national counterparts to plan and monitor the implementation of the EPR plan. EPR Committees composed of technical and non-technical members from health and other sectors. The EPR committee may establish sub committees to support their activities. See Annex 7 for details on establishing EPR Committees.

The EPR Committee meets regularly even when there is not an outbreak to assess risks and update preparedness plans. They review trends of diseases and share their conclusions and recommendations with local and national authorities.

More details about the functions, roles, and responsibilities of the EPR Committee at county level are in Annex 7.

5.4 Epidemic Preparedness and Response Plan

The National EPR Plan for Liberia was finalized in April 2016 and will be updated regularly. The plan focuses on preparedness and response activities before, during, and after an epidemic (or action) threshold for a specific disease has been reached.

The development of the National EPR plan was done in collaboration and coordination with County level plans. Examples of what is covered in the response plan include: identifying key members of a RRT and defining their roles and responsibilities, mapping available resources, estimating required supplies and procuring them. If these steps are carried out in advance of an event, the health system will be able to function promptly, effectively, and efficiently to prevent unnecessary morbidity or mortality due to the emergency.

Counties also have specific County EPR Plans. The purpose of these plans is to strengthen the ability of the county or district to be well prepared and to respond promptly when an acute outbreak or other public health event is detected. Each of the County epidemic preparedness and response teams did the following in their planning process:

a) Based their plans on risk assessments, and specified the resources available for epidemic preparedness and response
b) Accounted for diseases with epidemic potential in the local and national geographical area.
c) Provided estimates of the population at risk for epidemic-prone diseases and other public health emergencies
d) Clearly indicated for each suspected outbreak which reference laboratory will be used for confirmation
e) Provided estimates of quantities of drugs, vaccines and supplies for each epidemic-prone disease likely to occur in the district
f) Planned to be tested through dry runs and simulations before implementation and based on lessons learned in previous outbreaks.
g) Include SOPs
h) Included work plans

The County Epidemic Preparedness plans are available from the County Health Offices.

5.4.1 Supplies necessary for emergency response and investigations

Outbreaks and other public health emergencies require the rapid mobilization of resources including PPE, vaccines, medicines, lab reagents and supplies, and appropriate forms for reporting. These materials and supplies should be stockpiled onsite by the CHT or when necessary, provided by supporting partners. In addition, vehicles may be required for movement of personnel and ambulances for movement of sick persons.

The County Logistician is in charge of coordinating available supplies that are held by either the CHT or by partners supporting the county. This includes comprehensive stock lists as well as lists of supplies needed for response. In the event of a response, the County Logistician will coordinate and deploy all necessary resources from stocks available in the

CHT warehouse and those made available by the MoH, other government ministries and CHT partners.

Periodically, for example, every 3-4 months, make sure the supplies are dry, clean, and ready to be used. At a minimum, carry out the following tasks (relevant to each level) to estimate necessary supplies, inventory what is available, and plan to procure essential items for use in response. List all required items for carrying out surveillance, laboratory and response necessary for detecting and responding to priority diseases, conditions and events.

a) Case investigation and contact tracing forms
b) Laboratory supplies
c) Case management (treatment options) and field intervention materials including PPE and disinfection equipment
d) Prophylaxis and other logistics supplies
e) Make an inventory and note the quantity of each item that is available.
f) Observe expiry dates and practice best logistical practices for packing, shipping, storing and disposing of supplies and materials.
g) Establish a critical or minimum quantity for each item that would need to be on hand for an investigation or response activity. Consider logistic and epidemiologic factors in establish minimum quantities.

Annex 7A contains a checklist of supplies for responding to epidemics.

5.5 Establishing a Rapid Response Team

The RRT is a technical, multi-disciplinary team that is available for quick mobilization and deployment to support the field response to a suspected or confirmed outbreak or event if local capacity is exceeded. RRT activation is based on a critical analysis of the situation/context. Further details are described in Section 6.2.

Before leaving for the field it is important to prepare an outbreak plan specific to the situation. Refer to Section 5.4 and 5.5 for more details. The RRT can be activated at district or county level. The District Health Officer (DHO)/CHO will make the decision to deploy the RRT following verification of the reported event. The roles of the RRT are to:

a) Investigate and verify rumors and reported outbreaks and other public health events
b) Propose and initiate appropriate strategies and control measures in the event of an outbreak
c) Establish appropriate and coordinated risk communications messaging system through a trained spokesperson
d) Coordinate rapid response actions with partners and other agencies (including lab

testing)

e) Conduct ongoing monitoring and evaluation of effectiveness of control measures through continuous epidemiological analysis of event

f) Prepare detailed investigation reports

g) Contribute to ongoing preparedness assessments and the final evaluation of any outbreak response.

Members of the RRT can be selected according to the emergency situation. A core team should be established at the County or District levels led by the CHO or DHO. The team members could include the following (core functions):

a) Coordination – Team Lead

b) Surveillance and epidemiology

c) Including data management

d) Case management, including IPC

e) Implemented at HCF level by OIC

f) Overall coordination of case management activities by DHO if needed

g) Laboratory

h) Environmental Health, including Water, Sanitation and Hygiene (WASH) and Dead Body Management (DBM)

- Environmental Health Technicians will support IPC coordination at the district level & liaise with Case Management working groups from MOH for implementation at the healthcare facilities.

i) Veterinary/Livestock Officers

j) Health promotion/Social Mobilization

k) PSS

l) Logistics

Others based on availability of technical staff and type of event or outbreak.

5.6 Risk mapping for outbreaks and other public health events

Preparedness activities should be ongoing and updated periodically. This includes assessing risks (in the catchment area) with the potential to affect community health. These risk assessment activities may include evaluating drinking water sources or food storage methods. Regularly, for example, once a year, assess those risks and record the information on a map. This is useful information when considering supplies, transport and other

resource issues necessary for the response. Risk mapping should extend to all public health hazards as specified by IHR (2005), including chemical, zoonotic, radiological and nuclear.

6 Section 6: Respond to outbreak and other public health events

6.1 Overview on how to respond to outbreaks and other public health events

The goal of IDSR is to use data for public health action. This section describes steps for declaring an outbreak and activating the response structures, conducting a public health response and providing general directions for immediate response actions targeting the leading causes of illness, death and disability.

When an outbreak of acute public health event or condition is detected, an investigation should be conducted to determine its cause and prevent spread of the illness or further morbidity and mortality as described in Section 4.

Effective coordination of response activities is also critical, as many actors/stakeholders will be involved. It is essential that all actors/stakeholders be identified in advance, including their areas of support, roles and responsibilities to enable smooth response during an epidemic or any other public health event. This is the role of the PHERRT (defined in Section 5) which through activation of the PHEOC will ensure the effective coordination of response activities across different sectors and donors (as discussed in Section 5).

The results of the investigation should guide the response. Most disease prevention and control programs promote recommended response actions such as conducting a mass immunization campaign for a vaccine-preventable disease, strengthening nutritional support and feeding practices for children with malnutrition, or administering anti-malarial, antibiotic or antiviral treatments.

Successful responses are carried out with community involvement and often include a community education and behavior change component. Multidisciplinary RRT will be needed to plan and implement these responses only when the potential impact of the disease to the population requires it, or the capacity of the DHT or CHT to respond is inadequate, should RRT activation be considered. Regardless of the specific recommended response, the county's role in selecting and implementing a recommended response is essential for safeguarding the health and wellbeing of communities in the district.

A public health response is informed by the initial investigation into the outbreak or unusual public health event. After consideration of the results of the initial verification and investigation the DHT or CHT may decide to initiate a response to stop the transmission of a potentially epidemic disease in order to reduce morbidity and mortality. When an alert

and/or action threshold is reached at county or national level there are different degrees (escalations) of responses that can occur, including National IMS activation in unprecedented cases or those that exceed the capacity to respond and maintain core activities. Critical for success is good communication, prompt responses, and good feedback mechanisms as it is a dynamic, fluid situation.

Refer to section 11 for specific guidelines on surveillance and response activities for priority diseases in IDSR. Please consult relevant WHO guidelines for responding to chemical and radio-nuclear events.

When responding to an outbreak or other public health event or condition, refer to RRT Framework from Liberia MOH and NPHIL. Under the IHR (2005), countries are required to be involved in response to hazards such as infectious diseases, zoonosis, food safety, chemical, radio-nuclear and other unknown events if they are detected.

6.2 Declaring an Outbreak and Activating the Response Structures

Once an alert threshold is reached at district level, the DHT should notify the County and subsequently the national level (MOH/NPHIL/MOA/EPA and other relevant One Health sectors.). Depending on the event, at the national level, the IHR NFP will assess whether the event is a potential PHEIC using the IHR decision instrument (Annex 2A). The NFP in consultation with the Chief Medical Officer (MOH)/Director-General of the NPHIL shall notify the WHO IHR AFRO Office. They will then alert the nearby Counties and districts (where applicable) about the outbreak to ensure that there is coordination of response efforts. While waiting for confirmation of the laboratory diagnosis, there may be a declaration of an outbreak by the MoH.

The level of response will vary, taking into account the following factors:

a) Number of cases (single versus cluster outbreak)
b) Potential impact of the illness on the population
c) Geographic location (2 or more counties, cross border, etc.)
d) County resource availability (human, financial, logistic)

At this preliminary stage (still at alert threshold) the national level response may be minimum; verification, monitoring and when necessary providing county support including resource mobilization. The IMS will be in a state of alertness; prepared to be activated at any given time if required.

Once an epidemic threshold of a disease is reached, the county will immediately inform the national level (MOH/NPHIL), and pending confirmation there may be the declaration of an

outbreak. For some conditions, the case definition will change in the context of an outbreak. The decision to go to an outbreak case definition is based on a risk assessment that considers factors such as whether the area has been the site of previous cases, the presence of cases in surrounding countries, presence of the virus in animals, reservoir, or potential carriers/survivors. For high risk and outbreak scenarios refer to National EPR plan 2016.

The CHO/County Agriculture Coordinator (CAC)/ other relevant One Health sectors will determine if an outbreak is declared. When an outbreak is declared the established County or National PHERRTare switched into response mode and the IMS may be activated; the degree and level of IMS activation, RRT activations, and the defined roles will depend on the type and magnitude of outbreak.

If the decision is made to activate a PHERRT:

a) Provide orientation or training along with relevant supplies for the county and District RRT and HCF staff. Review existing resources as defined in the EPR plan. Determine what additional resources are required. Request these from local partners in first instance before approaching national level. Request outbreak or event response funds to be released in line with the existing preparedness and response plan.

b) Assign clear responsibilities to individuals or teams for specific response activities.

c) Mobilize logistics support (travel of PHERRT, accommodation arrangement, communication, other essential equipment).

If supplies are not available locally:

a) Contact the national level (MOH/NPHIL/MOA/EPA and other relevant One Health sectors) to request alternate suppliers

b) Borrow from other services, activities, or NGOs in your district

c) Identify practical low-cost substitutes

6.3 Mobilizing Public Health Emergency Rapid Response Teams for immediate action

The multidisciplinary PHERRT would have already been identified during preparedness activities. Mobilize the teams and make sure that their membership reflects the technical needs of the response. Refer to Section 5 of these guidelines for recommendations on the composition as well as the roles and responsibilities of the RRT.

6.3.1 Convene the District Public Health Emergency Response Team (PHERRT)

Once an outbreak or event is confirmed, the DHT will work with the local authority to convene the PHERRT to assess and implement the response. They will also activate the IMS (see Section 5). The following steps should be taken:

a) Request the release of outbreak or event response tools and funds.

b) Alert neighboring districts/counties within and outside the country about the outbreak. If they are reporting a similar outbreak, coordinate response efforts with them. If there is an already established cross-border surveillance and response framework with a neighboring country, then inform the neighboring district in that country. If not, the IHR NFP must communicate with the neighboring NFP to notify them of the public health event. This will facilitate coordination of the response to the public health event and curb the spread of the disease beyond the catchment area.

c) Assign clear responsibilities for specific response activities to lead the technical committee. They will also review the IMS team to ensure that it is adequately composed; i.e., has all the technical and non-technical members (See Section 5).

d) Provide orientation or training along with an adequate stock of relevant supplies and tools for the district response team and affected health facility staff.

e) Review existing resources as defined in the preparedness plan and determine what additional resources are required.

   For example, consider:

   i. the human resources that could be mobilized to manage the epidemic;
   ii. funds to support response activities; and
   iii. other logistical support; e.g., vehicles, fuel and phones.

f) Request emergency stocks or PPE, disinfection and required medicines and other medical supplies such as specimen transport kits.

g) Provide laboratory or diagnostic support for confirmation of pathogens responsible for the epidemics. If the district does not have the capacity to safely collect, package and ship the specimen, contact the National Public Health Reference Laboratory (NPHRL) for assistance. For laboratories where referral of specimen is a challenge, consider using approved rapid diagnostic kits or any other point-of-care (PoC) diagnostics, if available.

h) Mobilize logistical support (travel of RRT, accommodation arrangements, communication, other essential equipment) for the district and community levels.

i) If supplies are not available locally:

   i. contact the county or national levels to request alternate suppliers;

ii. collaborate with other services, activities or NGOs or private pharmacies/laboratories in your area; and

iii. identify practical low-cost substitutes.

j) Ensure clear lines of communication and appoint a spokesperson

6.4 Select and implement appropriate public health response activities

Review investigation results and data analysis interpretation provided by PHERRT to select appropriate response activities that would contain the confirmed outbreak or public health event. Regardless of the specific causes of the outbreak or event, the success of the response depends on activation of the IMS and implementation of intervention strategies such as:

a) overall coordination;

b) case management as well as infection, IPC;

c) logistics and supply chain management;

d) laboratory or diagnostic surveillance and epidemiology;

e) social mobilization and risk communication;

f) reactive vaccination;

g) WASH; and

h) vector control.

6.4.1 Coordinating the Response

Effective coordination of response activities is critical to large-scale responses with many actors involved. Two elements of coordination that have proved to be essential in Liberia include the following:

a) Partner mapping by their areas of support/operation improves coordination and reduces duplication

b) Providing ToRs and deliverables for all technical assistance or implementing partners assisting the CHT/DHT.

Implementing a response means executing the operational steps so that the actions are carried out as planned. Regardless of the specific causes of the outbreak or event, the success of the response depends on the success of general factors such as management (treatment and monitoring of patients for adverse events particularly if experimental medicines or vaccines are used) and appropriate IPC, provision of supplies and availability of trained health staff.

The selected activities for responding to outbreaks or public health events include the following:

a) strengthen case management and infection prevention and control measures;
b) build the capacity of response staff;
c) enhance surveillance during the response;
d) enhance surveillance in neighboring border district;
e) Provide community support during the response;
f) inform and educate the community;
g) conduct a mass vaccination campaign;
h) improve access to clean and safe water;
i) ensure safe disposal of infectious waste;
j) improve food-handling practices;
k) reduce exposure to infectious or environmental hazards;
l) ensure safe and dignified burial and handling of dead bodies; and
m) ensure appropriate and adequate logistics and supplies.
n) Risk communication (described in section 7)

6.4.2 Strengthen case management and infection prevention and control measures

Take steps to support improved clinical practices in the district as indicated below:

a) Train and equip health workers at the district level to implement these measures.
b) Ensure that clinicians receive laboratory confirmation results where necessary.
c) Ensure that health workers record all patients in a recognizable standardized register and a line list.
d) Ask the officer-in-charge at each health facility to identify an area that can be used to accommodate many patients during epidemics involving a large number of cases.
e) Provide SOPs that include IPC guidelines.
f) Implement IPC and risk mitigation measures such as:
    i. establish triage and isolation wards for highly infectious diseases (EVD, cholera, SARS, etc.).
    ii. ensure that health staff have access to safety and PPE for any infectious diseases (especially for EVD and SARS);
    iii. ensure that there are safe practices and protection of non-health workers (supporting staff, e.g. security, cleaners, administrative staff);

iv. assess and assure WASH standards for health facilities;

v. provide oversight about disposal of PPE and other contaminated supplies; and

vi. ensure appropriate biosafety and biosecurity for animals (farms, markets, etc.).

g) Ensure that the necessary medicines and treatment supplies are available.

h) Ensure that the proper treatment protocols are available.

i. Review the SOPs for the referral system;

ii. Ensure that a proper discharge protocol of cases linked to social workers is available.

6.4.3 Build the capacity of response staff

Provide relevant capacity-building opportunities for response staff on the outbreak or event case definition, case management procedures, reporting process and required data elements. It is essential that members of the PHERRT are aware of and have access to any indicated PPE and IPC practices relevant for the disease targeted by the response. If there are immunization requirements for responding to the particular disease or condition, ensure that members of PHERRT are protected with the required vaccines.

To reinforce the skills of response staff:

a) Give clear and concise directions to health workers and other staff participating in the response.

b) Select topics for orientation or training. Emphasize case management and infection prevention and control for the specific disease according to disease-specific recommendations. Select other training topics depending on the risk of exposure to the specific public health hazard, for example:

i. case management protocols for cases;

ii. enhancing standard precautions (use of clean water, hand-washing and safe disposal of sharps);

iii. barrier nursing and use of protective clothing;

iv. isolation precautions;

v. treatment protocols such as delivering oral rehydration salts (ORS) and using intravenous fluids;

vi. disinfecting surfaces, clothing and equipment;

vii. safe disposal of bodies and dignified burials;

viii. safe disposal of animal carcasses;

ix. others which may seem necessary and may include client-patient interactions and counselling skills, orientation on how health worker would interact with CBS focal persons etc.

c) Conduct orientation and training

i. reorient the district PHEMC, PHERRT and other health and non-health personnel on epidemic management based on the current epidemic.

ii. In an urgent situation, there often is not time for formal training. Provide on-the- job training as needed. Make sure there is an opportunity for the training physician or nursing staff to observe the trainees using the updated or new skill.

iii. Monitor participant performance and review skills as needed.

6.4.4 Enhance surveillance during the response

During a response to an outbreak, health staff at all health facilities must be vigilant in surveillance of the disease, condition or events, by liaising with the CHW or any person identified as community focal person. For example, members of the response teams and health staff in affected facilities should:

a) search for additional persons who have the specific disease and refer them to the health facility or treatment centers, or if necessary, quarantine the household and manage the patient, ensuring that they have access to consistent/adequate food, water, and non-food items (i.e. soap, chlorine, firewood, medicines, sanitary pads, etc.);

b) ensure timely provision of laboratory information to the team;

c) update the line list, make data analysis by time (epi curve), person (age and sex) and place (mapping of cases);

d) ensure timely provision of laboratory information to the team;

e) update the line list, make data analysis by time (epi curve), person (age and sex) and place (mapping of cases);

f) monitor the effectiveness of the outbreak response activity;

g) report daily at the beginning of the epidemic; once the epidemic progresses, the District PHERRT can decide on a different frequency of reporting;

h) actively trace and follow up contacts as indicated (See Section 4 for how to do contact tracing);

i) monitor the effectiveness of the outbreak response activity;

j) report daily at the beginning of the epidemic; once the epidemic progresses, the district public health emergency preparedness and response (PHEPR) committee can decide on a different frequency of reporting;

k) actively trace and follow up contacts as indicated (See Section 4 for how to do contact tracing).

6.4.5 Enhance surveillance with neighboring border counties

During response, it is important also to work closely with neighboring counties to ensure that the outbreak does not spill to another county. It is important to share information and also plan for joint surveillance and response activities.

Initiate the establishment of the cross-border disease surveillance and response committees to provide a platform for sharing surveillance data, epidemiological and other related information during the outbreak. The committee should have members from both neighboring counties and its composition should include at least:

a) CSO
b) CDO
c) CHO
d) County Environmental Health Supervisor (CEHS)
e) County Clinical Supervisor (CCS)
f) County Animal Health Surveillance Officer (CAHSO)

The committee can also coopt other members depending on the disease profile and the disease outbreak/public health emergency being handled.

The committee will meet as soon as a public health emergency is identified and then weekly or bi-weekly as it continues. It will continue to hold routine quarterly meetings during the inter-epidemic period to review disease trends, other early warning systems and its counties level of preparedness.

6.4.6 Provide community support during response

CBS focal persons (CHAs/CHVs and CAHWs) can be the first responders and take steps to make the situation as safe as possible for the community. Some of the actions include the following:

a) Engage and inform community leaders with information on the situation and actions that can be taken to mitigate the situation.
b) Keep people away from a 'risk' area (potentially contaminated water source).
c) Respectfully isolate anyone with a potentially infectious disease paying particular attention to cultural sensitivities.
d) Quarantine for animals, recommend market closures, etc.
e) Provide community education including specific actions the community can take to protect themselves.
f) Engage in IPC and hygiene promotion in coordination with any efforts at strengthening the availability of materials/infrastructure for IPC and hygiene.
g) Identify local effective channels for delivery of the information to the community.

h) Conduct door-to-door campaigns to reach every household within the catchment area in order to curb the spread of the public health event and to encourage self-reporting, health-seeking behavior among people who have had contact with the public health event or are suspected to be public health event cases.

6.4.7 Inform and educate the community

Effective risk communication is an essential element of managing public health events. It is a crosscutting activity that can impact other technical areas of the response such as WASH, vaccination, community surveillance, etc. It is also essential to create trust between first responders and the community. When the public is at risk of a real or potential health threat, treatment options may be limited, direct interventions may take time to organize, and resources may be few. Communicating advice and guidance, therefore, may be the most important public health tool in managing a risk.

Keep the public informed to calm their fears and encourage cooperation with the response efforts. Develop community education messages with information about recognizing the illness, how to prevent transmission and when to seek treatment. Begin communication activities with the community as soon as an epidemic or public health problem is identified. Identify community groups or local NGO or outreach teams that can help gather information and amplify the messages. Ensure consistency in content of messaging between all messengers (community leaders, health care personnel, religious leaders, etc.).

The following should be considered for effective risk communication:

a) Decide what to communicate by referring to disease-specific recommendations in Section 11 Make sure to include:

    i. signs and symptoms of the disease;

    ii. how to treat the disease at home, if home treatment is recommended and how to prepare disinfectant solutions;

    iii. prevention behaviors that are feasible and that have a high likelihood of preventing disease transmission;

    iv. when to come to the health facility for evaluation and treatment;

    v. immunization recommendations, if any.

    At the same time, maintain active processes for collecting qualitative information needed to establish and address any circulating rumors.

b) Decide how to state the message. Make sure that the messages:

    i. use local terminology;

ii. are culturally sensitive and acceptable;

iii. are clear and concise;

iv. consider local traditions;

v. address beliefs about the disease.

NB: Consider pre-testing the messages from similar settings before dissemination.

c) Select the appropriate communication methods available in your district. For example:

i. mass media, (radio, television, newspapers);

ii. meetings (health personnel, community, religious, opinion and political leaders);

iii. educational and communication materials (posters, fliers);

iv. multimedia presentations (e.g., films, video or narrated slide presentations) at the markets, health centers, schools, women's and other community groups, service organizations, religious centers;

v. social media (Facebook, Twitter, WhatsApp, etc.);

vi. community drama groups/play groups;

vii. public address system;

viii. corporate/ institutional website;

ix. e-mail/ SMS subscriptions.

d) Give health education messages to community groups and service organizations and ask that they disseminate them during their meetings.

e) Give health education messages to trusted and respected community leaders and ask them to transmit to the community.

i. designated person from the MoH should serve as spokesperson to the media. Tell the media the name of the spokesperson, and that all information about the outbreak will be provided by the spokesperson.

ii. release information to the media only through the spokesperson to make sure that the community receives clear and consistent information.

f) On a regular basis, district and CHO will meet with local leaders to give:

i. frequent, up-to-date information on the outbreak and response;

ii. clear and simple health messages for the media;

iii. clear instructions to communicate to the media the information and health education messages from the PHEMC.

6.4.8 Conduct a mass vaccination campaign

Collaborate with the EPI of MOH and the DIDE of NPHIL to conduct a mass vaccination campaign. Develop or update a micro-plan for the mass vaccination campaign as soon as

possible. Speed is essential in an emergency vaccination because time is needed to obtain and distribute vaccines.

Two worksheets entitled “Planning a mass vaccination campaign” and “Estimating vaccine supplies for vaccination activities” are found in Annexes 7F including recommended vaccination practices for vaccination campaigns.

6.4.9 Improve access to clean and safe water

Containers that hold drinking water can be the vehicle for disease outbreaks including cholera, typhoid, shigella and hepatitis A and E. Make sure the community has an adequate supply of clean and safe water for drinking and other uses. The daily water needs per person during non-outbreak situations are presented below. Water needs are much higher during an outbreak situation, especially outbreaks of diarrhoeal diseases.

Table 5: Basic water quantity needs

Daily water needs per person*		
	Non-outbreak	During outbreak of diarrheal disease
Home use	20 liters per day	50 liters
Health care setting	40 to 60 liters per day	50 liters in wards 100 liters in surgery 10 liters in kitchen

**Refugee Health: An Approach to Emergency Situations, Médecins sans Frontières, 1997 MacMillan

Safe drinking water includes:

a) piped chlorinated water;

b) safe drinking water obtained through chlorination at point-of-use;

c) water obtained from protected sources (such as wells closed with a cover);

d) boiled water from any source.

If no local safe water sources are available during an emergency, water may need to be brought from outside. To ensure that families have safe and clean drinking water at home (even if the source is safe) do the following:

a) Provide community education on how to keep home drinking water safe.

b) Provide containers that prevent water contamination. For example, containers with narrow openings are ideal because users would not be able to contaminate the water by putting their hands into the container.

c) Ensure that waste disposal sites, including for faeces, are located at least 30 meters away from water sources.

6.4.10 Insure safe disposal of infectious waste

To ensure the safe disposal of human excreta in order to avoid secondary infections due to contact with contaminated substances:

a) Assign teams to inspect local areas for human and animal waste disposal. Safe practices include disposing of feces in a latrine or burying them in the ground more than 10 meters from water supply.

b) If unsafe practices are found such as open defecation, educate the community on safe disposal of such waste. Construct latrines appropriate for local conditions with the cooperation of the community.

c) Conduct effective community education on sanitation practices.

6.4.11 Improve food-handling practices

Make sure that people handle food safely at home, in restaurants, at food vending settings and in factories. Refer to the National Food Safety Guideline Standard Operating Procedures for Liberia.

To ensure food hygiene:

a) conduct community education on food hygiene practices for the general public and those in the food industry;

b) visit restaurants, food vendors, food packaging factories and other venues to inspect food-handling practices, focusing on safe practices such as proper handwashing, cleanliness and adherence to national standards;

c) close restaurants, vending areas or factories if inspection results show unsafe food-handling practices;

d) strengthen national controls for food safety as necessary.

6.4.12 Reduce exposure to infectious or environmental hazards

As indicated by the outbreak or event, take action to reduce exposure to hazards or factors contributing to the outbreak or event. This may involve chemical, physical or biological agents. Technical requirements for reducing exposure will be determined according to national policy and through collaboration with those who have experience in these areas. For example, occupational or industrial exposure to heavy metals (e.g., lead) will require coordination with multiple ministries and partners. Community education and behavior

change interventions can help the community to effect changes that will limit exposure to dangerous levels of chemicals and other hazards.

For vector-borne diseases, engage the service of experts such as an entomologist in designing appropriate interventions that will reduce exposure to offending vectors (e.g., Anopheles mosquito). Work with the malaria control program in your county to:

a) promote indoor residual spraying;

b) conduct community education on the proper use of bed nets and the avoidance of dusk-to-dawn mosquito bites;

c) promote the use of locally available Insecticide-treated Nets (ITNs) and other insecticide-treated materials (blankets, clothes, sheets, curtains, etc.);

d) encourage environmental cleanliness (e.g. draining stagnant water, clearing bushes etc.).

Encourage the prevention of diseases transmitted by rodents by helping people in your district reduce their exposure to these animals. For example, rodents can transmit the virus that causes Lassa fever, or they may be infested with fleas that carry plague. Work with the environmental health technician in your district to encourage the community to:

a) avoid contact with rodents and their urine, droppings and other secretions;

b) keep food and water in the home covered to prevent contamination by rodents;

c) keep the home and cooking area clean and tidy to reduce the possibility of rodents nesting in the room;

d) use chemicals (insecticides, rodenticides, larvicides etc.) and traps as appropriate based on environmental and entomological assessment;

e) educate the community on personal protection to reduce exposure.

6.4.13 Ensure safe and dignified handling and burial of dead bodies

DBM is crucial in combating the spread of infectious diseases both in case detection and surveillance as well as in the management of potentially infectious material. VHF, cholera and unexplained deaths in suspicious circumstances are situations that require the careful handling of bodies. It is also essential to ensure the safe and dignified disposal of bodies by trained personnel, given the infectious nature of epidemic-prone diseases. The disinfection or decontamination of homes and hospital wards (where people have died of an infectious disease) should be implemented.

A guide should be prepared on the proper disinfection or decontamination of homes and hospitals where there have been corpses of persons who died from a suspected infectious disease.

DBM guidelines currently distinguish between high and low priority/risk bodies and rely on trained teams. Deaths that are considered high-risk may be treated as a form of surveillance and case detection for VHF or possibly other conditions when relevant testing capabilities are available.

Safe burials can be conducted in the community at approved burial sites at the discretion of the families. The DBM Team may be directed to develop a safe and dignified burial contingency plan when an infectious disease outbreak occurs and such plan will be reviewed periodically to adapt to the evolution of the epidemic.

6.4.14 Ensure appropriate and adequate logistics and supplies

A dedicated logistic team is needed during an outbreak response. Throughout the outbreak, monitor the effectiveness of the logistics system and delivery of essential supplies and materials. Carry out logistical planning to make sure transport is used in the most efficient ways. Monitor the reliability of communication between teams during the outbreak and if additional equipment is needed (e.g., additional airtime top-up for mobile phones), take action to provide teams what they need to carry out the response actions.

Monitoring the management of the outbreak or event is crucial to outbreak control. The monitoring results are important for they will be included in the response report submitted to the supervisory levels and to community leaders and needed for future advocacy.

For example, the response management team should make sure there is ongoing monitoring of:

a) disease trends to assess the effectiveness of the response measures, the scope of the epidemic and risk factors;

b) the effectiveness of the response: CFR, incidence;

c) implementation of the response: program coverage, meetings of the epidemic management committee, etc.;

d) availability and use of adequate resources, supplies and equipment;

e) community acceptability of response efforts;

f) regular reporting on stocks of supplies provided and consumption during emergencies;

g) Food security is important during the outbreak particularly for affected communities, persons in quarantine and improves the resilience of those affected. Providing food increases the cooperation of the community;

h) Well-coordinated ambulance system with communication facilities that will have two categories of services: specific for infectious diseases and maternal complications/other conditions.

6.5 Provide regular feedback or situational reports on the outbreak and events

Periodically, report on the progress of the outbreak response. Provide information developed by the PHERT to the affected communities and health facilities. In the situation updates, provide information such as:

a) details on response activities, including dates, places and individuals involved in each activity, as well as the "Epi" curve, spot map, table of person analyses, and the line list of cases;

b) any changes made since the last report;

c) effectiveness of the response: CFR, incidence;

d) implementation of the response of the EPR committee etc.;

e) operational challenges and gaps;

f) recommended changes to improve future epidemic response such as a vaccination strategy to enhance immunization or a transportation procedure to ensure that specimens reach the reference laboratory quickly and in good condition.

The SitReps will be an important reference for evaluating the response and developing a final report.

6.6 Document the response

During and at the end of an outbreak, the CHT/DHT should:

a) collect all the documents including minutes of any meeting, activity or process; epidemic reports; evaluation reports; and other relevant documents;

b) document lessons learnt and recommended improvements, and accordingly update the country EPR plan, event/disease-specific contingency plan and other relevant SOPs and tools, where appropriate (AAR).

This will become an essential source of data for evaluating the response. See Section 8, on how to monitor, evaluate, supervise and provide feedback on IDSR activities.

7 Section 7: Risk communication

Effective communication is an essential function of surveillance. Effective communication before, during and after an outbreak or a public health event also shows transparency in the management of the event and encourages participation by the affected population in responding to a disease or other public health event.

Risk communication is an essential element of disaster and EPR and is one of the core capacities in the IHR (2005). Risk communication is a two-way exchange of information, perceptions and advice among risk assessors, risk managers, and various groups of people in the society about the likelihood and consequences of harm from the event (WHO, 2005). Its ultimate purpose is to ensure that everyone at risk is able to take informed decisions to mitigate the effects of the threat (hazard) such as a disease outbreak and take protective and preventive action. Risk communication uses a mix of communication and engagement strategies and tactics, including but not limited to, media communication, social media, mass awareness campaigns, health promotion, stakeholder engagement, social mobilization, community engagement and human centered design and approach.

The 21st century has been marked by an exponential growth in travel, trade, migration, as well as a communication technology revolution that has widened access to a variety of means of communication and information. The public and communities have been exposed to a variety of dynamic, fast-changing, formal and informal media, social media and complex social networks that influence how risk is communicated, perceived and acted on. The latest evidence shows that the practice of risk communication is a complex task that is a core public health intervention in any response to disease outbreaks/epidemics, pandemics and other health emergencies (*Communicating Risk in Public Health Emergencies: Geneva. World Health Organization 2017,* License CC BY-NC-SA 3' IGO).

It is therefore important for risk communication to be conducted timely and effectively, so as to promote the primary public health goal of rapid outbreak containment and prevention of avoidable death and disease with the least possible disruption to economies and society. During epidemics and pandemics as well as humanitarian crises and natural disasters, effective risk communication enables people who are most at-risk to understand and adopt protective behaviors. It enables the authorities and experts to heed and address people's concerns and needs, and to offer advice that is relevant, trusted and acceptable.

7.1 Risk communication in the context of IDSR

The IDSR strategy is an approach for improving public health surveillance and response for priority diseases, conditions and events at the community, health facility, district and national levels. Since IDSR has the potential to ensure the reliable supply of information at the national level with a view to fulfilling IHR requirements, risk communication should be included in all IDSR core functions and activities, particularly detection, sample collection, reporting, analysis and interpretation, feedback, response and preparedness. IDSR core functions and activities for each level of the health system are well illustrated in the Introduction section of this guideline. Effective risk communication is therefore needed to achieve IDSR objectives.

If risk communication is well planned and integrated into IDSR, it can improve decision-making and the adoption of recommended behaviors by communities and also contribute to the prevention, control and response to priority diseases and other public health events including natural disasters. Such communication needs to be carefully planned, implemented and properly integrated with emergency management activities and operations at the community, district, county and national levels to support all relevant core IDSR functions and related activities.

7.1.1 Benefits of risk communication

Risk communication improves decision-making, compliance with treatment and the required behaviors for preventive actions. It also promotes transparency and accountability and builds trust with individuals, community leaders, health workers and policymakers. When risk communication is properly conducted, it promotes the primary public health goal of rapid outbreak containment, thereby preventing avoidable death and disease with the least possible disruption to economies and society. During epidemics, pandemics, humanitarian crises and natural disasters, effective risk communication enables people who are most at-risk to understand and adopt protective behaviors. It enables the authorities and experts to heed and address people's concerns and needs, and to offer advice that is relevant, trusted and acceptable. It is critical that risk communication is not only targeted at outbreak response; risk communication plans should include activities conducted before, during and after the outbreak.

When the public is at risk of a real or potential health threat, direct interventions may take time to organize and resources may be limited. Hence, communicating advice and guidance is often the first and most important public health tool in managing a risk. Proactive risk communication encourages the public and service providers to adopt protective behaviors when they are linked to functioning systems and services. It

facilitates heightened disease surveillance, reduces confusion, and minimizes miscommunication and falsehoods (rumors) related to the cause and transmission of a disease as well as proven effective protective actions. It allows for better use of resources, which is crucial to effective response (WHO, 2008).

7.1.2 Target audiences for risk communication

- Community: All people at risk of acquiring a disease or in need of health services within the context of the public health event.
- Health-care providers and first responders
- hospitals and clinic staff
- Surveillance officers
- Laboratory staff
- PoE and exit
- Airlines staff
- Immigration officers
- Travelers
- Stakeholders (including One Health platform, security, policymakers, ministries of health, maternal and child health organizations, partners, community organizations, et al.)
- Media (traditional and social) as a channel to reach these audiences
- Schools and workplaces
- Traditional and religious leaders

7.1.3 Community engagement and its relevance to public health emergency preparedness and response

Community engagement is crucial to risk communication. Community engagement is the process of working collaboratively with and through people affiliated by geographical proximity, special interest, or similar situations to address issues affecting their well-being and is often used as an active method of implementing change. During risk communication, the emphasis is on building relationships and trust. The steps for community engagement involve:

a) setting the goals of the plan;

b) determining who to engage (prioritizing stakeholders at all levels);

c) developing engagement strategies;

d) prioritizing these activities;

e) designing an implementation plan; and

f) monitoring your progress.

Effective community engagement helps you to:

a) know the community (problems and needs);

b) understand existing health beliefs, attitudes and practices;

c) listen to the community carefully;

d) analyze community dynamics; and

e) involve the community in all aspects of the response beginning from planning stages.

f) Engage community members as stakeholders and problem solvers, not merely beneficiaries.

7.1.4 Risk communication approaches

The components needed for effective emergency risk communication include:

a) health education;

b) social mobilization;

c) community engagement;

d) media and social media engagement;

e) outbreak communication;

f) crisis communication;

g) messaging (information, education and communication (IEC) and behavior change communication (BCC));

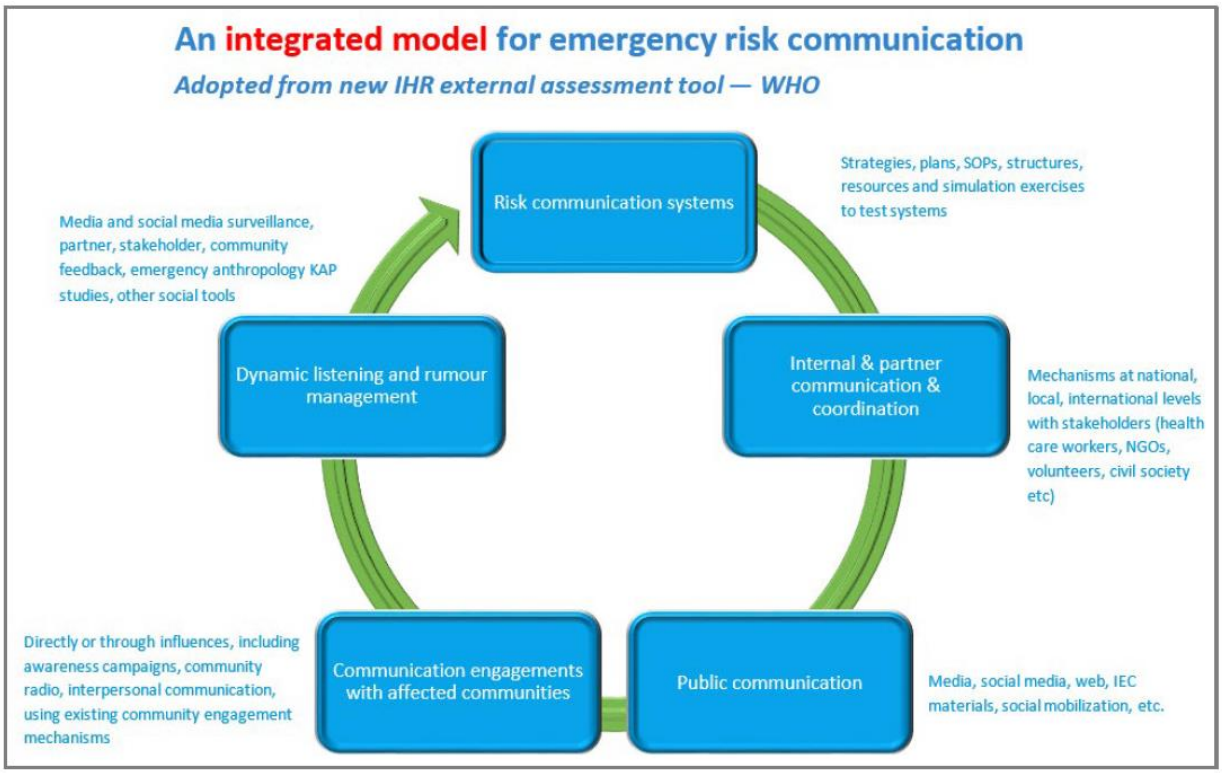
h) Rumor monitoring, tracking and management; and

i) advocacy.

7.1.5 Integrated risk communication model

Risk communication is a complex activity involving different audiences. It is crucial to adopt an integrated approach for an effective communication. The key components for integrated emergency risk communication are presented in Figure 17. This model allows for the successful design and implementation of an effective communication strategy. It highlights the need for a collaborative approach between different target audiences across the board.

Figure 17: An integral model for emergency risk communication



7.2 Key inter-linked principles for effective communication

There are five key principles for effective communication as outlined below:

I. Creating and maintaining trust

Building and maintaining trust is, arguably, the most important function in effective communication during an outbreak or a public health event and should include:

a) timely, transparent information regarding the nature of the threat;
b) the response to the event; and
c) actionable advice on protective actions people can take that, together with functioning services, increase self-efficacy.

This creates trust in the response and the response teams and increases the likelihood that they will follow the advice given. Trust is now considered the most important requirement for effective risk communication.

> Risk communication should include timely, transparent, understandable information relayed to the affected and at risk population on:
> 1. the nature of health risk they face;
> 2. the response that is being organized; and
> 3. what they can do to protect themselves and their loved ones.

Trust is therefore the currency for all public health interventions, and has, in the current era of information overload, emerged as the critical element for effective risk communication (i.e., ensuring that expert advice is acted on by key stakeholders and affected and at-risk populations). Risk communication should therefore be aimed at building, maintaining or restoring public trust in those tasked with risk management. Lessons learnt from the 2014 Ebola outbreak reveals that, in order to build trust, risk communication activities should:

a) be linked to functioning and accessible services;

b) be transparent and timely;

c) be easy to understand for target populations (i.e., in their preferred oral or visual formats; in their own languages or dialects; and tailored to their educational levels and cultural references);

d) acknowledge and communicate uncertainty (neither over-reassure nor speculate; rather, communicate frequently so that the evolution of the event and public understanding are transparent and not destroy trust);

e) link to self-efficacy (Can people really do what you ask them? Do they have the ability, equipment, services, education they need to adopt our advice?);

f) be disseminated using multiple platforms, methods and channels;

g) identify, involve and collaborate with people that the community trusts when making decisions and not just in information dissemination. This ensures that interventions and any communication on them are contextually appropriate and community-owned.

II. Timely announcements and transparency

In most cases, public response to a health threat depends on the way the first and subsequent announcements are made. This means that an event or threat should be announced as and when it emerges, even when the information is incomplete or changing fast. This in turn implies that communicating uncertainty is a cornerstone of risk communication. Communication by authorities, response managers or front-line personnel must include:

a) information about the uncertainties associated with the risk, event and interventions;
b) information indicating what is known and unknown at each given moment in time;
c) a commitment and follow-up to keep people frequently informed and updated on the changing, uncertain situation;
d) multiple platforms, mechanisms and trusted interlocutors to ensure that consistent and coordinated information reaches stakeholders and the population.

III. Listening to, understanding and respecting public concerns

Understanding public perceptions, concerns, fears and expectations is as critical to risk communication as understanding the risky practices and behaviors that affect risk. The

understanding of communities must start before and during an emergency. There are many ways to improve awareness of community concerns and understand the contexts that determine whether the advice given to them on corrective or preventive practices will actually be accepted and acted upon. These include knowledge, attitude and practice (KAP) surveys or mini-surveys, community walk-throughs, focus group discussions, key informant interviews, getting feedback from stakeholders, social media and media monitoring, etc. A serious attempt must be made to execute health interventions and offer health advices, based on evidence gathered using these methods and other social science approaches.

IV. Advance planning

Risk communication is most effective when it is integrated with emergency preparedness, risk analysis and response (risk management). This means that a risk communication plan must be prepared during the preparedness stage. Emergency risk communication planning must occur in advance and be a continuous process focused on preparedness, prevention and response. Planning should be sensitive to stakeholders' needs, participatory, responsive to the context of affected groups and should include feedback from such groups.

The IHR require all governments to build national capacity for detection, alert and response to public health emergencies. One of the core capacities is risk communication. Accordingly, risk communication planning should include the systems required (strategies, plans, SOPs and mechanisms at the national, county and district levels); the coordination of partners, sectors and stakeholders; the capacity for fast, effective public communication in the preferred languages and channels of the population; the ability to track and quickly manage concerns, perceptions, rumors and misinformation; and communication engagement with affected and at-risk communities.

V. Ensuring equity

All citizens have a right to appropriate information about health risks, including what needs to be done in response to threats to their health. Unfortunately, large segments of society are excluded from routine communication about threats to health. Risk communication must therefore ensure equitable sharing of information to the public and avoid exclusion of marginalized members of society from health action. This means paying attention to the reach of communication, using trusted channels and interlocutors; avoiding jargon or technical language; using the people's own languages and dialects; adapting messages to people's levels of understanding and education; and ensuring that the actions promoted are those that people can realistically change. Special attention should be paid to analyzing power dynamics in communities and taking special measures to reach those hardest to reach (women, minorities, the very old and young, people with disabilities, the poor, migrants and refugees, etc.).

7.3 Create an enabling environment for effective communication to at-risk populations

a) Establish risk communication systems and structures at the district, county and national levels.

   i. If unavailable, establish multisectoral communication committees/structures across all levels; i.e., national, county and district levels (See Annex 7 for examples of members of the communication subcommittee and their roles). TORs can be expanded depending on the pre-outbreak, outbreak and post outbreak phase in line with each function. See Annex 3 for an expanded list of possible stakeholders.

   ii. Review the existing risk communication structures and mechanisms.

b) Ensure that the communication system has a link to the community leadership structure since they wield great influence within the community. A quick assessment can be made to evaluate the framework for public health emergency risk communication and this can include:

   i. conducting an assessment to identify risk communication needs based on risk profile;

   ii. preparing a mapping and developing a database of risk communication stakeholders at all levels; and

   iii. preparing a resource mapping for risk communication.

c) Conduct mapping of languages and dialects; religions; preferred and trusted means/channels and interlocutors (sources) for communication; as well as traditional practices relevant to the top priority health risks and use all this information to shape risk communication strategies and plans.

d) If none is available at the district and county levels, identify a government spokesperson and ensure that he/she is trained in public communication procedures.

e) In addition to risk communication personnel, all frontline personnel should receive basic training in risk communication (surveillance, contact tracing, case management, social mobilization, community engagement, burial teams, health personnel, volunteers).

f) Develop a risk communication plan for Public Health Emergencies at district, county and national levels and ensure that key stakeholders are given some orientation on risk communication procedures.

g) Develop a coordination platform as well as internal and partner communication mechanisms for engaging key stakeholders, including media outlets and community radio networks and a definition of roles and responsibilities.

h) Have detailed budgets and advocate strongly for resources mobilization, and multisectoral collaboration to implement public health emergency and risk communication activities at all levels.

i) Create a system for dynamic listening and rumor management.

7.4 Communicating before, during and after the outbreak

7.4.1 Pre-outbreak/Routine risk communication

A large proportion of communication activities should be implemented in the pre-emergency phase to ensure better preparedness. Those managing communication activities should take advantage of the absence of an emergency to build the national communication capacity and develop communication plans and tools that will bring the country to a high level of communication preparedness. The pre-emergency phase should also be used to develop the necessary communication messages and materials and promote the practice of risk-prevention behaviors.

Before an outbreak, the following should take place:

- Ensure that the Public Health Emergency Management Subcommittee for risk communication meets at least once monthly or quarterly to;
  - review the risk communication plan and required risk communication materials/logistics;
  - develop, pre-test, print and disseminate appropriate IEC materials based on the common public health risk; and
  - organize the training of risk communication resource teams.
- Ensure that the communication coordination mechanism is in place with clear terms and well- defined roles and responsibilities for each entity.
- Organize periodic interactions with stakeholders who will be involved in risk communication for prevention and preparedness or in response should an event or emergency occur. These include district, county or national media; community radios; civil society; and stakeholders from other sectors, like the animal health sector, in countries where zoonotic influenzas are a priority threat.
- Review past emergency communication interventions to draw lessons learnt, build on successful practices and avoid negative ones.
- Collect and analyze epidemiological and social data about periodic disasters and outbreaks; outbreak seasons of common diseases; expected at-risk communities/populations; as well as accessible and credible channels of communication.
- Build capacity for outbreak communication and identify/train spokespersons to be

ready when an outbreak occurs.

- Alert all relevant entities and notify them on their role(s) in case the expected outbreak occurs.
- Ensure that messages and materials have been developed, pre-tested and are ready for production and dissemination.
- Ensure that all required training modules, guidelines and monitoring checklists are developed and updated.
- Develop and share SOPs for social mobilization and community engagement and ensure the integration of risk communication in the overall emergency response plan.
- Identify and prepare the database of stakeholders and partners, such as groups or organizations that focus on youth or women; schools; religious institutions; CSOs; theatre groups; and other community groups that can disseminate messages at the grassroots level and involve them in preparedness activities.
- Identify all the channels of communication available to spread the message and assess the reach and credibility of these channels.
- Produce a "Response Kit" which includes key frequently asked questions, media briefs, training manual, micro-planning tools, monitoring checklists/tools, communication plan templates and key IEC messages/materials for rapid distribution. This kit is intended for the use of communication practitioners at all levels.
- Establish communication lines with the media, journalists and radio/TV stations; train and regularly update them.
- Pre-arrange activities with theatre groups, musicians and traditional community entertainers.
- Identify and train CHWs, community leaders, religious leaders, influential people, women's groups, youth groups and other social mobilizers in Social Behavior Change Communication (SBCC) and risk communication.
- Identify mechanisms for communicating with hard-to-reach and vulnerable populations (the aged, persons with disabilities, children, the nomadic) and with isolated communities to ensure that they have access to health protection information and assistance.
- Define communication channels that can be used to reach vulnerable groups.
- Disseminate messages that describe the actions that the government is taking to protect the public and HCWs, promote awareness of the imminent health threats and preventive behaviors and actions that individuals, families and communities can take to reduce the risk. This can be done through the mass media, such as local community radios, public health addresses, community drama groups, television, print media and social media (Facebook, twitter, etc.).
- Conduct community engagement activities and build trusted relationships between

those in authority and communities through training, dialogue, consultations and capacity- building. It is important to note that effective community engagement is based on trusted relationships between those in authority and communities. It is important, therefore, to use every opportunity to strengthen these relationships during non-emergency periods.

- Use ongoing health education, health promotion and other means to create, test and build trust in the systems. Interlocutors can be used for risk communication during emergencies.
- Make arrangements for a hotline facility, which can be started immediately when the emergency occurs.
- Establish a media monitoring team to monitor the news and social media.
- Maintain and update a list of media houses.
- Develop plans for routine monitoring of misinformation and rumors and set up a media monitoring system to keep track of behaviors and practices related to the emergency.

Note that:

- It is important to integrate, to the extent possible, social science data that should be gathered as well. Data on the context and sociocultural information (including education, traditional practices, health-seeking and-health care behavior, and beliefs) relevant to priority hazards and epidemic-prone disease should also be obtained. This will make it possible to contextualize epidemiological data and create risk-based real intelligence and thus tailor possible health interventions accordingly.
- It is important to organize periodic interactions with stakeholders who will be involved in risk communication for prevention and preparedness or in response should an event or emergency occur. This includes the local, county or national media; community radios; civil society; and stakeholders from other sectors such as the animal health sector in countries where zoonotic influenzas are a priority threat.

7.4.2 During outbreak response

During an outbreak response, and when the public is at risk of a real or potential health threat, treatment options may be limited, direct interventions may take time to organize and resources may be few. Communicating advice and guidance, therefore, often stands as the most important public health tool in managing a risk. The focus of outbreak communication is to promote outbreak control and mitigate disruption to society by communicating with the public in ways that build, maintain or restore trust.

Proactive communication encourages the public to adopt protective behaviors, facilitates heightened disease surveillance, reduces confusion and fear and allows for a better use of resources, all of which are necessary for an effective response. Proactive communication also shows that health authorities are in control of the situation and care about the public. Hence, it builds trust between such authorities and the community at large.

People have a fundamental right to information and to participation. In addition to the public health objectives, remember that people have a right to information on protective actions and they have a right to participate in and shape interventions that are acceptable to them. By alerting a population and partners to an infectious disease risk, surveillance of potential cases increases, protective behaviors are adopted, confusion is limited, and communication resources are more likely to be focused. Effective communication can help limit the spread of a disease and ultimately save lives. It also minimizes damage to societies and economies and can help communities recover faster from a health event or emergency.

7.4.3 Identify and coordinate partners and other stakeholders during an outbreak

Outbreaks usually create fear in the community. The involvement of several different stakeholders sometimes leads to lack of coordination and the duplication of efforts. Provision of timely and accurate information through a well-coordinated mechanism is important.

Internal coordination of communication among national stakeholders is crucial during an emergency. The Risk Communication and Social Mobilization Subcommittee is responsible for ensuring that an internal communication system is established among national stakeholders to ensure the timely flow of information to various government sectors.

Partner coordination is another key essential element during outbreak and event response and is aimed at fostering ownership, effective participation of key players and efficient use of resources.

Coordination helps ensure that messages reaching the population are consistent and not contradictory or confusing, thereby promoting trust and the likelihood that expert advice will be followed.

The PHERRT through the PHEOC or through a similar coordination structure at national level may take responsibility for ensuring that communications are consistent and reflect the data that has been analyzed. Ensure that the focus of communication activities is transparent and accurate, and take into account community experiences and expectations regarding the outbreak.

Distinguish between communication with stakeholders who are experts and those who are part of the response and require a more layman's description and explanation. They and other important interlocutors such as the media and civil society (and the general population) will require targeted and adapted products and messages. This means that carefully segmenting and targeting audiences, as well as adapting materials, messages and mechanism to suit each of them is essential.

7.4.4 Communicate with the affected community and stakeholders

Communication with affected communities and stakeholders, including the media is essential during outbreak and event response. Thus, establishing routine communication structures and processes between the health and community partners helps to ensure that this vital link is available and functional during an emergency. Options for communicating between the various partners can range from press releases, press conferences, television and radio messages, meetings (health personnel, community, religious, opinion and political leaders), educational and communication materials (posters, fliers), to multimedia presentations (films, video or narrated slide presentations) at the markets, health centers, schools, women's and other community groups and service organizations, religious centers, local community media, Social media (Facebook, Twitter, WhatsApp, etc.), SMS, telephone, hand-carried message, community drama groups/play groups; site visits; fax, email updates and exchanges of communication materials through more formal decision-making committees. Regardless of the mechanism, ensure that the focus is on transparent and trustworthy communication that considers community experiences.

Consider the following points when preparing messages:

- **Make sure messages are clear and understandable to the audience:** What is happening? Why and how is it happening? What threats to health do exist or are likely to occur? What should the public do? Where can people get services or information? What assurances can be given? Are the messages written in an understandable language and tailored to the audience's level of understanding? Research shows that risk should not be explained in technical language.
- **Consider these factors when providing messages:** Who is your audience? What do you want your audience to do after hearing the message? Do they have an enabling

environment to do as advised? Are there functioning and accessible services that enable them to follow the advice?

- **Promote dialogue:** Ensure that there is two-way communication/exchange; listen to the audience's concerns and respond appropriately rather than just informing.
- **Demonstrate empathy and be caring:** Are you showing empathy for their suffering? Are you being too cold and clinical? Are you respectful?
- **Provide harmonized and consistent messages:** Ensure that consistent messages reach the public, notwithstanding the variety of partners involved in the dissemination of information. Use message maps and other tools to keep the same frame and logic for the messaging as this would enable partners to adapt to the context of more segmented audiences. Are messages consistent regardless of who is issuing them? Inconsistent or conflicting messages create confusion and destroy trust in the response and authorities
- **Establish a mechanism for continuous collation of facts and figures about the public health event.**
- **Update public information messages** produced and approved by the MoH, National Health Promotion Division and share them with stakeholders involved in information dissemination.
- **Ensure relevance:** Communicate data/information that best illustrate your point, factoring in community concerns. Use examples that relate to the audience.

NB: Consider pre-testing messages from similar settings before dissemination.

In case of rumors, quickly address them and any inaccuracies in general and especially within the specific community where they occur. Consider setting up a rumor monitoring system.

Widespread damaging rumors should be counteracted through public statements or press conferences. Provide comprehensive information to prevent rumors being generated from your response.

Build, maintain and restore trust as you communicate and be as courteous as possible in your communication. Give health education messages to trusted and respected community leaders and ask them to transmit to the community. Only authorized and credible persons should communicate during crisis periods.

On a regular basis, district and county medical officers should meet with the local leaders to provide:

- frequent, up-to-date information on the outbreak and response;
- clear and simple health messages for the media;
- clear instructions to communicate to the media only the information and health education messages provided by the PHERRT.

7.4.5 Distribute IEC material and develop fact sheets

Fact sheets are brief summaries of 1 to 2 pages. They are usually prepared by health staff for consumption by the general public and deal with a single topic or message. For example, a fact sheet on a *Shigella* outbreak in a district may contain the following information for the community: the cause of *Shigella*, how it is transmitted, steps for prevention and updates on the number of cases and deaths. The fact sheets could be posted on a bulletin board or distributed to community groups that are planning health education campaigns. Where possible, transform the fact sheets into audio products (audio files, short audio recordings on a phone), scripts or visual products (like posters or infographics). These can be used depending on the preference of the audience (oral or visual/written/illustrated communication). Also distribute other prepared IEC materials. Ensure that they have been pre-tested with the target audience to ensure comprehension and meaning.

7.4.6 Develop and distribute public health situation reports during outbreaks

In Liberia, the national or county level publishes a national Epidemiological bulletin. Rather than being published only during outbreaks, these bulletins should be produced more regularly and describe the outbreak, including trends; i.e., Sitrep. These SitReps or bulletins have a wider audience than just the health staff in a particular district or health facility. They are usually brief (2 to 8 pages) and are also read by policymakers, legislators and other decision-makers. They are valuable channels for reaching technical and donor partners.

The bulletins contain at least:

a) a summary table showing the number of reported cases and deaths to date for each priority disease;

b) a commentary or message on a given disease or topic;

c) any relevant social science data on risky practices, behaviors and other factors.

If a national public health SitRep is sent to the district office, display it where everyone can see it. Make copies and distribute to health facility staff. Take a copy of the report with you on your next supervisory visit to show health workers how data produced during outbreak contributes to public health. A sample template for preparing a SitRep is presented in Annex 9X.

7.4.7 Communicating to the media

The media is a major influence and should be seen as a partner in risk communication. However, the media is often associated with political parties or private interests and can therefore have biases of their own. They are also able to find and report on people's concerns, sensationalize stories and may not always rely on facts and evidence. Therefore, it

is essential to meet regularly with the media, brief and educate them on priority hazards and response systems, and also provide them with appropriate information so as to cultivate a respectful and trusted relationship with them. The media will ensure wider dissemination of messages on radio or other appropriate channels.

As part of your risk communication plan, determine how you will announce news of the outbreak and then keep the media regularly informed. Often, regular press releases and media briefings are appropriate tools for communicating with the media. If the emergency is complex, convening a workshop with targeted media is helpful to ensure correct information is disseminated, as most journalists have not been trained in medicine or public health.

In addition, it is good to develop media kits which could include fact sheets and community messages about the priority diseases and events.

Prior to the outbreak, ensure that you have reached out to the media and identified the key outlets you will need to work with during an outbreak. It is also good to identify, prior to an emergency, the clearance process for media products and appreciate the following:

- Ensure prompt and frequent access to experts, officials and spokespersons who will speak authoritatively and credibly on the issue at hand.
- Provide media training to spokespersons.
- Spokespersons should be able to speak in layman's language; clearly explain scientific ideas and terms; avoid speaking in jargon; and illustrate the information provided with easy-to- understand stories or examples. Talking points having the latest information could be used, with the messages kept as simple as possible. Ensure that the identified spokespersons are able to clearly communicate the uncertainty in an evolving event and to admit it when they do not know something. Community case definitions and job aids will help the spokesperson to deliver correct messages.
- Promptly answer journalists` calls to show your respect for them.
- Provide them with accurate and well-explained information.
- Give exclusive stories and interviews to provide a different perspective.
- Provide human interest stories.
- Give them clear easy-to-use handouts (written, audio, visual or audiovisual).

NB: Release information to the media only through the spokesperson to make sure that the community receives clear and consistent information.

Monitor the media daily to see how the outbreak is being reported. Include social media in

your monitoring strategy. If you feel that the wrong messages are being disseminated, devise a strategy for correcting this misinformation.

7.4.8 Communicating to health workers

Communicate regularly with health workers by providing correct information pertaining to the outbreak. It is important to communicate with health staff at the various levels about the data sent (including any gaps), analysis results for such data and the measures being taken to respond to the potential public health event which they have reported. Communication can also include providing participating HCWs with any outbreak or event response reports for future reference.

Make sure that health workers provide correct information on number of cases and any deaths that have occurred. Also make sure you provide any changing information on case management or any other response intervention.

Encourage health workers to keep updated information and to update it in real-time during an event or emergency using reliable sources such WHO's knowledge transfer platform (www.OpenWHO.org) on common, re-emerging and emerging epidemic-prone diseases and on risk communication.

Increasingly during emergency response to disease outbreaks, WHO will provide real-time online, off-line or face-to-face training to update HCWs and response teams. These provide an opportunity to update or acquire knowledge and skills.

7.4.9 Post-outbreak response

7.4.9.1 Prepare an outbreak or event response report

After an outbreak or event response has taken place, district staff who led the investigation should prepare a report. The purpose of the report is to document how the problem was identified, investigated, responded to; what the outcome was; which decisions were taken and what recommendations were made. Make sure that the health unit that reported the initial cases receives a copy of the report. See Annexes 7J for examples of recommended formats and samples.

7.4.9.2 Evaluate lessons learnt in order to strengthen appropriate public responses to similar emergencies in the future.

a) Assess the effectiveness of the communications team in each phase and area of work.

b) Assess the effectiveness of meetings.

c) Assess the effectiveness of the internal flow of communications.

d) Assess the monitoring of communications and of the media.

e) Assess the response of the communications media.

f) Assess the outputs and outcomes of risk communication and community engagement

7.4.9.3 Periodic testing of the risk communication plan

Carry out simulations to test the risk communication plan in order to detect possible weaknesses or gaps that need to be corrected before an emergency. Revise the plan based on lessons learnt from the SimExs, AAR or other assessment done.

WHO provides ready-made desktop and other SimExs on the www-OpenWHO.org .

8 Section 8: Monitor, supervise, evaluate, and provide feedback to improve surveillance and response

Monitoring of surveillance and response systems refers to the routine and continuous tracking of planned surveillance activities (prompt delivery of reports, for example), while evaluation, which is done periodically (annually, for instance), assesses the extent to which surveillance and response objectives have been achieved. Both monitoring and evaluation help to understand if the system has been working effectively. By evaluating information regularly, for example at the end of a given year, supervisors are able to determine the extent to which surveillance and response objectives have been achieved and whether outcomes are of high quality. Through supervision, supervisors and health professionals work together to review progress, identify problems, determine causes of the problem and develop feasible solutions. Sustainable supervision and feedback have been shown to contribute to improved performance of national disease surveillance systems.

This section will describe how to routinely monitor and annually evaluate performance of the surveillance system and specific disease or public health event control and prevention programmes. The section will concentrate on core surveillance functions described in the introduction section, and also describe how supervision and provision of feedback are key to improving the surveillance and response systems.

Some benefits of routine monitoring of the IDSR system are:

a) tracking progress of implementation of planned activities and ensuring that planned targets are achieved in good time

b) tracking progress of improvements in targeted indicators of the quality and attributes of the system, such as timeliness and completeness of reporting

c) identifying problems in the system in order to institute corrective measures in a timely manner

d) ensuring that all implementers of the systems are held responsible and accountable for their defined activities

e) ensuring that stakeholders can receive information on performance of the surveillance system.

Some benefits of evaluating the surveillance system are:

a) ensuring that the surveillance system meets the objectives for which it was formulated

b) documenting surveillance system status and change in performance

c) providing evidence, based on which surveillance objectives, implementation strategy and planned activities can be modified

d) enabling planning of resource allocation

e) providing explanations for achievements and failures in the system

f) providing specific recommendations for improving the system

g) The extent to which the implementation strategy is working

Some benefits of providing feedback after supervision are:

a) reinforcing health staff efforts to participate in the surveillance system

b) motivating those who provided data, hence scaling up compliance for reporting

c) improving quality of data provided by data collectors

d) enhancing planned public health action

e) complementing planning of appropriate actions

f) strengthening communication and spirit of teamwork

g) building trust with communities

Section 3 describes how, each month, health staff responsible for surveillance at health facility and district levels review and analyze data that is reported during the month. Conclusions are drawn about the following:

a) timeliness and completeness of reporting from each level;

b) quality of routine prevention and control activities taking place, so that when problems are detected, districts respond with appropriate action.

The same information can also be used during supervision to routinely monitor, and annually evaluate:

a) timeliness in reporting immediately notifiable diseases, conditions or events;

b) outbreak investigations and responses; and

c) reporting of summary data on a routine basis.

When problems are detected in the surveillance and response system, action can be taken to strengthen it. By providing feedback to health workers for implementing identified corrections, it is more likely that results of desired outcomes will be evident. For example, one may use the monthly monitoring data to do an evaluation at the end of the year, and questions to help carry out an evaluation may include:

a) Are surveillance objectives for existing activities being met?

b) Were surveillance data used for taking public health action?

c) Did surveillance, laboratory and response activities have an impact on the outcome of health events in the district?

8.1 Identify targets and indicators

Using indicators is helpful in measuring the extent of achievement of the objectives for a particular programme or activity. Indicators are signs of progress — they are used to determine whether the programme/intervention is on the way to achieving its objectives and goal. This achievement is then compared to overall recommended performance standards. Apart from performance standards, there are some disease-specific surveillance indicators that may be used to monitor quality of the surveillance system, e.g. those for AFP and measles.

Indicators are also used to assess performance of the surveillance system, to ascertain whether it is reaching its targets and objectives. For example, a district may have a goal of reaching 100% completeness of reporting by a certain period. An indicator can be developed to measure the proportion or percentage of facilities that are reporting. This proportion is then compared with the desired goal or target, and can be used to evaluate progress and, therefore, quality of a given service or activity.

8.1.1 Use indicators in accordance with national goals and specific plans

Use indicators according to national goals and specific plans to improve IDSR activities in a county. Select indicators that are most relevant to the county's plan for improving surveillance in the current year, and that will provide information the county can use.

8.1.2 Select data for measuring indicators

After selecting relevant indicators, specify the numerator and the denominator. For example, if a district's objective is for all health facilities to keep trend lines for selected priority diseases, the numerator and denominator are defined as follows:

Indicator: The proportion of health facilities in the district that keep trend lines for priority diseases.

Numerator: The number of health facilities that keep trend lines for priority diseases.

Denominator: The total number of health facilities in the district.

8.1.3 Ensure availability of data sources

Each level should make sure that the level it supervises has the following sources of data available. For example, the national level has data available from district and county levels to conduct required monitoring activities.

Table 6: Types of sources of data at various levels

Data source	Health Facility	District	County	National
Monitoring chart for tracking indicators (Sample charts are in Annex 8A.)	X	X	X	X
Outpatient register	X			
Inpatient register	X			
Health facility reporting forms	X			
Case-based and/or line listing reporting forms	X	X	X	X
Outbreak investigation report	X	X	X	X
Log of suspected outbreaks and rumours	X	X	X	X
Supervisory reports from district and county		X	X	X
Laboratory reports received	X	X	X	X

8.2 Monitor core function for IDSR at district level

Indicators for core functions measure processes and outputs from the surveillance system. In the introductory section, core surveillance functions have been described and so one may refer to the table of core surveillance functions for each level. This subsection describes key indicators at various levels, in relation to core functions.

The core functions are:

a) Identifying cases and public health events

i. Case detection is the process of identifying cases and outbreaks. Case detection is done through the health system (public, private and community structures). Case definitions and a functioning rumor-verification system are vital for case and outbreak detection. Once a case has been identified, it has to be recorded in a register (outpatient or inpatient register, clinical cases register etc.). In many countries, health workers use any of these registers to extract the IDSR priority diseases.

ii. Monitoring indicators should be established to monitor this core surveillance function. Examples of indicators could be:

- Proportion of health facilities that have standardized registers for recording diseases. Further assessment could also be done to examine the validity and quality of information recorded as well as factors that affect registration.
- Proportion of health facilities using SCDs to identify cases of IDSR priority diseases.

b) Report cases and events

i. Reporting refers to the process by which surveillance data move through the surveillance system from the point of generation to the next level.

ii. It also refers to the process of giving account of suspected and confirmed outbreaks as well as notifying under the IHR 2005 of PHEIC, using the decision instrument mentioned in section 2.

iii. There may be different reporting systems, depending on the type of data and information being reported, purpose and urgency of relaying data/information, and where the latter is being reported.

iv. Timely submission of data is critical for prompt outbreak detection and response to prevent widespread outbreaks. Health facilities should, therefore, strive to submit reports on time, as prescribed in national guidelines.

v. Examples of indicators for this core surveillance function include:

- Proportion of complete surveillance reports submitted on time to the district.
- Proportion of cases of diseases targeted for elimination, eradication and any other disease selected for case-based surveillance reported with case-based forms or line lists.

c) Analyze and interpret data

i. Analyzing data is the systematic process of examining data to generate relevant information for timely and appropriate public health action to be taken.

ii. Surveillance data should be analyzed routinely, and the information interpreted for use in public health actions.

iii. Capacity for routine data analysis and interpretation should be established and maintained for epidemiological and laboratory data.

iv. Examples of indicators which can be used to monitor analysis include:

- Proportion of priority diseases for which a current line graph is available.
- Proportion of districts that report laboratory data for diseases under surveillance.

d) Investigate and confirm suspected cases/outbreaks

i. Case/outbreak confirmation depends on the epidemiological and laboratory capacity for confirmation.

ii. Capacity for case confirmation is enhanced through improved referral systems, networking and partnerships. This implies having the capacity for appropriate specimen collection, packaging and transportation.

iii. Internal and external quality-control mechanisms are important elements for case confirmation; they help to ensure the validity and reliability of test results.

iv. Examples of indicators for monitoring this core function include:

- Proportion of suspected outbreaks of epidemic-prone disease notified to the national level within 24 hours of crossing the epidemic threshold.

- Proportion of investigated outbreaks with laboratory results.

e) Prepare

i. Epidemic preparedness refers to the existing level of preparedness for potential epidemics, and includes availability of preparedness plans; stockpiling; designation of isolation facilities; and setting aside resources for outbreak response.

ii. Examples of indicators which can be used to monitor preparedness include:

- Proportion of health facilities with stock of key items (e.g. PPE, specimen collection kits, case-investigation forms, intravenous fluids, treatment kits) for response.
- Proportion of county with EPR plans.

f) Respond

i. Public health surveillance systems are only useful if they provide data for appropriate public health response and control. For an early warning system, the capacity to respond to detected outbreaks and emerging public health threats needs to be assessed. This can be done, following a major outbreak response and containment, to document the quality and impact of public health response and control.

ii. Some examples of indicators for monitoring response include:

- Proportion of counties with functional multisectoral emergency public health preparedness and response committees.
- Proportion of counties and districts with functional PHERRT.
- Case-fatality rate for the epidemic-prone disease reported.

g) Provide feedback

i. Feedback is a process in which the effect or output of an action is returned to modify the next action. It is an important function of all surveillance systems. This section provides a thorough description of types of feedback which may be used to improve performance of IDSR.

ii. Some examples of indicators for feedback include:

- Proportion of districts/counties producing regular epidemiological bulletins.
- Proportion of feedback bulletins/reports received from national levels (when evaluating feedback from national to subnational levels).
- Proportion of health facilities with at least one IDSR technical support supervision visit in the previous quarter.

NOTE: While all indicators for the IDSR core function are important, the WHO AFRO will measure overall performance of core functions of IDSR in the countries, using key performance indicators.

8.3 Monitor quality of IDSR activities at the county and district levels

The quality level of the surveillance system is defined by attributes such as:

a) completeness
b) timeliness
c) usefulness
d) sensitivity
e) positive predictive value
f) specificity
g) representativeness
h) simplicity
i) flexibility
j) acceptability
k) reliability

Periodically, quality of the surveillance system should be assessed, based on these indicators.

Surveillance attributes can be evaluated using quantitative and qualitative methods. Some tools that may be used to comprehensively evaluate surveillance systems include: the updated Morbidity Mortality Weekly Report (MMWR); updated guidelines for evaluating public health systems, produced by the United States Centers for Disease Control and Prevention (CDC); and the framework for evaluating public health surveillance systems for early detection of outbreaks (CDC, 2001). Countries, which already have a Field Epidemiology Training Programme (FETP) or an equivalent applied epidemiology programme, should use residents to assist in evaluating the surveillance and response systems of IDSR and other disease surveillance systems.

8.3.1 Monitor timeliness and completeness of monthly reporting

An important indicator of a good-quality reporting system is the timeliness and completeness of reporting at each level. In the event reports are sent and received on time, the feasibility of detecting a problem and conducting prompt and effective response is greater. If, however, reports are incomplete, then the information cannot describe the problem, and if they are late, or not submitted at all, aggregated information for a given district (or any other administrative area) will not be accurate. In such an event, outbreaks can go undetected, and other opportunities to respond to public health problems will be missed.

8.3.1.1 Timeliness

The single most important measure of timeliness is whether data are submitted in good time to begin investigations and implement control measures. Timeliness of reporting should be measured against standards developed by each country, in accordance with timelines set by

the WHO AFRO. Important aspects of timelines of reporting in a communicable disease surveillance system include:

- timeliness of immediate notification, i.e. within 24 hours;
- timeliness of weekly reporting; and
- timeliness of monthly reporting.

a) Monitor detection and notification of immediately reportable diseases or events

Monitor how well the system is able to detect immediately notifiable diseases or events. Monitor the interval between the onset of the first known case and when the case was seen in the health facility. If this interval is too long, it will seriously affect the health outcome of individual patients and will alter the spread of outbreak.

Other intervals to monitor for detection of immediately reportable diseases include, monitoring reporting from community to health facility and its district (within 24 hours of onset of illness); from health facility to district (within 24 hours); and from the time threshold is reached to the time of concrete response (within 48 hours).

b) Timeliness of weekly and monthly reporting

If dates on which reports are received are routinely recorded and reviewed, system effectiveness can easily be assessed each month, in the course of analyzing routine and case-based data. A monitoring tool may be used to monitor timeliness in the district. For example, use the record of reports received to:

- measure how many reporting units submitted reports for a given week/month against the number of units expected to report;
- identify which reporting units have reported; and
- measure how many monthly reports were timely.

Ensure deadlines are given for each level to enable effective monitoring.

8.3.1.2 Completeness

Completeness in surveillance can have varying dimensions and may include the following:

a) Completeness of reporting sites submitting surveillance forms:

Completeness of reporting sites refers to the proportion of reporting sites that submitted a surveillance report, irrespective of the time that report was submitted. Computing completeness of reporting sites for each of the surveillance reports can:

i. provide a trend analysis on completeness of reporting for each of the surveillance reports over a period of time; and assist in identifying how each site is performing;
ii. in addition, trigger further investigation for reasons of poor performance, and possibly help to identify solutions to correct such performance

b) Completeness of case reporting

Completeness of case reporting refers to the match between the number of cases reported

and the actual number of cases. This can be obtained by comparing the number of notifiable conditions reported to the next higher level (over a period of time), with the number of cases recorded in the patient register, over the same period.

c) Completeness of surveillance data

Completeness of surveillance data is the match between the expected data requirement and what is reported. The following questions are useful in determining completeness of surveillance data and its implications on public health actions:

i. Are all data on each of the required variables in a surveillance form collected, registered, validated and compiled?
ii. If not, which variables are not routinely collected, and what problems are encountered in their collection?
iii. What is the implication of missing data on the quality of surveillance data?
iv. How can this problem be resolved?

8.3.1.3 Identify problems and take actions

If monitoring information shows that a health facility or any other reporting unit has not provided a report, or if the report is not on time, the SFP at the facility should be contacted. Work with the designated staff to identify what has caused the problem, and develop solutions together (for example, find out if a reliable supply of forms or other reporting method such as text messaging or radiophone is available). Explain to the facility staff the benefits of collecting good-quality data and reporting it in good time. This can help them, for instance, to detect outbreaks, improve forecasting of medicines and supplies, and improve overall health facility management.

Additionally, ask if a new staff has started working at the facility, and is yet to receive orientation on the procedure for reporting; or find out if health facility staff receive feedback about case reports they have generated, and if there are resources available for taking action in response to the information obtained.

Make plans with the reporting unit to find solutions for improving the situation. Explain that, when information is complete, the district/county can assist health staff more efficiently with planning responses and carrying them out. For example, if lack of supplies is a problem, the district can use the reporting information to advocate with higher levels in the system.

8.3.1.4 Report timeliness and completeness to other levels

When routine reports or line-listed records of the number of cases are being sent to the county or national level, include also necessary data for timeliness and completeness. This will help the other levels to understand the situation much more clearly, and to evaluate quality of the data that is being sent. For example, if the report to the national level states that two cases of measles were detected during the month, it should also include information about the number of health facilities that have reported. It will make a

difference to the other levels, when they evaluate the information, if the 2 cases occurred with only 20%, rather than 100% of the units reporting.

8.3.2 Monitor other attributes for assessing quality of the IDSR system

Some other key attributes are summarized in the table below and can be used to assess quality of surveillance systems during periodic evaluation assessments (Table 7). Readers are referred to the updated framework for evaluating surveillance systems for a complete list of attributes.

Table 7: Summary of other attributes for assessing quality of the surveillance system

Attributes	Definition	Examples of some questions to assist in assessment
Usefulness	Describes if the surveillance system has been able to contribute to the prevention and control initiatives or has been useful in contributing to performance measures e.g. Usefulness of surveillance data in an early warning system	Is the system e.g. the early warning system able to detect outbreaks early? Example: A useful system, over time must, demonstrates that a certain intervention has been instituted and has worked effectively. In a malaria programme, data collected over time might show if ITN has been useful in reducing incidences of malaria among children under five years
Simplicity	Simplicity refers to structure of the system and ease of its implementation from the end-user to those at higher levels.	Is the system simple? e.g. is the standard-case definition simple? Does it have multiple reporting structures? Example: A health worker has to report maybe to the district, as well as to another vertical programme if a disease is under that programme
Acceptability	Acceptability of a system is a reflection of the willingness of the surveillance staff to implement the system, and of the end-users to accept and use data generated through the system	How is the participation rate of surveillance sites? How is the degree of completeness of reports? Example: number of health facilities submitting reports on time
Representative ness	Representativeness refers to the degree to which reported cases reflect occurrence and distribution of all cases in the population under surveillance.	Is the system covering all geographical areas to ensure accurate capture of cases? NB: A good system should be able to cover all population, even those who are marginalized
Data quality	Data quality reflects completeness and validity of data recorded in the public health surveillance system.	For completeness one can examine the percentage of "unknown" or "blank" responses to items on surveillance forms NB: Validity depends on data quality. Error-prone systems and data prone to inaccurate measurement can negatively affect detection of unusual trends.

For further information on the other unmentioned attributes above, please refer to Centers for Disease Control and Prevention (CDC) (2001). Updated guideline for evaluating public health surveillance systems. MMWR: 50 (RR-13); 1–35.

8.4 Monitor quality of surveillance activities at community level

8.4.1 Monitor events from community event-based surveillance

Monitoring a Community Event-Based Surveillance (CEBS) system is as equally important as monitoring health facility, districts and county. CHWs/supervisors or community focal

persons involved in the system must understand the benefit of the system, and know that their input is of value and can assist in improving or adapting the system to work better for the community.

Qualitative feedback from CHWs and the community is an essential part of contextualizing and understanding quantitative CEBS data. A system should be in place from the beginning to capture community and CHWs feedback, and this may involve one or more of the following approaches:

a) open and regular community meetings where all issues are noted and acted upon;
b) focus group discussions with CHWs and/or community leaders;
c) suggestions and complaints box (es) for use in the community;
d) appointment of a community representative(s) to gather feedback and complaints;
e) feedback platforms on mobile phones, which may be used by CHWs to give feedback.

There should also be community-driven data analysis with help from CHSS and monitoring, whereby communities are supported to undertake their own data analysis. Communities may be provided with basic material to record the type of occurrences they report, as well as resulting actions, and also record outbreaks or events that occurred but did not trigger an alert, so that triggers can be adjusted. Some performance indicators listed below (Table 8)are examples of indicators for CBS.

Table 8: Examples of indicators for community-event based surveillance

Number of triggers detected	A trigger is unofficial information about a disease, condition or event of public health importance which may be true or invented	Number of trigger detected from each CBS focal person	CBS reports
Proportion of triggers responded to within 24hr–28hr	Numerator: number of triggers responded to on time. Denominator: Total number of triggers detected from CEBS focal person/CHWs NB: responding to trigger is defined as visit by the nearby health facility for case investigation, case management, health promotion, community sensitization and distribution of materials (must be defined according to response plan)	Number of trigger responded to within 24hr–48hr divided by total number of trigger reported	CBS reports and response reports
Proportion of trigger which are true events	Number of true events detected	Total number of true events detected divided by total number of triggers reported	CBS reports and response reports

8.5 Supportive supervision and feedback for improving IDSR activities

8.5.1 Supportive supervision

Supportive supervision is a process of helping to improve work performance. Supervision is not an inspection. Rather, good supportive supervision aims to sustain good-quality services, and not to find what is wrong with the latter. In a good supportive supervision system, supervisors and health professionals work together to review progress, identify problems, decide what has caused the problem and develop feasible solutions.

a) Ensure availability of job descriptions and Standard Operating Procedures for surveillance staff

Job descriptions and SOPs are the basis for conducting supervision and assessing performance. Review job descriptions and SOPs of health staff who have a role in the surveillance and response system. Make sure that a job description states:

i. the surveillance tasks to perform

ii. to whom the staff reports

iii. a defined scope of work, as well as SOPs that are adhered to in practice

b) Prepare a supervision plan

Include surveillance and response targets in the overall plan for supervision in a district. For example:

i. Decide how often to monitor health staff performance. For instance, a district may decide to conduct a supervisory visit at least 4 times in a year for each health facility. In some countries, depending on resources, supervisory visits take place more often (monthly, for example).

ii. Ask health facility supervisors to make a schedule of supervision they intend to conduct over the next year in their own facilities, and in any community sites that report to the facility.

iii. Make sure that transport is available for supervision and for surveillance activities that require transportation means. For example, coordinate travel or logistics for surveillance supervisory visits with visits made by other programmes or activities.

iv. Include in the overall plan, other reporting sites in supervision of district surveillance activities, such as private health centers, other clinics (of schools, uniformed forces etc.), medical centers and community reporting sites.

c) Use a supervisory checklist

Each health facility has unique problems and priorities that require specific problem solving and corrections. To maintain positive motivation of health facility staff for their efforts at ensuring improvement, consider developing a graduated checklist to guide the supervisory

visit. The items listed in a graduated checklist (such as the one in Annex 7 M,) are some achievements that a health facility can be evaluated on. For example, when the facility has achieved one objective (using standard-case definitions consistently, for instance), work with health facility staff to include the next indicator or item for monitoring performance, such as using thresholds for action. Revise the supervisory checklist accordingly. Use it during future visits to help health staff in monitoring their activities and progress towards an improved system.

During the visit, use a checklist to monitor how well health staff are carrying out the recommended surveillance functions. For example, a DSO visiting a health facility for a supervisory visit should verify the following:

Identifying and registering cases Check the health facility register to see if the case diagnoses correspond to the recommended case definition. Check the register to see if all columns are filled out correctly.

Confirming cases Compare laboratory records for priority diseases with the number of cases seen in the clinic for the same period of time. For example, compare the number of positive malaria slides with the reported number of hospitalized malaria cases.

Reporting Ask to see copies of the most recent reports for the most recent reporting period. Compare the number of cases of priority diseases that were reported with the number recorded in the register. Check the date on which the case report was sent against the date recommended for sending the report. Check reports to make sure they are complete and accurate.

Reviewing and analyzing data Verify that trend lines are prepared and updated for priority diseases. Ask to see the “Health Facility Analysis Book,” or the electronic health facility data in your district. Look to see if the trend lines for selected diseases are up to date.

Preparedness Look at the stocks of emergency drugs, supplies and PPE to be sure there is adequate supply.

Note: A sample supervisory checklist is in Annex 7 M-Q. Additionally, Annex 7 O, describes details of core surveillance functions at health facility level and can be used for guidance in supervision of the health facility. Questions to be answered during a supervisory visit may be adapted or modified to meet specific concerns, and determine the extent of progress towards an integrated surveillance system within a health facility.

d) Conducting supervisory visits

Conduct regularly scheduled supervision at all levels (national to county; county to district; district to health facility; health facility to community) to ensure that:

i. appropriate supplies (e.g. forms, job aids) and required standard-case definitions/ guidelines are available;

ii. public health staff know how to identify and use standard-case definitions to record suspected cases of priority diseases seen in their health facility;

iii. priority diseases are recorded in the case register, according to the case definition;

iv. some data are analyzed in the health facility to identify thresholds to take action both for routinely reported priority diseases (disease of public health importance) and case- based diseases (epidemic-prone diseases, and diseases targeted for eradication or elimination);

v. reported cases of diseases, conditions, or events for which a single case is a suspected outbreak or public health emergency, are investigated promptly (for example a single confirmed case of cholera or polio, maternal death, MDR/XDR TB);

vi. response takes place when outbreaks or other public health events are confirmed, or when problems are identified in routine reporting;

vii. response actions are monitored, and action is taken by the health facility to improve surveillance and readiness for outbreak response.

Make sure during the visit to:

i. provide feedback to health staff. Let them know what is working effectively and what is not. Also give feedback on how previously reported data was used to detect outbreaks and take action to reduce illness, mortality and disability in the district. If improvements are needed, discuss solutions with staff;

ii. provide on-the-job training, as needed, if a problem is identified. For example, during review of the analysis workbook, the supervisor noted that case-fatality rates were not correctly calculated. The supervisor, therefore, met with the health staff who are in charge of calculation, and reviewed steps for calculating the rate with the staff in question;

iii. follow up on any request for assistance, such as for emergency response equipment or supplies;

iv. if solution to a pre-existing problem was identified during a previous visit, check to see how well the solution has been implemented. Find out if problems are still occurring and modify the solution, if necessary;

v. ensure that both supervisor and supervisee(s) sign the supervision reports and also provide dates on which supervision was done.

e) Writing a report on supervisory visit

Include in the report, achievements that were identified during the visit; also, state follow-up actions that were planned with the health staff, and any requests for additional resources, funds or special problems.

f) Using supervisory visits to improve surveillance activities in the district

Visits of surveillance supervisors and county or national disease control programmes are good opportunities to discuss and improve disease control in a district. For instance, if a national malaria control person visits the district, the reason why inpatient malaria deaths have not been declining could be discussed with them. Questions may also be asked about additional ideas or resources that the malaria control programme could provide.

8.5.2 Feedback

In most cases, health facilities and districts reliably report surveillance data to the next level as required. When district or county or national managers receive data, they should respond to health facilities that provided them. The purpose of feedback is to reinforce health workers' efforts at participating in the surveillance system. Another purpose is to raise awareness about certain diseases and any achievements made by disease-control and prevention projects in the area. Feedback is classified as supportive when it reinforces and acknowledges good performance, and corrective, when a change in behavior and improvement is required. It also strengthens the communication and spirit of team working. Feedback should be both vertical and horizontal targeting different audiences as provided by different levels in the health system. Effective feedback should be:

a) specific to ensure that recipients understand the subject of the feedback;

b) based on the report submitted or the actual events and activities observed in the field; and

c) given as soon as feasible, after receiving the report or field visit, so that recipients will remember activities that should be sustained or corrected.

If the facility does not receive information from the next level about how data were used or what data meant, health staff may think that their reporting is not important. As a result, future reporting may not be reliable, since health staff will not know whether the information, they sent to other levels was important or necessary. Their understanding of

the health situation may be good at their own level, but they may not have the needed information for characterizing the situation at district or national level. At community level, communication includes building relationships, communicating and coordinating with other community key informants, resource persons and existing formal and informal networks for information dissemination and reporting.

Feedback may be written, such as a monthly newsletter/bulletin, emails, WhatsApp, SMS or periodic official information like publications, or it may be given verbally through telephone calls or periodic meetings. Although this section focuses on district-level feedback, this can also be applied at health facility and national levels. Feedback may also be given during supportive supervision, by the district to health facilities, or by the county to districts or by the national level to districts and counties. Supervision can be on performance of health programmes and feedback can be provided during such supervisory visits.

a) Developing and disseminating routine epidemiological bulletins

Feedback should also be given periodically of IDSR reportable diseases, and this can be done through weekly, monthly or quarterly epidemiological bulletins. Bulletins provide information on disease patterns and achievement of programme objectives in the country. They are usually brief and are important for reaching policy-makers, legislators, development partners, programme technical staff and stakeholders. As a minimum, they contain:

i. a summary table with the number of reported cases and deaths, to date, for each priority disease;

ii. a commentary or message on a given disease or topic; and

iii. any relevant social, economic or cultural information or data on the context that can lead to creating real intelligence regarding an event.

Annex 7I shows examples of an epidemiological bulletin.

b) Developing information summary sheets

An information summary sheet is a report that presents data and its interpretation in a table or other graphic format. For example:

i. At a staff meeting, or during a supervisory visit, give a verbal report or comment about data that were reported by the health facility during a given period.

ii. Display data in a simple table. Sit with health staff and show them the data. Talk together about the likely conclusions that may be drawn from said data. Consider conclusions not only for the health facility, but also for the district as a whole.

iii. Prepare a single sheet with a simple table that shows how data reported for a given period are different from data reported for some other period or target population.

For instance, show the number of cases of diarrhea with dehydration in children aged less than 5 years, from the same period last year, and compare them with a corresponding period in the current year, after a safe water project was implemented in a high-risk area, for example; use summary sheets to support requests made to higher levels for additional funds, supplies and resources.

c) Developing district newsletters

The purpose of a district newsletter is to provide shorter updates than those provided in a more detailed feedback bulletin. The district newsletter is useful for informing and motivating health staff. The target audience for a newsletter could be health staff in the district. The newsletter may be 2 to 4 pages long, and produced simply with a computer-entered or typewritten text.

Examples of articles that could be carried in a newsletter are:

i. summary of national or district data for a given priority disease;
ii. report of progress towards a specific public health target;
iii. report of specific achievements towards public health by an individual health worker or a group of health workers; and
iv. description of special events or activities (for example, a change in market day).

8.6 Evaluate effectiveness of performance of the IDSR system

The purpose of evaluating a surveillance system is to assess its effectiveness and response system in terms of timeliness, quality of data, preparedness, case management, overall performance and using indicators to identify gaps or areas that could be strengthened. A comprehensive evaluation should thus include the surveillance system and, if already available, the IDSR Implementation Plan. Evaluation of the surveillance system should:

a) show the extent to which desired outputs and outcomes are achieved
b) provide explanations for achievements, disparities and failures
c) document quality of the system and demonstrate any changes in its performance; and
d) demonstrate the extent to which overall surveillance objectives are achieved

Depending on the development status of surveillance in a district, select evaluation indicators that will provide information relating to district's priorities and objectives for the year.

If there is already an IDSR implementation plan, with clearly defined objectives, then it is

appropriate to conduct annual review. Otherwise, surveillance systems should be evaluated every 2, 3 or 5 years. Key steps in evaluation include:

8.6.1 Defining objectives

Objectives should be simple, measurable, attainable, realistic, and time-bound (SMART).

8.6.2 Developing evaluation indicators

Indicators should be identified for each of the evaluation objectives, and should be harmonized, as much as possible, with monitoring indicators.

8.6.3 Developing evaluation methods and tools

Based on these indicators, an evaluation protocol should be developed describing the evaluation process, methods, target group, data sources, data collection methods, and plan for data analysis and utilization.

8.6.4 Identifying people to conduct evaluation

a) Determine who evaluators will be; people within the districts, people outside the district, or a mixture of people including partners/donors. Depending on the scope of evaluation, its purpose and available resources, a decision should be made during the planning stage on who should undertake evaluation.

b) To ensure objectivity and transparency during the evaluation process, a blend of self-internal evaluations and external evaluations should be conducted periodically.

8.6.5 Conducting the evaluation

8.6.5.1 Compiling and organizing monitoring data and other results

The district health office should summarize surveillance data received from all health facilities in the catchment area, and submit a compiled report to the county or national level as appropriate. Report submission should not be delayed due to late reports from some health facilities; promptly submit all reports received. Late reports should be submitted as they arrive. Follow up with health facilities who did not report or who consistently provide late reports.

Help health facilities to solve any problems that prevent them from submitting their summary reports on time. Provide regular feedback to health facilities about the indicator results. Feedback is a positive tool for motivating health staff to provide information on time, and contribute to the national reporting system.

The county should compile surveillance data received from all districts, and submit the report to national level. Report submission should not be delayed because a last report is

late. The county should compile and submit available reports on time. Late reports may be sent separately when they are received.

The national level should compile surveillance data received from all counties, and also look for epidemics that were not identified by districts. Follow up with areas where reporting continues to be unreliable or does not happen at all. Support county in providing assistance to districts when they evaluate measurements, and take action to improve the situation. Provide feedback to each and every level about national, county, district and health facility levels.

Use a monitoring chart, such as the one on the next page, to monitor performance of indicators at your level. Share these results with staff in your catchment level. Acknowledge successes and help health staff to maintain positive progress. When problems occur, talk together about what is causing the problem and how it can be solved. Seek assistance of the next level, as needed, for obtaining additional help or resources.

Gather data from several sources. For example:

a) Review objectives for the year listed in the district's annual plan for improving

b) surveillance and response.

c) Gather monthly summaries of cases and deaths reported to the district, spot maps, and other analysis results performed by the district.

d) Collect any results from special surveys or studies that were done in the district over the previous year.

e) Include case investigation forms and reports of outbreak response activities that took place in the district.

f) Gather summary information from the community and from health staff.

8.6.5.2 Analyze data

As summary data for the year are evaluated, some issues to make decisions on are as follows:

a) Were the reports complete, on time and accurate?

b) What were significant changes in disease or event trends during the year? If an increase occurred, was the problem identified?

c) If additional cases are still occurring, why are they occurring? Where are they occurring?

d) Were appropriate and timely actions taken in response to the surveillance data?

e) Were supervisory visits conducted as planned and follow-up tasks carried out as

planned?

f) Did the community feel that response activities were successful?

g) Were any actions taken to address health staff requests or suggestions about services or surveillance?

h) Were appropriate measures taken to prevent similar events?

8.6.6 Identify problems and their causes

If problems occurred, and the district did not meet an expected target, or reach a desired level of performance with any indicator, find out what caused the difference between what was planned and what actually occurred. If a problem is identified, talk with the district team and health facility staff to find out possible causes of the problem.

8.6.7 Update plans for improving the IDSR system

Include in the district plan, successful activities that should continue. Also, include feasible solutions selected as a result of analysis of the year's annual evaluation. Plan to implement the solution. For example:

a) State the new activity and its objectives

b) Specify personnel who will carry out the activity

c) Estimate the cost of the activity (if any)

d) Develop a timetable for the activity. Define the sequence of activities in logical order

e) Specify logistics for the new activity (equipment, personnel, transportation, resource allocation).

8.6.8 Provide feedback to health facilities about the evaluation

Provide a report and give feedback to health facilities and others in the district about results of the evaluation activity. State in the feedback report:

a) what the objectives were for the year

b) what was actually achieved

c) what the likely reasons were for any differences between what was planned and what was achieved

d) recommended solutions and prioritized activities for improving surveillance and response in the district

8.6.9 Frequency of Supervision for Health Facilities

The frequency of supervision visits to health facilities should be based on their priority categorization. All health facilities in the county should be categorized as high, medium or

low priority based on the following factors amongst others:

a) Patient Load e.g. high, medium or low
b) Accessibility e.g. whether hard to reach or not
c) Resources e.g. both personnel (availability of staff) and operational (access to regular power)

All health facilities in the counties should be visited within a month using the following schedule as a minimum:

a) High priority – weekly supervision
b) Medium priority – bi-weekly supervision
c) Low priority – monthly supervision

All referral hospitals are categorized as high priority and should be visited on a weekly basis. However the factors that determine whether a facility is high, medium or low priority are changeable and are based on prevailing factors e.g. if a case of Yellow Fever is reported in a health facility that health facility would then move to a high risk category and be visited on a weekly basis for a certain period before re-categorization.

8.6.10 Improve surveillance and response activities

The purpose of the IDSR reporting system assessment evaluation is to assess the effectiveness of the surveillance and response system in terms of timeliness, completeness and quality of data. To effectively achieve this the following areas should be considered:

a) Were the surveillance reports complete, on time and accurate?
b) What were significant changes in disease or event trends during the year? If an increase occurred, was the problem identified?
c) If additional cases are still occurring, why are they occurring? Where are they occurring?
d) Were appropriate and timely actions taken in response to the surveillance data?
e) Were supervisory visits conducted as planned and follow up tasks carried out as planned?
f) Did the community feel that response activities were successful?
g) Were any actions taken to address health staff requests or suggestions about services or surveillance?
h) Were appropriate measures taken to prevent similar events?

If problems occurred, and the county did not meet an expected target, or reach a desired level of performance with any indicator, find out what caused the difference between what was planned and what actually occurred. If a problem is identified, talk with the county,

district team and health facility staff to find out the possible causes of the problem.

Include in the county plan successful activities that should continue. Also include possible solutions to any problems or gaps identified and plan to implement the solution. For example:

a) State the objectives and corresponding activity
b) Specify the personnel who will carry out the activity
c) Estimate the cost of the activity (if any)
d) Develop a timetable for the activity and define the sequence of activities in logical order
e) Specify the logistics for the new activity (equipment, personnel, transportation, resource allocation)

9 Section 9: Electronic IDSR

Recently, there have been various supporting initiatives and resolutions, regionally and globally, which have recognized the potential of digital technologies to advance the Sustainable Development Goals (SDGs), and particularly to support health systems in all countries in health promotion and disease prevention. The eIDSR is, hence, developed to reflect the following recently adopted overarching frameworks:

a) IDSR ((AFR/RC/48.8)
b) IHR (2005) (WHA58.3)
c) Regional Strategy for Health Security and emergencies strategy (AFRO/RC66/6)
d) eHealth resolution and decision (WHA58.28)
e) Digital health (WHA71.7)

9.1 What is eIDSR?

eIDSR is the application of electronic tools to principles of IDSR to facilitate prevention, prediction, detection, reporting and response. It is based on standardized interoperable and interconnected information systems administered within the national context; and rapid collection, analysis, reporting and use of disease/events data in real time for appropriate public health action. In Liberia, the goal of eIDSR is to:

a) Establish a real-time electronic case-based reporting and lab response system for IDSR;
b) Use a low to medium level technology due to limited phone coverage, human capacity, and rural infrastructure;
c) Is sustainable but allows for future growth using higher level technology such as smart phones and computers;
d) Longer-term goal: Point of care computer entry when the infrastructure, Information and Communications Technology (ICT), human capacity, and sustainability will support it.

The using of paper-based tools for implementation of IDSR has been an instrumental strategy for strengthening public health surveillance in Liberia since IDSR was adopted in 2004. This is in line With the IHR (2005), which requires countries (including Liberia) to strengthen capacity for disease surveillance and response, application of electronic tools to enhance real-time surveillance can improve timeliness of outbreak detection.

In recent years, technological and analytical innovations have emerged as an approach which can be used to facilitate rapid transmission of public health surveillance information, thus aiding timely detection of and response to outbreaks and other public health events. Application of e-tools in the health sector has the potential to provide real-time validated data for public health surveillance, investigation and prompt outbreak response. eIDSR

provides new opportunities for accelerating achievement of the IHR (2005) core capacities.

9.2 Rationale of eIDSR

Limitations of the current approaches to IDSR data collection and transmission are attributed to the fact that Liberia still uses manual procedures and paper-based methods to collect and transmit data. Submitting and transmitting data on time is a challenge, as health workers have to travel long distances on difficult terrains to submit their files. This leads to delays in getting information on time for action, especially in the event of a suspected outbreak.

The eIDSR system aims to facilitate the work of every staff member in a health system, by improving disease surveillance using electronic tools, and hence strengthening surveillance and response capacities, while, in the long-term reducing morbidity and mortality due to epidemic-prone diseases as well as other public health events.

eIDSR is thus likely to improve the following:

a) Timeliness and completeness of reporting
b) Early detection, investigation, and response to outbreak or public health events
c) Manual data entry that is prone to errors
d) Systematic information sharing across levels and sectors
e) Combining data streams
f) Data use, analysis, analytics

9.2.1 eIDSR development and implementation process in Liberia

Following the shock and devastation of EVD, Liberia transitioned to building a sustainable resilient health system.

Acknowledging the need for increased emphasis on active surveillance and response, the national investment plan calls for the establishment of an IDSR and Early Warning and Alert Response Network (EWARN) structures at national, county, district, health facility and community levels and to set up comprehensive surveillance integrated data reporting and action frameworks.

In 2016, the country piloted an mHealth solution – electronic disease early warning system (eDEWS) for early warning and notification of notifiable diseases in seventy-five (75) health care facilities in four counties (Bomi, Gbarpolu, Grand Bassa, and Montserrado). This system was effective, but costly and not sustainable. Subsequently, another platform was piloted, called the electronic system eIDSR leveraging the mHero space which started in November 2017 in two counties (Margibi and Grand Cape Mount).

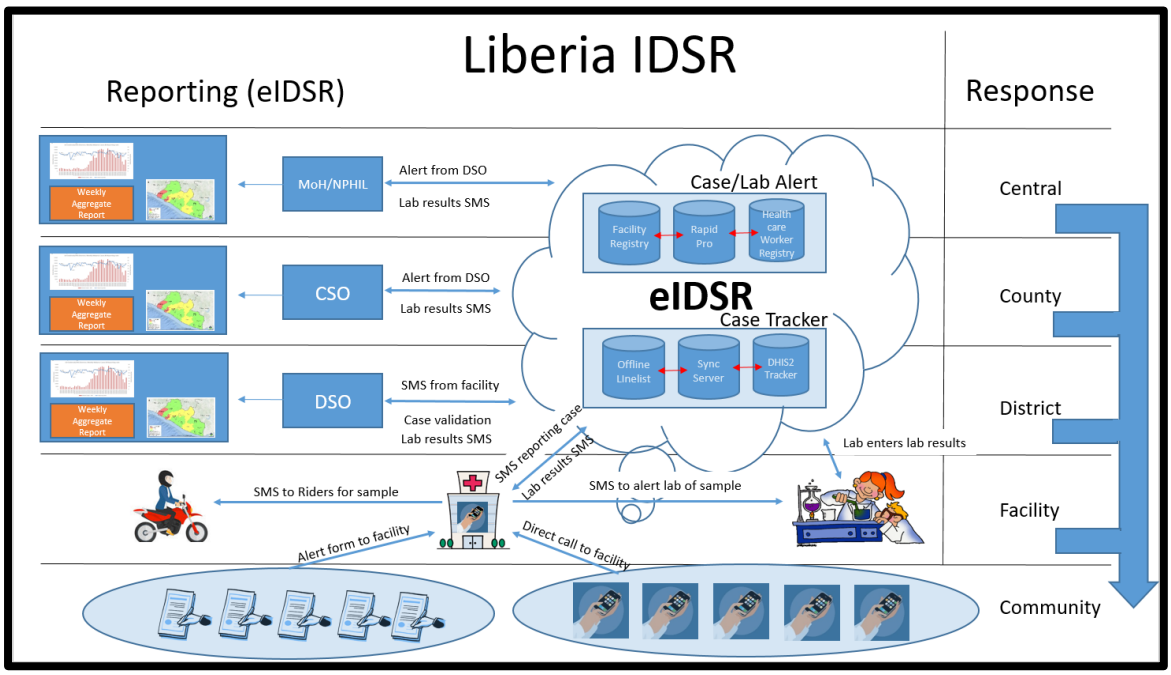
The evaluation shows the system was more effective, less costly, sustainable and uses non-android phones.

9.2.2 eIDSR System

The eIDSR framework leverages the existing DHIS2 software that is currently being used for HMIS. In addition, the SMS component leverages the existing mHero platform that uses Rapid Pro that leverages the HCW registry and the facility registry which support Human Resource Information System (iHRIS). An expansion of this existing process and technology aligns to the current One Health Platform, and also, provide SMS options for lab, EOC, logistics, and other sub-systems which aligns to the overarching Health Information System (HIS) strategy.

The eIDSR consists of two components; Case Alert (mHero+) and Case Tracker. Case Alert provides the SMS alerting capacity via Rapid Pro, the health worker registry, and the facility registry. This functionality allows an alert to be generated from a facility that is validated by the DSO/District Animal Health Surveillance Officer (DAHSO) and then pushed into Case Tracker and available to the CSO/CASO and Central for analysis, visualization, and reporting (AVR). Meanwhile, the case alert form is sent to the DSO/DASO to create the case linelist in the offline component of Case Tracker. The data that is entered is automatically exported into a local Epi-Info database and then automatically syncs to the online tracker whenever there is connectivity. Once in the online tracker, the linelist is available to the CSO/CASO, Lab, and Central in near-real time. See the conceptual diagram below for data flow and structure.

Figure 18: eIDSR data flow and structure in Liberia



9.3 Benefits of eIDSR

The eIDSR provides real-time information for immediate action. Potential benefits of eIDSR include:

a) Early alert and detection

With eIDSR, the speed of outbreak detection can be improved, as information may be more rapidly captured, and in some cases, the time and place of an outbreak can be predicted with varying degrees of accuracy, thus enabling opportunities for prevention and control.

b) Timely reporting

eIDSR tools allow rapid and timely transmission of data from lower primary reporting units to subsequent higher levels to enable appropriate public health action.

c) Standardization of data

Standardization of tools in the eIDSR system enables data collection to be more consistent and complete for ease of data exchange and comparison across health facilities.

d) Better data transmission and management including storage

i. A major challenge of paper-based data is a need to compile reports from various sources and provide reports to higher level offices at regular intervals and to different administrative levels. Moreover, data storage and transport can be difficult, and there is a risk of data damage and loss.

ii. With eIDSR there is faster data transmission, and moreover, data are also organized into a format that is more accessible for use and interpretation.

e) Interoperability and sharing of data

eIDSR provides an opportunity for exchange and use of information across entities, especially if standards and workflow have been well developed for the eIDSR system to allow interoperability with other information systems.

f) Automated transmission, analyses and improved quality data

i. Paper-based reporting runs the risk of omitting valuable information when reporting to higher administrative levels.
ii. eIDSR reduces the number of data entry errors and facilitates automated data analysis, thus saving considerable effort for health staff.

g) Ultimate contribution towards good response, better monitoring and evaluation

eIDSR provides a platform for data storage and automatic analysis across health facilities for better monitoring and evaluation of various public health interventions.

h) Cost reduction

eIDSR leads to timely reporting of disease outbreaks, which in effect, can contribute to overall reduction of high costs associated with management of these outbreaks and other public health emergencies.

10 Section 10: Tailoring IDSR to Emergency or Fragile Health System Contexts

10.1 Introduction

Humanitarian emergencies have major implications for the populations where they occur and for their health services surveillance systems (WHO, 2012). Emergencies typically result in population displacement to congested settings where access to basic needs like water, food, shelter and other social services are constrained. These conditions increase the risk of death from common epidemic and endemic diseases.

Consequently, effective public health surveillance and outbreak response is a priority during public health emergencies in affected populations. Due to the disruption of health and other social services during the emergencies, the routine IDSR system must be enhanced to meet the public health surveillance and outbreak response needs in humanitarian contexts. In these settings, IDSR should be tailored to the prevailing context to meet the additional emergency needs.

Similarly, an enhanced IDSR system should be established in such settings to address the humanitarian emergency. It should be based on the IDSR strategy, structures, tools, guidelines and resources, but should ensure the flexibility required in addressing the surveillance and response needs of affected populations in emergency situations. This should be done within the existing national IDSR system.

This section introduces key principles of implementing IDSR in complex humanitarian emergencies. This will involve enhancing IDSR core functions to ensure early detection, assessment and response to acute public health events. For a more detailed description, please refer to the WHO document on early detection, assessment and response to acute public health events – implementation of early warning and response with focus on event-based surveillance, (WHO, 2014).

10.2 Health Information System in Emergency Contexts

Acute and protracted crises have major immediate and long-term effects on population health and health systems. Conflicts and disasters create disruptions in the overall functionality of the health system. In such situations, the routine IDSR system may be underperforming or may be disrupted. The IDSR must therefore be tailored to adequately meet the surveillance information needs of a humanitarian emergency. Examples of such humanitarian emergencies include: armed conflict, famine, natural disasters and other major emergencies.

10.3 Key definitions in emergency contexts

10.3.1 Disaster

A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources (International Strategy for Disaster Reduction [ISDR], 2009). A disaster is also defined as a situation or event which overwhelms local capacity, necessitating additional national or international assistance (Center for Research on Environmental Decisions [CRED, ReliefWeb, 2008).

10.3.1.1 Humanitarian emergency

A situation where the basic human needs of a population are threatened and therefore requires extraordinary measures and urgent action (ReliefWeb, 2008).

10.3.1.2 Complex emergency

A humanitarian crisis in a country, region or society where there is total or considerable breakdown of authority resulting from internal or external conflict and which requires an international response that goes beyond the mandate or capacity of any single and/or ongoing UN country program (ReliefWeb, 2008).

10.3.2 Early warning and response

Early warning is an organized mechanism to detect, as early as possible, any abnormal occurrence or any divergence from the usual or normally observed frequency of diseases, conditions and events. Liberia relies on a network of people (CHAs, CHVs, Traditional healers, Spiritual healers, News outlet, surveillance officers) from health facilities (clinics, health center, and hospital) to collect, investigate, report, analyze and disseminate information from the sub-national to national level for appropriate action.

10.3.2.1 Why early warning and response?

The enhanced surveillance needs during humanitarian emergencies demand that surveillance systems are in place for systematic collection, collation, analysis, and interpretation of data, and for dissemination of information to facilitate public health response to prevent excess morbidity, mortality and disability (WHO, 2009). Consequently, during the acute phase of a humanitarian emergency, IDSR should be modified as soon as possible to focus on priority health problems during the emergency phase. For example, during political crisis where huge population displacement and new events and conditions occur, there will be a need for reclassification of catchment area, augment the routine surveillance structure with personnel from multi sectorial approach. The tailored IDSR should focus on diseases, conditions or events for a given emergency context and should be

flexible enough to respond to other emerging or re-emerging public health priorities (WHO, 2009).

During emergencies, populations are more vulnerable to morbidity, mortality and disability resulting from endemic and epidemic-prone diseases. Thus, IDSR should be enhanced within 3–10 days of grading the public health emergency to facilitate rapid detection and response to disease outbreaks and public health events. Ultimately, this will contribute to the overall goal of reducing avoidable mortality, morbidity, and disability during humanitarian crises (WHO ERF, 2009).

10.3.2.2 Objectives of tailoring IDSR to emergency context

The main objective is to rapidly detect and control acute public health events of any origin, with particular attention to prioritized health risks. The aim is to increase sensitivity of detection, quality of risk assessment, and timeliness and effectiveness of the response to acute public health risks in order to minimize the negative health consequences to the affected population.

The specific objectives are to:

a) Detect acute public health events and health risks early
b) Ensure immediate communication of information from subnational to national level as well as from any source identified
c) Verify the initial information (i.e. the signal)
d) Document the nature of the event through investigation, characterization, etiological confirmation
e) Perform risk assessment to determine the level of risk posed by the detected event.
f) Ensure immediate alert mechanisms from national to subnational levels
g) Ensure prompt investigation as necessary and implement an adequate response through mitigation and control measures, as required by the continuous risk assessment.
h) Alert and maintain communication and coordination with national and international stakeholders.

10.3.2.3 Critical components

During humanitarian crises, all health facilities, including those in camps for IDPs which provide curative, disease prevention and health promotion interventions should be included in the IDSR network to enhance the sensitivity of the system (WHO, 2009). Depending on the extent of the crisis, the surveillance network may include all health facilities.

To ensure efficiency, the data collection and analysis processes need to be integrated, systematic and formalized. Epidemic intelligence should be based on the two main IDSR

event detection systems, namely: IBS (immediate and weekly reporting of data aggregated by health facilities) and event-based surveillance, which is the organized collection, monitoring, assessment and interpretation of mainly unstructured ad hoc information regarding health events or risks. These complementary systems increase the sensitivity of IDSR to ensure timely detection and verification of outbreaks, and effective monitoring of morbidity patterns (WHO, 2012).

10.3.3 Implementation of IDSR in humanitarian emergencies

10.3.3.1 Rapid assessment of the situation

During the acute phase of the emergency, it is helpful to undertake a systematic assessment of the risk of acute public health events. This involves gauging both the likelihood of a disease occurring and its eventual impact. The assessment can identify the epidemic-prone diseases that have the potential to cause the greatest amount of morbidity and mortality in the affected population, and determine the geographical scope of surveillance. An evaluation of the status of key surveillance infrastructure is also done, including existing surveillance capacity, identification of resource needs for IDSR implementation, staff with relevant skills, communication and IT equipment, laboratory support and transport. The assessment should be based on consensus, analysis of existing data, establishment of working groups and the conduct of in-depth interviews, as required. It should include all-hazards and multisectoral approach.

10.3.3.2 Gap analysis

A gap analysis should be performed to complement the situation analysis and the assessment of the surveillance system. It aims to assess the specific needs and environment and review the strengths, weaknesses, threats and opportunities around the existing national surveillance system in order to identify available resources to reinforce IDSR. Gap analysis does not require a new or additional formal evaluation to .be carried out. The results of previous evaluations of the surveillance system can be reused. In case of information gap, focus groups or in-depth interviews with stakeholders at all levels of the surveillance system should be considered.

10.3.3.3 Prioritization

In order to ensure the most efficient use of resources, the strategy should be based on a prioritization exercise, the results of the gap analysis and the list of priority events for surveillance. For each selected disease, condition or event, surveillance objectives need to be specified based on Liberia's context. The objectives will depend on the characteristics of the disease, condition or event (e.g. attack rate, morbidity and mortality, setting), the mode of transmission (e.g. person to person, point source outbreaks, exposure to toxic substances), and the nature of the public health interventions required to control spread.

10.3.3.4 Development of a plan of action for the implementation of IDSR

Once the prioritization exercise has been completed and all potential sources of information listed, a plan of action should be developed and implemented at the national and sub-national levels. The plan of action should be well-integrated with the national IDSR system, including monitoring and evaluation.

10.3.3.5 Designate a coordination mechanism

A coordination structure should be established at the national and sub-national levels to ensure a single-entry point for reporting, analysis and triangulating of information, verifying signals, assessing risks, and monitoring and responding to acute public health events.

10.3.4 Various actors in enhancing IDSR to Improve early warning and response

During acute or complex emergencies where the capacity of the national and sub-national IDSR system in the MoH and NPHIL are greatly constrained, the roles and responsibilities may be expanded to include other One Health actors.

10.3.4.1 National level

The overall coordination of data collection, entry, analysis and dissemination during humanitarian crises should be managed by the DIDE in NPHIL with support from MoH health information system unit, WHO and health partners. Information gathered should be shared and disseminated with the PHEOC and other key stakeholders. However, during acute crisis or complex emergencies where the capacity of the DIDE in NPHIL is greatly constrained, the roles and responsibilities of One Health actors should be expanded and enhanced. The functions of the one health actors will be guided by the initial rapid assessment and should include but not be limited to:

a) Providing dedicated technical oversight.
b) Coordinating the supervision of surveillance and outbreak response activities in crisis-affected areas.
c) Coordinating health workers and partners for effective disease surveillance, outbreak and public health response in crisis-affected populations.
d) Supporting districts, counties or regions to investigate and respond to outbreaks or public health events including refresher training of staff in IDSR.
e) Conducting regular analysis of epidemiological trends and production of regular surveillance bulletins and SitReps.
f) Providing technical and operational support for reporting and notifying priority diseases, conditions and events.
g) Supporting evaluation.

10.3.4.2 County level

The existing surveillance officers at district and/or county level should coordinate surveillance and response activities in crisis-affected populations. However, during acute crises or complex emergencies where the capacities of district/county SFPs are constrained, WHO country office, working in close collaboration with the health cluster and one health actors, should assign a partner or a focal point in each affected district or county to:

a) Coordinate disease surveillance and outbreak response in crisis-affected populations.

b) Ensure timely reporting of priority diseases, conditions and events related to the crisis.

c) Conduct trend analyses and provide feedback to health facilities and stakeholders.

d) Conduct initial investigation of disease outbreaks and public health events.

e) Respond to disease outbreaks and public health emergencies in collaboration with NPHIL, MoH, partners, health facilities and stakeholders

10.3.4.3 Public and private health facilities or mobile clinics

All identified focal persons working in health facilities or mobile clinics offering curative, preventive and health promotion services should implement the following:

a) Detect, collect and report priority diseases, conditions and events

b) Support the verification and investigation of outbreaks and public health events

c) Undertake public health and outbreak response measures, with support from the community focal persons, district, county and national SFPs

10.3.5 Key structures and tools to be in place during an acute humanitarian crisis

10.3.5.1 List of diseases/conditions/events

During the acute phase of a humanitarian crisis, a rapid risk assessment should be conducted to identify diseases, conditions and events that pose a threat to the population. These should be prioritized in addition to the national IDSR priority list. In identifying the list of additional priority diseases, conditions and events, criteria for inclusion should take into account WHO guidelines for events under surveillance (WHO, 2012), namely:

a) Epidemic

b) VPDs due to disruption of immunization in most of the emergencies

c) Ability to cause severe morbidity or death

d) International surveillance requirements (IHR, 2005)

e) Availability of prevention and control measures

f) Availability of reliable and meaningful case definitions and simple laboratory tests, where appropriate

It is critical that clinicians register the most important diagnosis per patient and that only new case visits are counted and not the follow-up visits.

The sources of data on new cases include:

a) Outpatient clinics
b) IPD
c) Laboratory
d) Mobile clinics in the community or from focal people identified from community
e) IDP/refugee camp clinics
f) Other sources of event-based information

10.3.5.2 Case definitions

For the diseases, conditions and events already included on the IDSR priority disease list, the existing case definitions should be used. Sensitive case definitions that increase the chances of detecting new outbreaks should be developed for the additional diseases, conditions, events and syndromes identified as part of the risk assessment. These case definitions should be simple, standardized and harmonized with the national IDSR case definitions.

10.3.5.3 Laboratory support

Quality assured WHO approved Point of care Rapid Diagnostic Test (RDT) kits for diseases like malaria, cholera, meningitis, and hepatitis A and E are essential for timely treatment and outbreak response decisions.

Laboratory confirmation is more critical for suspected outbreaks in crisis-affected populations and the following should be in place to facilitate timely investigation of new outbreaks:

a) Adequate stocks of outbreak sample collection kits and SOPs should be available at the sub-national level
b) Cold chain and shipping arrangements should be linked to the national specimen transportation network
c) Field or mobile laboratories should be set up to address the routine and outbreak laboratory testing needs of crisis-affected populations
d) Existing laboratories at national and sub-national levels should be strengthened to address the extra demands of crisis-affected populations
e) Referral laboratories (national and international) should be identified to facilitate laboratory confirmation, antibiotic susceptibility testing and quality control
f) The existing IDSR laboratory and case investigation forms should be used for routine collection and reporting of laboratory aggregate and case-based data
g) Harmonization of laboratory reporting between surveillance and laboratory systems for timely dissemination of results

10.3.5.4 Methods of data collection

Data should be collected on reportable trigger and priority diseases, conditions and events that are generated from data sources, such as inpatient and outpatient clinics, mobile clinics, laboratories; disease-specific active case search or outbreak investigations; CHWs; community trigger and other sources of disease surveillance data. Health workers should observe the following standards:

a) Strict adherence to the case definitions while collecting disease, conditions or event data
b) Each patient should be assigned one main diagnosis and counted once
c) New and follow-up visits should be coded separately in the health facility register

The data collection will entail the following paper-based tools and/or electronic platforms:

a) National HMIS outpatient and inpatient registers.
b) IDSR immediate case-based and laboratory investigation form
c) IDSR weekly/monthly summary reporting form
d) IDSR health facility alert logbook
e) Disease specific line lists
f) Generic or disease-specific case investigation forms
g) Mortality line lists

10.3.5.5 Data reporting and transmission methods

Humanitarian crises tend to disrupt existing national disease surveillance platforms for transmitting data. In the same way, crisis-affected populations may have additional public health needs beyond the ones established through the routine IDSR. Flexibility should be exercised to update the existing IDSR/HMIS reporting tools to capture diseases, conditions and events unique to crisis-affected populations. Consequently, the existing IDSR/HMIS paper-based tools and/or electronic reporting platforms should be updated to capture such additional diseases, condition, and public health events.

The reporting platforms (paper based and/or electronic) should provide for the following reporting timelines:

a) Immediate reporting of epidemic-prone disease trigger
b) Daily reporting of aggregated and/or case-based data on priority diseases, conditions, events during the acute phase of the crisis and after a new outbreak is confirmed
c) Weekly reporting of aggregated data on priority diseases
d) Weekly mortality line listing should be updated with community and health facility deaths and reported

10.3.5.6 Data analysis and interpretation

The principles of data analysis utilized as part of the routine IDSR should be used in crisis-affected populations. Analysis on aggregated data is therefore conducted to document and

describe disease trends and crossing of thresholds. The data is also used to calculate ratios and rates.

Before embarking on any analysis, data validation and cleaning should be undertaken for missing entries, outliers, and duplicates. The basic analysis entails case/death descriptive analysis by time, person, and place.

Morbidity indicators in crisis-affected populations include:

a) Absolute counts of cases and deaths by priority disease.
b) Incidence of disease (new cases by week divided by the total population) with a graph to show trends from recent weeks. This can be disaggregated by location and person characteristics.
c) Proportional morbidity (new cases of disease in a week divided by the new consultations in the week).
d) CFR – the proportion of cases that die from a specific disease.
e) Attack rate during outbreaks as the cumulative incidence of epidemic disease in a population over a period of time.

The mortality indicators in crisis-affected populations

It is critical that mortality rates (MRs) (Crude Death Rate (CDR)/CDR and U5MR) are monitored for crisis-affected populations to ensure that rates exceeding the established emergency threshold are detected and responded to promptly.

a) Crude Mortality Rate (CMR) is defined as deaths per 10,000 population. It is calculated as the number of deaths in a given population or geographical space (town, district, county, etc.) divided by the population present during the period multiplied by 10,000.
b) U5MR is defined as under-five deaths per 10,000 children under-five. It is calculated as the number of deaths in under-fives divided by the population of under-fives present during the period multiplied by 10,000.
c) CFR – Is the proportion of death(s) attributed to a specific disease (confirmed cases). It is calculated as the number of death(s) due to specific disease (confirmed cases) in a given population divided by the total number of reported cases multiplied by 100.

Electronic platforms offer the advantage of automated analyses for both routine and case-based outbreak data thus saving time and ensuring analyzed data is available in real-time to inform disease surveillance and outbreak response decisions at all levels.

10.3.5.7 Feedback and dissemination

Feedback and information dissemination are critical for ensuring full engagement of stakeholders. Therefore, information providers should be included in the regular feedback chain in order to improve disease control efforts. For example, weekly surveillance summaries, SitReps, bulletins and presentations should be presented and reviewed during:

a) Weekly IDSR or outbreak committee meetings
b) WASH (and other relevant) cluster meetings
c) Other relevant disease control meetings
d) Regular stakeholders and response committee meeting

Electronic platforms offer the advantage of producing automated disease surveillance and epidemic bulletins or SitReps to inform disease surveillance and outbreak response decisions at all levels.

10.3.5.8 Support functions for surveillance in crisis-affected populations

To optimize the functioning of disease surveillance and outbreak response in crisis-affected populations, the IDSR guidelines are adapted to:

a) improve surveillance and outbreak response at all levels.
b) improve training of health workers, SFPs and RRTs on surveillance functions including outbreak preparedness, investigation and response
c) access support to communication (computers, phones, internet connectivity, etc.) based on local context and surveillance needs.
d) improve regular supervision and support to enhance surveillance functions at all levels.
e) improve periodic evaluation to improve the performance of the surveillance system (refer to framework for evaluating surveillance systems)

10.3.6 Outbreak preparedness

Outbreak preparedness is paramount given the heightened risk of disease outbreaks in crisis-affected populations. Preparedness efforts should, as much as possible, be integrated in the existing national IDSR framework at national and sub-national levels with the MoH and the NPHIL leading the efforts, supported by WHO and partners. However, during acute or complex emergencies where the capacities of the MoH are greatly compromised or diminished, WHO, working with the health cluster partners should take lead to enhance outbreak preparedness (WHO, 2012). The key preparedness efforts in crisis-affected populations should entail the following:

a) Strengthening existing or forming new multi-sectorial outbreak control teams at national and sub national levels, with roles and responsibilities designated for each team member
b) Updating existing or developing new outbreak prevention and response plans that incorporate risks unique to crisis-affected populations
c) Development or updating (if necessary) of standard line-list forms for data collection during an outbreak
d) Development and distribution of standard treatment protocols for key diseases, with strategies for training of staff
e) Calculation of potential attack rates for epidemic-prone diseases, where possible

f) Pre-positioning stocks of essential treatment supplies to initiate outbreak control (e.g. oral rehydration salts, intravenous fluids, vaccination material, PPE, transport medium for samples, water purification supplies, disinfectants, spray pumps and information leaflets on preventive measures for health staff or the community

g) Procurement of laboratory sample collection for the priority diseases and identification of a competent laboratory for confirmation of cases

h) Identifying potential sites for isolation and adequate treatment of patients, or for extra capacity, in the event of a surge in cases (e.g. a cholera treatment center)

i) Implementing relevant prevention measures based on the risk assessment of diseases (e.g. measles and cholera vaccination, indoor-residual spraying of dwellings and distribution of long-lasting insecticide-treated nets to prevent outbreaks of measles, cholera, and malaria)

j) Scaling up preparedness and response efforts/ activating RRTs at the PoE

10.3.6.1 Alert and epidemic thresholds

The following thresholds are used in crisis-affected populations:

a) Assess the severity of the humanitarian crisis based on the CMR and U5MR.

   i. The CMR threshold should be less than 1 death per 10,000 people per day.
   ii. The U5MR threshold should be less than 2 deaths per 10,000 people per day.

b) Alert system for detecting possible outbreaks based on doubling of weekly incidence compared to the weekly average of previous 2-3 weeks.

c) Detection of a case of potentially severe epidemic-prone disease like measles, polio, cholera, VHF or meningitis based on the IDSR alert and action thresholds specific to crisis-affected populations.

Once the thresholds are exceeded, verifications, investigations and response should be instituted promptly to prevent further morbidity and mortality.

10.3.6.2 Alert verification

To minimize morbidity and mortality, alert verification should start immediately once the alert is received by sub-national and national SFPs (WHO, 2012). The verification can be done by telephone or site visit and can include the collection of information about:

a) Cases based on SCDs
b) Symptoms and signs (consider differential diagnoses)
c) Date of onset of symptoms of the first and the most recently detected cases
d) Place and date seen or admitted at the health facility
e) Age, sex and vaccination status of patients, where relevant
f) Place of residence at onset of illness
g) Where cases are occurring (community-level data)
h) Geographical, personal and time relationships between cases
i) Prompt laboratory investigation of samples from suspected cases
j) Outcomes including, for example, deaths, case management details and the health-

care staff affected

10.3.7 Outbreak investigation

Outbreak investigation involves determining the cause of an outbreak and who is at risk so that control measures can be implemented. The main objective of an outbreak investigation is to control the outbreak and thus reduce morbidity and mortality. The investigation should begin as soon as an alert is detected and has been verified.

The investigations should be undertaken by RRTs at national and sub-national levels that have been established as part of the national IDSR framework. In acute and complex emergencies, dedicated and trained teams will be identified to undertake the investigations, which should follow existing IDSR outbreak investigation guidelines that have been adapted to address the unique needs of crisis-affected populations.

10.3.8 Outbreak response

Outbreak response shall follow the existing national IDSR framework at national and sub-national levels with the existing structures leading the efforts. However, during acute or complex emergencies where the capacities of the MoH and NPHIL are greatly compromised or diminished, WHO, working with the health cluster partners shall take lead in coordinating and implementing outbreak response activities.

The additional risks in crisis-affected populations will demand strengthening existing or formation of new multi-sectoral outbreak control teams at national and sub national levels, with roles and responsibilities designated for each team member as set out in the IDSR outbreak response guidelines. Health, WASH and other relevant cluster partners should support outbreak response activities in crisis-affected populations.

10.4 **Exit Strategy**

During the recovery phase of the crisis, the MoH and NPHIL should work with WHO and partners to re-establish all the IDSR structures and focal points in the crisis-affected populations. Liberia shall conduct an evaluation to assess what happened, why it happened and document lessons learnt and gaps identified to inform the recommendations to prevent future occurrence.

11 Section 11: Summary guidelines for priority diseases, conditions and events

This section provides summary guidelines for each of the priority diseases, events and conditions targeted for surveillance by MoH and NPHIL. It provides disease/event/condition specific guidance to:

- Take action to respond to trigger and action thresholds,
- Identify surveillance goals and objectives,
- Surveillance data analysis and interpretation,
- Prepare to use the national, county and district analysis database,
- SCDs for reporting diseases/events/conditions.

This section is intended as a rapid reference. The table below shows how information is organized in this section.

Priority disease/event/condition for IDSR

Background

In this sub-section, you will find general information about:

- The disease or event, the causative agent, geographic range affected and other epidemiologic information.
- Transmission routes such as person-to-person, unprotected contact with infectious body fluids or contaminated materials, vector-borne, and so on.
- Why the disease/event is a priority for surveillance. For example, the disease/event is responsible for a high number of deaths, disability and illness,
- General and specific risk factors in Liberia.
- Any additional background information that might serve the national, county and district surveillance teams.

Surveillance Goal

This sub-section states how the surveillance information is used for action.

Standard case definition

Suspected case: A definition is provided for suspecting a case or outbreak of this disease or event.

Probable case: A definition is provided for a suspected case with epidemiological link to a confirmed case or an outbreak if laboratory confirmation results are not available.

Confirmed case: A definition is provided for classifying a case as confirmed through laboratory diagnostic testing.

Respond to alert threshold

Some diseases or events have program specific thresholds for alerting the health facility or district to a potential problem.

For epidemic-prone diseases, diseases targeted for elimination or eradication, or public health events of international concern, a single case is a suspected outbreak and requires immediate reporting followed by patient treatment, collection of specimens for case confirmation, and investigation of the case to determine the risk factors and potential interventions.

For other priority diseases of public health importance, an outbreak or event is suspected when there is any unusual cluster, pattern, or increase in the number of cases when compared with previous time periods. This should prompt a response such as investigating what might have caused the unusual events. If laboratory confirmation is indicated, specimens should be collected for laboratory confirmation.

Respond to action threshold

For epidemic-prone diseases, diseases targeted for elimination or eradication, or public health events of international concern, a confirmed case should trigger a response such as conducting an emergency immunization activity, enhancing access to safe drinking water, community education campaigns, and improving case management.

For other priority diseases of public health importance, a confirmed outbreak should prompt an appropriate response such as improving coverage for specified immunizations, strengthening case management, providing information, education and communication about preventing and controlling the disease, and so on.

Analyze and interpret data

This sub-section contains generic information about the minimum data elements to collect, analyses and interpret. The key points to consider for interpreting the data and specific elements for analysis are also stated (time, place, and person).

Laboratory confirmation

In this sub-section, guidelines on laboratory confirmation are provided including: relevant diagnostic tests, how to collect, store and transport the specimens needed for laboratory confirmation, and information on the results of laboratory work.

Reference

Appropriate references for further information stated for each disease. Most are available from the WHO website related to the various diseases.

Disease/events specific guidelines

11.1 Acute Bloody Diarrhea (*Shigella*)

Background	*Shigella dysenteriae* type 1 (SD1) is the most common cause of enteric infections and is transmitted from person-to-person through fecal-oral spread. • Large scale outbreaks may be caused by *Shigella dysenteriae* type 1 (SD1) with up to 30% of populations infected. The case fatality rate may approach 20% among young children and elderly persons who develop associated severe dehydration. • The incubation period is from 1 to 4 days. • Clinical illness is characterized by acute fever and bloody diarrhea, and can also present with systemic symptoms and signs as well as dehydration especially in young children. • Risk factor: overcrowded areas with unsafe water and poor sanitation ○ SD1 is frequently resistant to multiple antibiotics including trimethoprim-sulfamethoxazole. ○ Enterohaemorrhagic and enteroinvasive E. coli and other bacteria or parasites such as Entamoeba histolytica may also cause bloody diarrhoea.
Surveillance goal	• Detect and respond to dysentery outbreaks promptly. • Improve percentage of laboratory-confirmed cases and evaluate proportion verified as type 1 (SD1). • Determine antibiotic sensitivity pattern of the agents isolated (especially SD1) both for routine surveillance and during outbreaks.
Standard case definition	Suspected case: A person with diarrhea with visible blood in stool. Confirmed case: Suspected case with stool culture positive for Shigella dysenteriae type1.
Respond to alert threshold	≥ 5 cases in one location in 1 week or double the weekly average • Report the increase to the next level of the health system. • Treat the suspected cases with oral rehydration and antibiotics based on recent susceptibility results, if available. • Obtain stool or rectal swab specimen for confirming the SD1 outbreak. • Investigate the case to determine risk factors contributing to transmission.
Analyze and interpret data	Time: Graph monthly trends in cases and deaths. Construct an epidemic curve for outbreak cases. Place: Plot location of case households. Person: Count cases and deaths each month. During an outbreak, count outbreak-related cases by week. Routinely analyze age distribution. Assess risk factors to improve control and prevention of sporadic diseases and outbreaks.
Laboratory confirmation	Diagnostic test Isolate Shigella dysenteriae type 1 (SD1) in culture to confirm shigella outbreak. If SD1 is confirmed, perform antibiotic sensitivity tests with appropriate drugs.

	Specimen: Stool or rectal swab. When to collect the specimen: • For each new area affected by the outbreak, a laboratory confirmation should done. • Collect sample when an outbreak is suspected. • Collect stool from 5-10 patients who have bloody diarrhea and: • Onset within last 4 days, and • Before antibiotic treatment has started. • Preferably, collect stool in a clean, dry container. Do not contaminate with urine. Sample stool with a swab, selecting portions of the specimen with blood or mucus. If stool cannot be collected, obtain a rectal swab sample with a clean, cotton swab. How to prepare, store, and transport the specimen • Place stool swab or rectal swab in Carey-Blair transport medium. Transport to laboratory refrigerated. • Carey-Blair transport media is stable and usually good for at least one year after preparation. It does not require refrigeration if kept sterile and in properly sealed container. If color changes (media turns yellow) or shrinks (indents), do not use the media. • If Carey-Blair not available, send sample to lab within 2 hours in a clean, dry container with a tightly-fitting cap. Specimens not preserved in Carey-Blair will have significant reduction of Shigella after 24 hours. • If storage is required, hold specimens at 4°C to 8°C, and do not freeze. Results • Culture results are usually available 2 to 4 days after receipt by the laboratory. • SD1 isolates should be characterized by antibiotic susceptibility. After confirmation of initial 5-10 cases in an outbreak, sample only a small number of cases until the outbreak ends, to monitor cessation of the outbreak, and antibiotic sensitivity patterns, which will guide the definitive treatment.
References	• Guidelines for the control of epidemics due to Shigella dysenteriae type 1. WHO/CDR/95.4 • Safe Water Systems for the Developing World: A Handbook for Implementing • Household-based Water Treatment and Safe Storage Projects. Department of Health • & Human Services. Centers for Disease Control and Prevention. Atlanta. 2000 • Laboratory Methods for the Diagnosis of Epidemic Dysentery and Cholera. CDC/WHO, 1999 CDC, Atlanta, GA, USA

11.2 Acute Flaccid Paralysis (Poliomyelitis)

Background	Poliovirus (genus Enterovirus) serotypes 1, 2, and 3 are transmitted from person-to-person via fecal-oral spread. • Incubation period is 7 to 14 days for paralytic cases and the range is approximately 3 to 35 days. The virus may be shed for several years by immuno-compromised persons. • Infection is usually asymptomatic, but may cause a febrile syndrome with or without meningitis. In less than 5% of infections paralysis results, often of a single leg. • Polio infection occurs almost exclusively among children. Infection may occur with any of 3 serotypes of Poliovirus. Immunity is serotype-specific and lifelong. • Paralytic polio, though not fatal, has devastating social and economic consequences among affected individuals. • The Polio Eradication Program has nearly halted ongoing wild-type polio transmission worldwide through use of oral poliovirus (OPV) vaccine. Globally, poliovirus type 2 appears to have been eliminated. Polio is near eradication and is currently found in Afghanistan and Pakistan. • Areas with low vaccine coverage may allow ongoing wild-type transmission. • Other neurological illnesses may cause AFP, for example, Guillain-Barré syndrome and transverse myelitis.
Surveillance goal	• Immediate case-based reporting of all poliomyelitis cases. Weekly summary reporting of cases for routine surveillance and outbreaks. • Detect cases of acute flaccid paralysis (AFP) and obtain laboratory confirmation of the etiology of all suspected AFP cases. Obtain two stool specimens within 14 days of the onset of paralysis for viral isolation however stool can be collected up to 60 days. • Surveillance for AFP is used to capture all true cases of paralytic poliomyelitis. Target for surveillance performance to provide certification of polio eradications is 1 case of AFP / year / 100 000 population aged less than 15 years.
Standard case definition	Suspected case: Any child under 15 years of age with acute flaccid paralysis or any person with paralytic illness at any age in whom the clinician suspects poliomyelitis. Confirmed case: A suspected case with virus isolation in stool.
Respond to alert threshold	If a single case is suspected: • Report the suspected case immediately according to national level policy. • Conduct a case-based investigation. Include a patient vaccination history. • Collect two stool specimens. Collect the first one when case is investigated. • Collect the second one from the same patient 24 - 48 hours later. See laboratory guidelines for information on how to prepare, store and transport the specimen.

	• Obtain virological data from reference laboratory to confirm wild-type poliomyelitis, vaccine derived polio virus.
Respond to action threshold	If a case is confirmed: If wild polio virus is isolated from stool specimen a coordinated with national polio eradication program for guidance on response actions. The national level will decide which actions to take. They may include the following: • Specify reasons for non-vaccination of each unvaccinated case and address the identified deficiencies • Immediately conduct "mopping-up" vaccination campaign around the vicinity of the case • Conduct surveys to identify areas of low OPV coverage during routine EPI activities, improve routine vaccine coverage of OPV and other EPI antigens. Lead supplemental vaccination campaigns during National Immunization Days (NIDs) or Sub-National Immunization Days (SNIDs). Focus supplemental vaccination activities in areas of low vaccine coverage during EPI. Consider use of house-to-house vaccination teams in selected areas.
Analyze and interpret data	Time: Graph monthly cases (which should be zero to very few cases per area per year), or weekly cases during an outbreak. Evaluate the percent of suspected cases reported within 24 hours and the percentage with adequate laboratory evaluation. Place: Plot location of case households. Investigate the circumstances of poliovirus transmission in each case thoroughly. Examine the possibility of other potential areas of transmission. Person: Count monthly routine and outbreak-related cases. Analyze age distribution. Assess risk factors for low vaccine coverage.
Laboratory confirmation	Diagnostic test: Isolation of polio virus from stool Specimen: Stool Note: If no specimen is collected or if specimen collected 14 days after symptom onset, re-evaluate patient after 60 days to confirm clinical diagnosis of polio. When to collect the specimen • Collect 2 specimens from every suspected AFP case. • Collect the first specimen when the case is investigated. • Collect a second specimen on the same patient 24 to 48 hours later. How to prepare, store, and transport the specimen • Place stool in clean, leak-proof container and label clearly. • Immediately store a refrigerated temperature or cold box (4-8°C) not used for storing vaccines or other medicines. • Transport specimens so they will arrive at National level (NDS) within 72 hours of collection. • When there is a delay, and specimen will not be transported within 72 hours, freeze specimen at -20°C or colder. Then transport frozen specimen with dry ice or cold packs also frozen at -20°C or colder. Results: Confirmed results are usually available within 21 days after receipt of specimen by the laboratory. If wild or vaccine derived polio virus is detected, the national program will plan appropriate response actions.

References	• Field Guide for Supplementary Activities Aimed at Achieving Polio Eradication. World Health Organization. • WHO global action plan for laboratory containment of wild polio viruses. WHO/V&B/99.32, Geneva, 1999 • Manual for the virological investigation of polio, WHO/ EPI/GEN/97.01, Geneva, 2004 • Supplement to the Manual for the virological investigation of Polio. WHO/EPI 2007 Further technical documents: http://www.polioeradication.org/Resourcelibrary/Resourcesforpolioeradicators/Technicalguidelines.aspx http://www.polioeradication.org/Portals/0/Document/Resources/PolioEradicators/1c.QuickFixesforSIA20100914.pdf

11.3 Adverse Events Following Immunization (AEFI)

Background	An adverse event following immunization is any untoward medical occurrence (unfavorable or unintended sign, abnormal laboratory finding, symptom or disease) which follows immunization and which does not necessarily have a causal relationship with the usage of the vaccine. It ranges from minor side-effects to more severe reactions. They can be a cause of public concerns about vaccine safety. To understand a specific event and to be able to respond appropriately, there are several questions that need to be answered: What caused the reaction? • Was it related to the vaccine, or the way it was administered, or was it unrelated? • Are the reactions minor or severe? The surveillance begins immediately (0 hours) after immunization to day forty. **Cause-specific type of AEFI:** • Vaccine product-related reaction • Vaccine quality defect-related reaction • Immunization error-related reaction (formerly “programme error”) • Immunization anxiety-related reaction • Coincidental event The five categories of AEFI as defined by CIOMS and WHO are described in table 2.1 of the AEFI Technical Guidelines.
Surveillance goal	The ultimate goal of an AEFI surveillance is to find the cause of the reported AEFI(s) and prevent recurrence. Remedial action needs to be taken promptly for immunization error related AEFI. Even if the cause cannot be identified or the cause of the event was due to some other reason, the fact that staff had investigated the incident itself will increase public confidence in the immunization program. A robust AEFI surveillance system in Liberia will help authorities to detect, manage and prevent AEFIs. Other goals of AEFI surveillance are: • To confirm the reported diagnosis and/or propose other possible diagnoses as well as clarify the outcome of the medical incident comprising the AEFI. • To ascertain the particulars, circumstances and procedures around the vaccine used to immunize the affected recipient. Most importantly, identify any potential vaccine related link to the given AEFI. • To examine the operational aspects of the programme. Even if an event seems to be vaccine product induced or coincidental. • To determine whether a reported event was a single incident or one of a cluster and if it is a cluster, confirm that the suspected immunizations were indeed given and the individual vaccines that were used. • To determine whether unimmunized people are experiencing the same medical incidents.
Standard case definition	An adverse event following immunization is any untoward medical occurrence (unfavorable or unintended sign, abnormal laboratory finding, symptom or disease) which follows immunization and which does not necessarily have a causal relationship with the usage of the vaccine. Reported adverse events can either be true adverse events - i.e. resulting from the vaccine or immunization process - or coincidental events that are not due to the vaccine or immunization process but are temporally associated with immunization.

	Minor /non-serious AEFI • Usually occur within a few hours of injection • Resolve after short period of time and poses little danger • Local (includes pain, swelling or redness at the site of injection) • Systemic (includes fever, malaise, muscle pain, headache or loss of appetite) Severe/serious AEFI Severe is used to describe the intensity of a specific event (as in mild, moderate or severe) • results in death, • is life-threatening, • requires in-patient hospitalization or prolongation of existing hospitalization, • results in persistent or significant disability/incapacity, • is a congenital anomaly/birth defect, or • requires intervention to prevent permanent impairment or damage **A case suspected to be vaccine/vaccination related is called an Adverse Event Following Immunization (AEFI).**
Respond to alert threshold	All AEFIs identified, verified and validated should be reported.
Respond to action threshold	All serious AEFIs should be investigated and reported.

11.4 Adverse Events of Special Interest (AESI)

Background	In addition to AEFI, other conditions may arise from vaccination refer to as AESI. AESIs are conditions and diseases known historically to have been vaccine related. During the launch of a new vaccine, it's indicated to closely monitor them. When a vaccine is introduced, the eventual increase in the occurrence of the diseases may be attributable to the vaccine. For nOPV2 the following AESIs have been documented (not limited to): • Anaphylactic reactions • Aseptic meningitis/encephalitis • Acute disseminated encephalomyelitis (ADEM) • Guillain-Barré syndrome (GBS)/Fishers Syndrome • Myelitis/transverse myelitis • Acute flaccid paralysis (AFP): VDPV and VAPP • Unexplained deaths An increase in the number of AESIs following the introduction of the vaccine may be attributable to the vaccine and this has to be detected to make sure that it is at an acceptable rate.
Surveillance goal	The goal of AESI surveillance is to monitor the safety profile of the vaccine. An active case search is implemented in order to detect the defined AESIs and anticipate eventual risks.
Standard case definition	Adverse Events of Special Interest: a focused list of adverse events that can assist with generating safety signals for complex conditions that may warrant timely investigation.
Respond to alert threshold	All AESIs identified, should be investigated and reported.
Respond to action threshold	All AESIs identified, should be investigated and reported.

11.5 Adverse Drug Reactions (ADR)

Background	Since Pharmacovigilance is a science and activities relating to the detection, assessment, understanding and prevention of adverse effects of medicines or any other medicine-related problems, little is known of it by most health professionals because of limited knowledge of and training in the collection and reporting of adverse drug reactions (ADRs). As objectives, pharmacovigilance aims at improving patient care and public health in relation to use of medicines and other related health products, as well as contributes to the assessment of benefit, harm, effectiveness and risks of medicines; promotes understanding of clinical trainings and effective communication to health professionals and the public. Adverse drug reaction is essential for safe, rational, as well as cost-effective utilization of medicines worldwide; it plays an important role in improving the clinical outcomes and also decreasing mortality and morbidity rates. ADRs are considered a major cause of patients' morbidity, mortality, hospital admissions, as well as increasing length of hospitalization and cost of treatment. Literature demonstrates the importance of involving pharmacists in ADR reporting and considered pharmacists the most valuable sources of spontaneous reporting of ADRs.
Surveillance goal	Early detection of cases of ADR incidences for investigation and reporting for policy making regarding medicines safety in the population
Standard case definition	Pharmacovigilance is the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other drug-related problem (WHO 2002). Adverse reaction A response to a drug which is unpleasant and unintended, and which occurs at doses normally used in patients man for the prophylaxis, diagnosis, or therapy of disease, or for the modifications of physiological function.
Respond to alert threshold	All ADRs identified, should be investigated and reported.
Respond to action threshold	All ADRs identified, should be investigated and reported.

11.6 Buruli ulcer (BU) (Mycobacterium ulcerans disease)

Background	• Skin infection caused by Mycobacterium ulcerans (an acid fast bacilli (AFB)) • Occurring mainly as skin lesions (nodules, plaques and ulcers) than can be complicated by bone and joint involvement. Involvement of other organs like the eyes is rare • Spreading in inter-tropical areas, in swampy soils or water body surroundings, forestry or surface mining zones • Patients are classified into three categories: • Category I: patient with a single lesion which size is less than 5 cm of diameter (early lesion) • Category II: patient with single lesion which size is between 5 and 15 cm of diameter • Category III: patient single lesion which size is over 15 cm of diameter or with multiple lesions or lesion located in critical site (face, head & neck, breast, perineum, genitalia, lesion spanning over joints) • BU case management has improved greatly through use of WHO recommended antibiotics (rifampicin and streptomycin) in 2004. Since 2017, full oral combined antibiotics (rifampicin and clarithromycin) are now recommended for treatment of cases with wound care of ulcers. Surgery is still needed for late cases (category III). Cumulative number of cases in the WHO African Region that is the most affected (95% of global cases) is around 90,000 in 2017. • Mode of transmission is still unknown. M ulcerans could penetrate the skin through insect bite (water bugs); micro trauma or small wounds • Confirmation of diagnosis is done by PCR, AFB search with Ziehl-Neelsen (ZN) staining, culture or histology. Specimens of lesions are taken by swab in ulcer, fine needle aspiration (FNA) or biopsy in case of surgery. New diagnostic tests based of the presence of mycolactone, a toxin released by M ulcerans in lesions, are under development.
Surveillance goal	Geographical distribution of the disease to locate endemic areas and districts and focus early case finding, proper management with WHO recommended antibiotics and prevention of disabilities
Standard case definition	Suspected case: A person presenting a painless skin nodule, plaque or ulcer, living or having visited a BU endemic area Confirmed case: A suspected case confirmed by at least one laboratory test (ZN for AFB, PCR, culture or histology). Confirmation of presence of mycolactone in skin lesions
Respond to alert threshold	If a single case is suspected: • Report the suspected case to the appropriate level of the health system • At health facility level: • Take a specimen for laboratory confirmation (swab or FNA) • Begin wound dressing and combined antibiotic treatment with: Rifampicin 10 mg/kg daily oral intake for 8 weeks (56 days). • Clarithromycin 7.5 mg/kg twice daily oral intake for 8 weeks (56 days) • Refer category III patients to reference hospital/centre • Fill in case report form (BU 01 or BU 02) with origin village GPS data and report to Health District, Regional and National levels • Search other cases in origin village of confirmed case of BU
Respond to action threshold	Not applicable to BU

Analyze and interpret data	Time: Graph of cases by year of diagnosis, graph of cumulative number of cases. Place: A lot cases by location of households and colour shade endemic districts Person: Count newly detected cases monthly by category of patients (Cat I, II or III). Analyse age and disability distribution and treatment outcomes (cases cured, cured without limitation of movement or amputation, relapse after recommended antibiotic treatment).
Laboratory Confirmation	

Diagnostic test	*Mycobacterium ulcerans*: Smears and biopsy specimens can be sent to the laboratory for confirmation by:
	• Ziehl-Neelsen stain for acid-fast bacilli
	• Culture
	  ○ PCR
	  ○ Histopathology
	Mycolactone detection in lesion (new)

Specimen	• Smears • Fine needle aspirations (FNAs) • Biopsy specimens
When to collect the specimen	Specimens should be collected from suspected patient with clinical symptoms (nodule, plaque, ulcer, osteomyelitis ...) Specimen should be collected before any antibiotic is given. Another specimen should be collected at the end of the treatment (in case the treatment is not efficacious or surgery is indicated)
How to prepare, store, and transport the specimen	Collection of specimen: it is important to avoid cross contamination between the collection of samples Materials: Dry swabs and recipients. Types of specimens: No ulcerative forms, ulcerative forms, bone: Store at 4°C
Results	Buruli ulcer is usually diagnosed clinically and by finding acid fast bacilli (AFB) in smears from infected ulcers and tissue biopsies. It can also be identified using PCR. M ulcerans can be cultured in a reference laboratory using the same culture media used to grow M. tuberculosis. The organism grows very slowly, usually requiring several weeks to provide visible colonies. Diagnostic services are not routinely available. Contact the appropriate National authority or WHO.
References: BU	• Resolution WHA 57.1 on surveillance and control of Mycobacterium ulcerans disease (Buruli ulcer). In: 57th World Health Assembly, Geneva, 17-22 May 2004; Resolutions and decisions, annexes. Geneva, WHO; 2004 (WHA57/2004/REC/1: 1-2) • Provisional guidance on the role of specific antibiotics in the management of Mycobacterium ulcerans disease (Buruli ulcer) WHO/CDS/CPE/GBUI/2004.10 • Buruli ulcer: First programme review meeting for West Africa – Summary report. WHO, WER, 6; 2009 : 43-48 • Control of Communicable Diseases Manual, 18th Edition • District Laboratory Practice in Tropical Countries, Cambridge

11.7 Corona Virus Disease (COVID-19)

Background	The coronavirus disease 2019 (COVID-19) is a disease of global concern. On December 31, 2019, the World Health Organization (WHO) was informed of 44 cases of pneumonia of unknown microbial etiology associated with Wuhan City, Hubei Province, China (Zhu et al., 2020). Most of the cases in the outbreak reported a link to a large seafood and live animal market (Huanan South China Seafood Market) (Zhu et al., 2020). WHO announced on January 9, 2020, that a novel coronavirus that had not been previously identified in humans had been detected in samples taken from cases in Wuhan City. Laboratory tests ruled out SARS-CoV, MERS-CoV, influenza, avian influenza, and other common respiratory pathogens (Corman, Gralinski & Menachery, 2020). On January 30, 2020, it was declared as a Public Health Emergency of International Concern (PHEIC) and as a Pandemic on March 11, 2020 by WHO (Ahmad et al., 2020 & Abebe et al., 2020). Coronavirus disease 2019 (COVID-19) is caused by the severe acute respiratory syndrome coronavirus 2(SARS-CoV-2). SARS-CoV-2 is a positive-sense single-stranded RNA virus that is contagious in humans. ((WHO, 2021; Diaz, Appiah, & Askie, 2021). Globally, as of 31 May 2021, there have been 170.363,852 confirmed cases of COVID-19 including 3,546,870 deaths reported while 1,579,416,705 vaccine doses have been administered (WHO, 2021). On 16th March 2020, Liberia recorded its first case of COVID-19 in a 46-year old Liberian who had returned from Switzerland. Since the outbreak in Liberia (March 16, 2020 – April 25, 2021) a total of thousand ninety-eight (2,098) confirmed cases recorded including 85 deaths have been recorded. Liberia reported its first confirmed case of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus strain on 16 March 2020 in Monrovia, the country's capital. As of the 30 May, 2021, Liberia recorded a total of 2191 cases including 86 deaths. A total of 55,892 doses of Astrazeneca vaccine has been administered. (NPHIL & MOH, 2021). The incubation period range from 2 to 14days, with an estimated median of 5.2 days (Lauer et al., 2020). The clinical presentation greatly resembles viral pneumonia, and severity ranges from mild to severe. The majority of patients present with mild illness. Approximately 20% of cases progress to severe disease requiring hospitalization. Severe illness may be more likely in older people or those with underlying health conditions. The most common symptoms are fever, cough, and shortness of breath. Other less common symptoms include myalgia, fatigue, sputum production, confusion, headache, sore throat, runny nose, chest pain, diarrhea, and nausea/vomiting. (Jiang et al., 2020).
Surveillance goal	The goal of COVID-19 surveillance is to reduce transmission, thereby limiting associated morbidity and mortality.
Standard case definition	*Simplified/Community case definition:*

	Any person with hot skin, cough, not breathing well, and/or who has travelled from outbreak area OR who has taken care of sick person *Suspected case:* Any person with acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath), AND a history of travel to or residence in country or location reporting community transmission of COVID-19 disease during 14 days prior to symptom onset; **OR** A person with any acute respiratory illness AND having been in contact with a confirmed or probable COVID-19 case (see definition of contact) in the last 14 days prior to symptom onset; **OR** A person with severe acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath; AND requiring hospitalization) AND in the absence of an alternative diagnosis that fully explains the clinical presentation. *Probable case:* A suspect case for whom testing for the COVID-19 virus is inconclusive **OR** A suspect case for whom testing could not be performed for any reason *Confirmed case:* A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms **Additional case definition** a) **Index case**: The case first detected, which alerts health authorities to the existence of an outbreak. b) **Primary case**: A primary case is an individual who tests positive for COVID-19 and has the earliest onset date in a particular setting e.g. household, school, hospital etc. c) **Secondary case**: A secondary case is a contact who becomes a case. d) **Imported case**: An imported case is a case with a history of travel from an affected area in the 14 days
Respond to alert threshold	Respond to a suspected case of COVID-19 or any new strain of the disease or an unusual event of severe acute respiratory infection: • Report case-based information immediately to the appropriate levels. • Implement acute respiratory disease infection control precautions immediately and enhance Standard Precautions throughout the health care setting. • Treat and manage the suspect case according to national guidelines • Collect laboratory specimens from case-patient and from symptomatic contacts and arrange for laboratory testing. • Review clinical & exposure history up to 14 days prior to symptom onset • Identify and follow-up close contacts of case-patient • Search for additional cases
Respond to action threshold	If a single case of COVID-19 or a new subtype is confirmed: • Maintain strict acute respiratory disease infection control precautions and establish an isolation ward/unit to manage all cases including index case

	• Treat and manage the patients according to national guidelines • Implement active surveillance of case-patient contacts • Conduct active case search for additional cases • Distribute laboratory specimen collection kits to health care facilities • Identify high-risk populations • Mobilize the community to enable rapid case detection and treatment • Conduct community education on how COVID-19 is transmitted and on how to implement infection measures in home and community settings
Analyze and interpret data	Time: Graph cases and deaths daily, weekly and monthly • Construct an epicurve Place: Plot distribution of cases per county, district, community, health facility, … Person: Count daily, weekly and monthly cases and deaths • Analyze age and sex distribution
Laboratory Confirmation	Diagnostic test Respiratory specimens (**Oral and Nasal Pharyngeal swaps**) are required for all suspected COVID-19 cases. Once suspected, specimen should be collected and sent to the National Public Health Reference Laboratory (NPHRL) within 24 hours for testing. Molecular testing with real-time reverse-transcriptase polymerase chain reaction (**RT-PCR**) is required to confirm the diagnosis (WHO, 2021). Identification of corona virus (SARS-CoV-2) infections is by: • Isolation in cell culture (BSL3 lab required for suspected new subtype) • Direct antigen detection (low sensitivity) Specimen A variety of specimens are suitable for the diagnosis: • Throat swab • Nasopharyngeal swab • Nasopharyngeal aspirate • Intubated patients: tracheal swab or broncholavage fluid • Blood Specimens should be collected in the following order of priority: • Throat swab/Nasopharyngeal aspirate • Acute serum • Convalescent serum
When to collect the specimen	• Obtain specimen when suspected • Initial specimens (respiratory or blood) should ideally be collected from suspected patients before therapy is begun but treatment must not be delayed in order to take specimens.
How to prepare, store, and transport the specimen	• Respiratory specimens should be transported in virus transport media. Media that could be used for a variety of viruses are commercially available. • Specimens in viral transport medium for viral isolation should be kept at 4°C and transported to the laboratory promptly. If specimen is transported within 2 days, it may be kept at 4°C; Otherwise, should be frozen at or below -70 °C until transported to the laboratory. Repeated freezing and thawing must be avoided to prevent loss of infectivity. • Sera may be stored at 4°C for approximately one week, but thereafter should be frozen at -20°C. • Transport of specimens should comply with the WHO guidelines for the safe transport of infectious substances and diagnostic specimens.

Results	• Laboratory results should be confirmed by an approved laboratory. • Any specimen with a positive result for corona virus and suspected of new subtype should be further tested and verified by a designated WHO CC/ WHO H5 Reference laboratory. • Inform the WHO Office in the country that specimens or virus isolates are being forwarded to other laboratories for further identification or further characterization.
References	• INTERIM GUIDANCE ON CLINICAL CARE FOR PATIENTS WITH COVID-19 IN LIBERIA, June 2020 • WHO. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19) 16-24 February 2020 Geneva: WHO, 2020 • Wallis LA. COVID-19 Severity Scoring Tool for low resourced settings. African Journal of Emergency Medicine 2020. • Health' NIo. COVID-19 Treatment Guidelines Panel. Coronavirus Disease 2019 (COVID-19) Treatment Guidelines. USA: National Institute of Health, 2020 • WHO interim guidelines on clinical management of humans infected by influenza A(H5N1), August 2007. • WHO guidelines for clinical management of human infection with new influenza A (H1N1) virus: Initial Guidance, May 2009. • WHO Guidelines for pharmacological management of pandemic (H1N1) 2009 influenza and other influenza viruses, 20 August 2009. • Recommended laboratory tests to identify avian influenza virus A in specimens from humans, WHO, revised August 2007. • Collecting, preserving and shipping specimens for the diagnosis of avian influenza A(H5N1) virus infection. Guide for field operations, October 2006 WHO/CDS/EPR/ARO/2006.1 • WHO interim guidelines on infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care, June 2007. • Collecting, preserving and shipping specimens for the diagnosis of avian influenza A (H5N1) virus infection. Guide for field operations, October 2006

11.8 Dengue Fever

Including Dengue hemorrhagic fever (DHF) and Dengue shock syndrome (DSS)

Background	• Dengue fever is an arbovirus transmitted by aedes mosquitoes (both Ae. aegypti and Ae. albopiticus). Dengue is caused by four serologically distinct, but closely related viruses: dengue virus (DENV) 1, 2, 3, and 4 of the Flaviviridae family. • Dengue fever is an emerging pandemic that has spread globally during the past 30 years as a result of changes in human ecology. Dengue is found in tropical and sub-tropical regions around the world, predominately in urban and semi-urban areas. During dengue epidemics, infection rates among those who have not been previously exposed to the virus are often 40% to 50%, but can reach 80% to 90%. • Dengue fever is a severe, influenza-like illness that affects infants, young children and adults, but seldom causes death. Dengue hemorrhagic fever (DHF) is a potentially deadly complication that has become a leading cause of hospitalization and death among children in Asia. There is good evidence that sequential infection with the different serotypes of dengue virus increases the risk of more severe disease that can result in dengue shock syndrome (DSS) and death. • Epidemic dengue activity in Africa has mostly been classical dengue fever caused by DENV-1 and DENV-2 without associated mortality. The first major outbreak of DENV-3 in Africa was documented in Mozambique in 1984-1985. During this outbreak, most patients experienced secondary infections and 2 deaths were attributed to DHF and shock. In 2008, yellow fever and DENV-3 were found to be co-circulating in Abidjan, Cote d'Ivoire, however, no severe dengue cases or deaths attributable to dengue were identified. • There is no specific treatment for dengue, but appropriate medical care frequently saves the lives of patients with dengue haemorrhagic fever. • Infected humans are the main carriers and multipliers of the virus, serving a source of the virus for uninfected Aedes aegypti mosquitoes which maintain the urban dengue transmission cycle. The virus circulates in the blood of infected human for 2-7 days, at approximately the same time that they have a fever. A sylvatic transmission cycle has been documented in west Africa where DENV-2 has been found in monkeys. There is no evidence of person-to-person transmission. • At present, the only method of controlling or preventing dengue virus transmission is to combat the vector mosquitoes using environmental management and chemical methods.
Surveillance goal	Surveillance for suspected cases and investigation of clusters of suspected cases in areas with Ae. aegypti and Ae. albopiticus mosquitoes
Standard case definition	*Dengue Fever Suspected case*: Any person with acute febrile illness of 2-7 days duration with 2 or more of the following: headache, retro-orbital pain, myalgia, arthralgia, rash, haemorrhagic manifestations, leucopenia. *Dengue Fever Confirmed case*: A suspected case with laboratory confirmation (positive IgM antibody, four-fold or greater rise in IgG antibody titres, positive PCR

	or viral isolation). *Dengue Haemorrhagic Fever*: A probable or confirmed case of dengue with bleeding tendencies as evidenced by one or more of the following: positive tourniquet test; petechieae, ecchymoses or purpura; bleeding: mucosa, gastrointestinal tract, injection sites or other; haematemesis or melaena; and thrombocytopenia (100 000 cells or less per mm3) and evidence of plasma leakage due to increased vascular permeability, manifested by one or more of the following: 20% rise in average haematocrit for age and sex, 20% drop in haematocrit following volume replacement therapy compared to baseline, signs of plasma leakage (pleural effusion, ascites, hypo-proteinaemia). *Dengue Shock Syndrome*: All the above criteria, plus evidence of circulatory failure manifested by rapid and weak pulse, and narrow pulse pressure (≤ 20 mm Hg) or hypotension for age, cold, clammy skin and altered mental status.
Respond to alert threshold	If a single case is suspected: • Report case-based information immediately to the next level. • Conduct active search for additional cases • Collect specimens for confirming the cases
Respond to action threshold	If a single case is confirmed: • Report case-based information immediately to the next level and initiate a line list/register of suspected cases • Conduct active search for additional cases • Collect specimens for confirming the cases and ensure results are linked with cases • Survey the community to determine the abundance of vector mosquitoes, identify the most productive larval habitats, promote and implement plans for their elimination, management or treatment with appropriate larvicides. • Educate the public and promote behaviors to remove, destroy or manage mosquito vector larval habitats. • Manage and provide supportive treatment to dengue fever cases. Implement standard infection control precautions. Prevent access of mosquitoes to patients by using mosquito bed nets. Refer suspected DHF/DSS cases to more advanced facilities.
Analyze and interpret data	Time: Graph cases and deaths weekly/monthly. Construct an epidemic curve during the outbreak. Place: Plot location of case households and work sites using precise mapping. Person: Case-fatality rate. Analyse age and sex distribution. Percentage of DHF / DSS cases and of hospitalisations.
Laboratory confirmation	
Diagnostic Test	Demonstration of IgM and IgG by antibody assays. Detection of viral genomic sequences by PCR. Isolation of the dengue virus using cell culture. Antigen detection Assays for acute phase samples when PCR or isolation is negative. Demonstration of dengue virus antigen in autopsy tissue by immunohistochemistry or immunofluorescence or in serum samples by enzyme immunoassays (EIA). *Note: there are several diagnostic techniques available to document an infection by the dengue virus. The IgM ELISA is the basic test for serologic diagnosis.*
Specimen	ELISA: Whole blood, serum or plasma from acute (0-5 days) and convalescent 6 or

	more days) depending on each case. PCR: Whole blood or blood clot, serum/ plasma or tissue preferably from acute specimens (0-5 days) The samples should be collected for diagnosing a suspected dengue fatality: A blood sample to attempt PCR, virus isolation and serology. If an autopsy is performed, blood from the heart should be collected
When to collect the specimen	Collect specimen from the first suspected case. If more than one suspected case, collect until specimens have been collected from 5 to10 suspected cases. Type of Specimen • Acute-phase blood (0-5 days after onset of symptoms) • Convalescent-phase blood (≥ 6 days after onset) Time of collection • Collect 2nd sample during convalescence. Between days 6 and 21 after onset. • Laboratory diagnosis of fatal cases is indispensable for understanding the risk factors for severe cases.
How to prepare, store, and transport the specimen	Transport of specimens should comply with the WHO guidelines for the safe transport of infectious substances and diagnostic specimens. *For ELISA or PCR:* • Refrigerate serum or clot. For long term storage freeze -20°C • Freeze (-20C or colder) tissue specimens for virus isolation If an autopsy has been performed and no fresh tissues are available, tissues fixed in formalin should be submitted for immunohistochemical studies.
Results	Diagnostic services for Dengue fever and Dengue hemorrhagic fever are not routinely available. Advance arrangements are usually required for VHF diagnostic services. Contact the appropriate National authority or WHO.
References	• WHO Recommended Surveillance Standards WHO/CDS/CSR/ISR/99.2 • Dengue: Clinical and Public Health Aspects, CDC

11.9 Guinea Worm (Dracunculiasis)

Background	*Dracunculiasis* is commonly known as Guinea worm disease. It is caused by a large nematode, a disabling parasite that emerges through the skin of the infected person. • This is an old disease, known since antiquity, leaving many patients with unfortunate socio-economic consequences. Guinea worm disease is transmitted exclusively by drinking stagnant water contaminated with tiny water fleas that carry infective guinea-worm larvae. The larvae (Cyclops) is found in stagnant surface water sources (ponds, traditional shallow wells) in rural areas. The female nematode discharges from the host's skin when there is contact with water. • The incubation period is between 9 to 12 months • There is no treatment or vaccine against the disease. • Successful disease control strategies conducted by the endemic countries and an international coalition of partners has pushed Dracunculiasis towards eradication. By December 2008, 4619 cases of Guinea worm were reported to WHO, worldwide, compared to 892 000 that were reported in 1989, showing a reduction of 99.47%. • Currently, solely Africa remains affected where 6 countries are still endemic in 2009: Sudan, Ghana, Mali, Ethiopia, Nigeria, and Niger. • Liberia was certified free of Dracunculiasis transmission in 2007. However, the disease remains present in the region.
Surveillance goal	• Active detection and investigation of each case at the community level. Monthly reporting of cases to the next level. • In zones where local transmission of the Guinea worm disease has been interrupted, maintain active searches for additional cases or rumors of case. • Report all imported cases to countries or areas of origin. • Integrate into surveillance to confirm absence of transmission.
Standard case definition	*Suspected case*: A person presenting with a skin lesion with itching or blister, living in a Guinea worm endemic area. *Confirmed case*: at the last phase of the programme, confirmation of last cases by knowledgeable health staff is required. Visual recognition of the adult worm protruding from a skin lesion or by microscopic identification of larvae.
Alert threshold	If a single case is suspected: • Report the case according to County and National Disease prevention and control staff. • Treat the wound (if any) to decrease disability associated with painful leg lesions. • Conduct case investigation to confirm risk factors. • Improve access to safe water according to national guidelines.
Analyze and interpret data	Time: Graph cases monthly. Place: Plot distribution of households and work sites for cases from which cases have been reported. Person: Count monthly cases, and analyze age distribution. Report monthly to next levels.
Laboratory confirmation	Routine laboratory confirmation for surveillance is not required. • Diagnosis is made by visual recognition of the adult worm protruding from a skin lesion or by microscopic identification of larvae. • Laboratory tests to investigate Dracunculiasis are limited because the larvae of

	• D. medinensis are normally washed into water. • A diagnosis is usually made when the blister has ruptured and the anterior end of the female worm can be seen. • If required, laboratory confirmation of the diagnosis can be made as follows: place a few drops of water on the ulcer, collect and transfer the water to a slide and examine microscopically for motile larvae.
References	• Dracunculiasis or guinea-worm, Geneva, World Health Organization, WHO/CDS/CEE/DRA/99.2, 1999 and WHO/WER N°37 September 2003 • Control of Communicable Diseases Manual, 18th Edition • District Laboratory Practice in Tropical Countries, Cambridge

11.10 Human Influenza Caused by a New Subtype

Background	• An influenza pandemic occurs when a new influenza A virus emerges with efficient and sustained human-to-human transmission in populations with limited immunity. Influenza pandemics occurred in 1918, 1957 and 1968. The 1918 pandemic killed an estimated 40– • 50 million people. It is predicted that a pandemic of equivalent magnitude could kill 62 million people, 96% of them in developing countries. • Successful containment or control of pandemic influenza is dependent on early recognition of sustained human-to-human transmission. Countries have been encouraged as part of pandemic preparedness planning to enhance surveillance to (i) detect the emergence of new disease; (ii) characterize the disease (epidemiology, clinical manifestations, severity); and (iii) monitor its evolution. • Influenza A (H1N1) 2009: On 11 June 2009, WHO declared a global pandemic due to influenza A (H1N1) 2009 virus and of 8 October 2009, 195 countries, territories and areas had reported cases and/or outbreaks of pandemic (H1N1) virus. The spectrum of disease ranges from non-febrile, mild upper respiratory tract illness to severe or fatal pneumonia. Influenza A (H5N1): Another influenza subtype, H5N1 has been circulating among birds for more than 10 years. In 2003, infections in people exposed to sick birds were identified. Since 2003, H5N1 has been confirmed in poultry and/or wild birds in 62 countries and 442 confirmed human H5N1 cases with 262 deaths have been reported from 15 countries. One confirmed death from human infection with A (H5N1) was reported from Nigeria in January 2007. Most patients with H5N1 present with symptoms of fever, cough and shortness of breath and radiological evidence of pneumonia. The large majority of cases for which risk factor • Data are available indicate that direct contact with live or recently dead poultry is the most important risk factor for human H5N1 infection. However, the continued geographical spread of this highly pathogenic avian influenza virus among birds in Asia, Europe, the Middle East and Africa has heightened concerns about the possibility of a global human pandemic of influenza H5N1. • Under the IHR (2005), a State Party is required to notify WHO of the first occurrence of human influenza caused by a new subtype, including pandemic (H1N1) 2009 virus.
Surveillance goal	• To detect and investigate the first evidence of sustained human-to-human transmission of an influenza virus with pandemic potential. • To assess the earliest cases of pandemic influenza occurring in a country in order to characterize the new disease including its clinical characteristics, risk factor information, and epidemiological and virological features. • To monitor the course of the pandemic within the country, regionally and globally. • Influenza viruses can circulate at any time in tropical and subtropical climates.
Standard case definition	*Suspected* H5N1 case: Any person presenting with unexplained acute lower respiratory illness with fever (>38 ºC) and cough, shortness of breath or difficulty breathing AND one or more of the following exposures within the 7 days prior to symptom onset: • Close contact (within 1 meter) with a person (e.g. caring for, speaking with, or touching) who is a suspected, probable, or confirmed H5N1 case; • Exposure (e.g. handling, slaughtering, de-feathering, butchering, preparation for consumption) to poultry or wild birds or their remains or to environments contaminated by their feces in an area where H5N1 infections in animals or

	humans have been suspected or confirmed in the last month; • Consumption of raw or undercooked poultry products in an area where H5N1 infections in animals or humans have been suspected or confirmed in the last month; • Close contact with a confirmed H5N1 infected animal other than poultry or wild birds; • Handling samples (animal or human) suspected of containing H5N1 virus in a laboratory or other setting. *Confirmed* H5N1 case: A person meeting the criteria for a suspected case AND positive laboratory results from a laboratory whose H5N1 test results are accepted by WHO as confirmatory. Suspected pandemic (H1N1) 2009 virus infection: An individual presenting with influenza- like-illness (sudden onset of fever > 38°C and cough or sore throat in the absence of another diagnosis) with a history of exposure to a pandemic (H1N1) 2009 virus. Confirmed pandemic (H1N1) 2009 virus infection: An individual with a laboratory-confirmed pandemic (H1N1) 2009 virus infection by one or more of the following tests: PCR; viral culture; 4-fold rise in pandemic (H1N1) 2009 virus-specific neutralizing antibodies.
Alert threshold	Respond to a suspected case of human influenza caused by a new subtype or to an unusual event of severe acute respiratory infection: • Report case-based information immediately to the appropriate levels. • Implement acute respiratory disease infection control precautions immediately and enhance Standard Precautions throughout the health care setting. • Treat and manage the patient according to national guidelines. • Collect laboratory specimens from case-patient and from symptomatic contacts and arrange for laboratory testing. • Review clinical & exposure history during 7 days before disease onset. • Identify and follow-up close contacts of case-patient. • Search for additional cases. • Conduct epidemiological investigation to identify risk factors for infection and populations at risk for severe disease. • Plan and implement prevention and control measures.
Action threshold	If a single case of human influenza caused by a new subtype is confirmed or if another acute respiratory disease of epidemic or pandemic potential is confirmed: • Maintain strict acute respiratory disease infection control precautions and establish an isolation ward to manage additional cases who may present for care. • Treat and manage the patient according to national guidelines. • Implement active surveillance of case-patient contacts. • Conduct active searches for additional cases. • Distribute laboratory specimen collection kits to health care facilities. • Identify high-risk populations. • Mobilize the community to enable rapid case detection and treatment. • Conduct community education on how influenza is transmitted and on how to implement infection measures in home and community settings.
Analyze and interpret data	Time: Graph weekly cases and deaths, construct an epidemic curve Place: Plot location of case households and work sites using precise mapping. Person: Count weekly total cases and deaths for sporadic cases and during

	outbreaks. Analyze age and sex distribution. Characterize the illness in terms of clinical presentation, the spectrum of disease, the proportion of cases requiring hospitalization, clinical outcomes, case fatality ratio, attack rates by age/occupation/epilinks & exposure.
Laboratory confirmation	Diagnostic test Identification of human influenza virus infections by: Detection of influenza-specific RNA by reverse transcriptase-polymerase chain reaction • Isolation in cell culture (BSL3 lab required for suspected new subtype) • Direct antigen detection (low sensitivity) Specimen • A variety of specimens are suitable for the diagnosis: • Throat swab • Nasopharyngeal swab • Nasal swab • Nasopharyngeal aspirate • Intubated patients: tracheal swab or broncholavage fluid • Blood Specimens should be collected in the following order of priority: • Throat swab/Nasopharyngeal aspirate • Acute serum • Convalescent serum
When to collect the specimen	• Obtain specimen within 3 days of the onset of symptoms. • Initial specimens (respiratory or blood) should ideally be collected from suspected patients before antiviral therapy is begun but treatment must not be delayed in order to take specimens. • Optimally, paired sera (3-5 ml of whole blood), collected first during the acute phase of illness and then 14 days or later after the onset of illness, should be tested simultaneously. Specimens should be collected from deceased patients as soon as possible after death.
How to prepare, store, and transport the specimen	• Respiratory specimens should be transported in virus transport media. Media that could be used for a variety of viruses are commercially available. • Specimens in viral transport medium for viral isolation should be kept at 4°C and transported to the laboratory promptly. If specimen is transported within 2 days, it may be kept at 4°C; otherwise should be frozen at or below -70 °C until transported to the laboratory. Repeated freezing and thawing must be avoided to prevent loss of infectivity. • Sera may be stored at 4°C for approximately one week, but thereafter should be frozen at -20°C. • Transport of specimens should comply with the WHO guidelines for the safe transport of infectious substances and diagnostic specimens.
Results	• Laboratory results should be confirmed by an approved laboratory. • Any specimen with a positive result for influenza A virus and suspected of avian influenza infection/new subtype should be further tested and verified by a designated WHO CC/ WHO H5 Reference laboratory. Laboratories that lack the capacity to perform specific influenza A subtype identification procedures are requested to: Forward specimens or virus isolates to a National Influenza Centre or to a WHO CC/WHO H5 Reference Laboratory for further identification or characterization.

	• Inform the WHO Office in the country that specimens or virus isolates are being forwarded to other laboratories for further identification or further characterization.
Resources	• WHO guidelines for global surveillance during an influenza pandemic, April 2009. • WHO updated interim guidance on global surveillance of human infection with pandemic (H1N1) 2009 virus, July 2009. • WHO guidelines for investigation of human cases of avian influenza A(H5N1), 2007 • WHO Rapid Advice Guidelines on pharmacological management of humans infected with avian influenza A (H5N1) virus, May 2006. • WHO interim guidelines on clinical management of humans infected by influenza A(H5N1), August 2007. • WHO guidelines for clinical management of human infection with new influenza A (H1N1) virus: Initial Guidance, May 2009. • WHO Guidelines for pharmacological management of pandemic (H1N1) 2009 influenza and other influenza viruses, 20 August 2009. • Recommended laboratory tests to identify avian influenza virus A in specimens from humans, WHO, revised August 2007. • Collecting, preserving and shipping specimens for the diagnosis of avian influenza A(H5N1) virus infection. Guide for field operations, October 2006 WHO/CDS/EPR/ARO/2006.1 • WHO interim guidelines on infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care, June 2007. • Collecting, preserving and shipping specimens for the diagnosis of avian influenza A (H5N1) virus infection. Guide for field operations, October 2006

11.11 Human Rabies

Background	Rabies is a zoonotic disease (a disease that is transmitted to humans from animals) that is caused by a virus. • Rabies infects domestic and wild animals, and is spread to people through close contact with infected saliva (via bites or scratches). • The rabies virus infects the central nervous system, causing disease in the brain and, eventually, death. Early symptoms in people include: fever, headache, and general weakness or discomfort. As the disease progresses, symptoms include; insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, increase in saliva, difficulty swallowing, and fear of water. • Rabies is almost always fatal if post-exposure prophylaxis (PEP) is not administered before the onset of any symptoms. Death usually occurs within days of the onset of neurological symptoms. The sooner post-exposure prophylaxis is given the more likely it will be effective and delay in treatment worsens the outcome. • Dogs are the main carrier of rabies in Liberia and are responsible for most (approximately 97%) of the human rabies deaths. • WHO estimates approximately 55,000 human deaths worldwide due to rabies each year; in Africa the annual death toll is 24,000. • People most at risk of rabies live in rural areas and include woman and children. • About 30% to 60% of the victims of dog bites/scratches (the primary mode of virus transmission) are children less than 15 years of age. Children often play with animals and are less likely to report bites or scratches or animal saliva contact with open wounds/scratches. • Liberia is at Stage 0 using the Stepwise Approach towards Rabies Elimination (SARE) tool. The SARE planning tool provides practical guidance on how countries can elaborate and implement a national rabies elimination strategy in a stepwise manner- with the ultimate goal to eliminate dog-transmitted rabies. Stage 0 means that no information on rabies is available for a suspected rabies-endemic area. • Collaboration for comprehensive rabies control has started in Liberia with the Ministry of Health and the Ministry of Agriculture and includes implementing partners. This joint program uses a One-Health approach. The goal at this time is control of rabies in dog populations and access to human rabies post exposure prophylaxis to substantially reduce the burden of rabies in human and animal populations. • In Liberia the community-based alert triggers for rabies suggest that persons with animal bites immediately go to the nearest health care facility for rabies post- exposure prophylaxis and care for the wound. • All persons that will work with animals (livestock officers, Community animal officers, and others with frequent contact) should receive rabies vaccine as part of their occupational health. • Prevention efforts planning in national comprehensive rabies program include: o Promote public awareness of rabies through health education and advocacy campaigns, pet owners associations and community health assistants. o Vaccinate local dogs and cats to prevent outbreaks. Target immunization campaign for domestic or wild animals in high-risk areas o Control stray animals through spaying and neutering o With MOH and MOA maintain active surveillance of rabies in animals

Surveillance goal	The Liberian MOH and Ministry of Agriculture collaborate to prevent and control Rabies. Joint activities are being undertaken aimed to: • Prevent infections and transmissions • Identify high-risk areas and persons • Detect and respond promptly and appropriately to cases and outbreaks of rabies. • Estimate disease burden • Immediate reporting of cases and routine monthly summary reports
Standard case definition	*Suspected*: A person with one or more of the following: headache, neck pain, nausea, fever, fear of water, anxiety, agitation, abnormal tingling sensations or pain at the wound site, when contact with a rabid animal is suspected. *Probable*: A suspected case with history of contact with a suspected rabid animal. *Confirmed*: A suspected case that is laboratory confirmed
Alert threshold and public health action	For a single case: • After an animal bite call an animal control officer (animal community health worker, livestock officer, or Veterinarian) to isolate and quarantine the animal for 14 days to observe behavior after a bite. Otherwise, no contact with animal is recommended. • Immediately send patient to HCF for post exposure prophylaxis to prevent rabies after any bite or scratch • Thoroughly wash wound for 15-20 minutes to remove virus. • Isolate patient with suspected human rabies if symptoms develop to prevent infection of others. Prevent contact with body fluids. • Immunize close contacts if patient develops rabies
Analyze and interpret data	Time: Plot cases weekly. Place: Plot the location of case households and animal exposures. Person: Analyze distribution of cases by age, exposing animal, and circumstances of infection. Assess risk factors to improve control of cases.
Laboratory confirmation	Diagnostic test • Detection of rabies viral antigens with direct fluorescent antibody (DFA) and PCR in clinical specimens, preferably brain tissue (collected postmortem) • Human rabies cannot be lab confirmed prior to the development of clinical symptoms at which time the window for post-exposure prophylaxis has passed. Liberia currently does not have lab capacity for the diagnosis of human rabies by any method Specimen If international testing planned: Live specimen: Secretions, biological fluids (eg saliva, spinal fluid, tears) and tissues (skin biopsy specimen and hair follicles at the nape of the neck) can be used to diagnose rabies during life. Postmortem specimens: Brain and corneal tissue When to collect the specimen • When a person is bitten or scratched by an animal, the biggest health concern is rabies. No test can determine whether the rabies virus has been transmitted to the person immediately after the bite. So, post-exposure prophylaxis is recommended. • If a person who has been bitten by an animal becomes increasingly confused and agitated or paralyzed, the diagnosis is probably rabies. At this point, tests can detect the rabies virus but prior to symptom onset there are false

	negatives. How to prepare, store, and transport the specimen • Safety precautions in handling rabies virus should be taken to avoid infection. • Professional animal control officers or Veterinarians may remove the head of the suspected animal for specimens testing. The head must be handled carefully and wrapped completely such that no blood is oozing out. • Specimen should be stored at -20°C or less. Serum should be collected from blood samples before freezing and stored at -20°C or less. • Sample should be sent to international reference Lab for Rabies virus based on a request from Rabies Technical Working Group, MOA, or MOH. Results • The treatment should never await the results of laboratory diagnosis. A laboratory diagnosis may be delayed for a variety of reasons. • Laboratory results can be obtained from the international reference lab within 1-2 days
Resources	• WHO Recommended Surveillance Standards WHO/CDS/CSR/ISR/99.2 • Laboratory techniques in rabies, Fourth Edition. WHO, edited by F.X. Meslin • World Health Organization, Rabies Fact Sheet: • http://www.who.int/mediacentre/factsheets/fs099/en/ • Council of State and Territorial Epidemiologists (CSTE). National Surveillance for Human Rabies. CSTE position statement 09-ID-70. Atlanta: CSTE; June 2009. Available from: http://www.cste.org. • Centers for Disease Control and Prevention (CDC). Human Rabies Prevention — United States, 2008: Recommendations of the Advisory Committee on Immunization Practices. MMWR 2008; 57(RR03):1–26, 28. Available from: http://www.cdc.gov/mmwr/ • Bleck TP, Rupprecht CE. Chapter 160 – Rhabdoviruses. In: Mandell GL, Bennett JE, Dolin R, editors. Principles and Practice of Infectious Diseases, 6th edition. Philadelphia: Churchill Livingstone; 2005. • Stepwise Approach towards Rabies Elimination (SARE) tool https://rabiesalliance.org/media/news/a-tool-for-the-planning-and-evaluation-of- rabies-control-programmes

11.12 **Lassa Fever**

Background	Lassa fever belongs to the Arenaviridae virus family and is known to be endemic in Guinea, Liberia, Nigeria and Sierra Leone, but probably exists in other West African countries as well. Some studies indicate that 300,000 to 500,000 Lassa fever cases with 5,000 deaths occur each year in West Africa. • The animal reservoir of the Lassa virus is a rodent of the genus Mastomys. Mastomys infected with Lassa virus do not become ill but shed the virus in their excreta (urine and feces) and humans usually become infected through aerosol or direct contact with excreta of infected rodents. Lassa fever can also be spread between humans through direct contact with the blood, pharyngeal secretions, urine, faeces or other body secretions of an infected person. • Person-to-person transmission of Lassa fever has occurred in health care settings after exposure to blood and secretions of infected patients. • The incubation period for Lassa fever ranges from 6-21 days. • About 80% of human Lassa fever infections are mild or asymptomatic; the remaining cases have severe multi-system disease. The onset of disease in symptomatic patients is usually gradual starting with fever, general weakness and malaise. Lassa fever is difficult to distinguish from many other diseases which cause fever, including malaria, Shigellosis, typhoid fever, yellow fever and other VHFs. The overall case fatality ratio is 1-15% among hospitalized patients; case fatality rate increases with liver disease. • Ribavirin is the most effective treatment for Lassa fever when given early in the course of clinical illness (less than 7 days after the onset of symptoms). See Annex 9S for the VHF Generical Investigation Form.
Surveillance goal	• Early detection of cases and outbreaks, rapid investigation, and early laboratory verification of the etiology of all suspected cases. • Investigation of all suspected cases with contact tracing. • Assess and monitor the spread and progress of epidemics and the effectiveness of control measures.
Standard case definition	*Suspected case* of Lassa Fever: Any person with fever (>38 C) and two or more of the following signs: malaise, headache, sore throat, cough, nausea, vomiting, diarrhea, myalgia, chest pain, hearing loss, bleeding, swollen neck or face, absence of a response after 48 hours of antimalarial treatment and/or broad spectrum antibiotic, history of contact with rodents or with a case of Lassa Fever *Confirmed case* of Lassa Fever: A suspected case that is laboratory confirmed (positive IgM antibody, PCR or virus isolation) or epidemiological linkage to a confirmed case.
Respond to alert threshold	If a single case is suspected: • Report case-based information immediately to the appropriate levels. • Suspected cases should be isolated from other patients and strict barrier nursing techniques implemented. • Standard infection control precautions should be enhanced throughout the healthcare setting. • Treat and manage the patient with supportive care. • Transfer to facility with capacity to treat with ribavirin as early as possible. • Collect specimen to confirm the case(s). • Case-contact follow-up and active case search for additional cases.
Respond to action threshold	If a single case is confirmed: • Maintain strict VHF infection control practices* throughout the outbreak.

	• Mobilize the community for early detection and care and conduct community education about how the disease is transmitted and how to implement infection control in the home care setting. For Lassa fever, enhance rodent control activities. • Conduct active searches for additional cases. • Request additional help from other levels as needed. • Establish an isolation ward to handle additional cases that may come to the health center.
Analyze and interpret data	Person: Implement immediate case-based reporting of cases and deaths. Analyze age and sex distribution. Assess risk factors and plan disease control interventions accordingly. Time: Graph cases and deaths daily/weekly. Construct an epidemic curve during the outbreak. Place: Map locations of cases' households.
Laboratory confirmation	Diagnostic test • Diagnostic test for antigen detection – Rapid Diagnostic Test (RDT) and ELISA serology; ELISA for antigens and antibodies (IgM and IgG) to Lassa virus; RT-PCR for Lass virus antigen. Specimen • For RDT: Whole blood, serum or plasma • For ELISA: Whole blood, serum or plasma • For PCR: Whole blood or blood clot, serum/plasma or tissue When to collect the specimen • Collect specimen from the first suspected case. • If more than one suspected case, collect until specimens have been collected from 5 to 10 suspected cases. How to prepare, store, and transport the specimen HANDLE AND TRANSPORT SPECIMENS FROM SUSPECTED VHF PATIENTS WITH EXTREME CAUTION. WEAR PROTECTIVE CLOTHING AND USE BARRIER PRECAUTIONS. For ELISA or PCR: • Refrigerate serum or clot (4-8°C) • Package in triple packaging to prevent breakage and leaks • Transport in well-marked container (4-8°C) Results Lassa fever testing is currently undertaken in Sierra Leone. Efforts are ongoing to ensure that testing will be available in Liberia in the near future. Annex 5E includes a list of reference laboratories that confirm priority diseases and conditions.
Resources	• Lassa Fever Fact Sheet. March 2016. WHO. http://www.who.int/mediacentre/factsheets/fs179/en/

11.13 Maternal Death

Background	Maternal Death refers to death during pregnancy, childbirth or termination of pregnancy, and deaths up to 6 weeks (42 days) after childbirth. • Globally, about 80% of maternal deaths are due to; severe bleeding (mostly bleeding postpartum), infections (also mostly soon after delivery), hypertensive disorders in pregnancy (eclampsia) and obstructed labor. Complications after unsafe abortion cause 13% of maternal deaths. • Across the developing world, maternal mortality levels remain high, with more than 500,000 women dying every year as a result of complications during pregnancy and Child birth. About half of these deaths occur in sub-Saharan Africa where a woman's lifetime risk of maternal death is 1 in 22, compared with 1 in 8,000 in industrialized countries. • Maternal mortality ratio in Liberia was estimated at 1072/100,000 live births in 2013 which is very high as compared to previous years 2003-2007 (994/100,000 live births) according to the 2013 Demographic Health Survey (DHS) report. • According to the Health Management Information System (HMIS) reports most of the maternal deaths in Liberia are due to preventable or treatable conditions such as postpartum hemorrhage, Sepsis, eclampsia, complications of unsafe abortion, anemia, and obstructed labor. • Hemorrhage remains the leading cause of maternal death in Liberia, and unattended births by skilled attendants are a particular risk, especially in rural areas where transport to health care facilities is nearly non-existent. • Review of progress towards MDG 5 indicates that Liberia is unlikely to achieve this MDG by 2015. Intensified actions and increased investments are required to improve the coverage and quality of maternal health care services at all levels in Liberia. Thus, monitoring maternal deaths and addressing issues and factors contributing to these deaths are key if we are to achieve MDG 5. See Annex 9Ufor the maternal variable list.
Surveillance goal	The overall goal of the MNDSR protocol is to guide an effective implementation and scale up of MNDSR in systematic, standardized and integrated manner. Refer to Maternal and Newborn Death Surveillance and Response guidelines for Liberia. (MNDSR)
Surveillance Objective	• Estimate and monitor maternal mortality rates. • Identify risk factors for maternal mortality to inform programs and decision makers. • Investigate all maternal deaths in facilities and communities and take necessary action.
Standard case definition	The death of a woman while pregnant or within 42 days of the delivery or termination of the pregnancy, regardless of the duration and site of the pregnancy, from any cause related to the pregnancy or its management but not from accidental or incidental causes.
Respond to alert threshold	An alert threshold response is a single case: • After determining that the death of a woman occurred during pregnancy or within 42 days of its termination, the initial notification of the suspected death should be done immediately, by the fastest means possible • The health facility should contact the district authority and provide information about the IDSR Case Alert form. The form is completed and submitted electronically when possible; if not it is delivered by telephone or on paper. • The initial notification should be followed by a written report using a maternal death review form/case investigation form. (Annex 11) Continue / complete epidemiological investigation including screening for vaccination status • Initiate social mobilization for interventions selected • Continue risk communication and action to reduce risk including vector control if indicated

Recommended public health action	A case of maternal death is an alert for action at all levels (communities, health facilities, districts counties and national). Refer to Liberia MNDSR Technical guidelines/protocol for details. • Monitor trends and respond to each alert • All health care providers (professional and non-professional) should be trained on these protocols. • Identify all of suspected maternal deaths in facilities (maternity and other wards) and communities, followed by immediate notification (within 24 hours) to the appropriate authorities • Increase availability and use of antenatal care • Provide specialized training to traditional and professional birth attendants • Support interventions to improve recognition and response to high-risk pregnancies at the community level • Improve vaccination coverage to prevent maternal and neonatal tetanus
Analyze and interpret data	Time: Graph cases to construct an epidemic curve throughout the year in order to identify trends. Place: Plot the location of cases and analyze the distribution. Person: Analyze the distribution of cases by age and other demographic factors.
Laboratory confirmation	Routine laboratory confirmation for surveillance is not required.
Resources	• WHO Maternal Mortality http://www.who.int/making_pregnancy_safer/topics/maternal_mortality/en/index.html • UNICEF http://www.unicef.org/index.php • Maternal death surveillance and response: technical guidance information for action to prevent maternal death. http://www.who.int/maternal_child_adolescent/documents/maternal_death_surveillance/en/

11.14 Measles

Background	Measles is a febrile rash illness due to paramyxovirus (Morbillivirus) transmitted human-to-human via airborne droplet spread. It is the fourth leading cause of death in children less than 5 years of age in many African countries. • The incubation period is 7 to 21 days from exposure to onset of fever. • Among children with vitamin A deficiency and malnutrition, measles may result in severe illness due to the virus itself and associated bacterial infections, especially pneumonia; only the minority of cases are severe. • Measles is among the most transmissible of human infections. Large outbreaks occur every few years in areas with low vaccine coverage and where there is an accumulation of persons who have never been infected or vaccinated. The true incidence of measles far exceeds reported cases. • Risk factors include low vaccine coverage (<85 to 90% of the population) which allows accumulation of susceptible persons at high risk for measles. Outbreaks can be explosive in areas of high population density. • Other viral illnesses such as rubella may cause or contribute to similar outbreaks • This is a vaccine preventable disease
Surveillance goal	Detect outbreaks of fever with rash illness promptly: • Immediate case-based reporting of suspected cases and deaths of fever with rash illness; • Test the first five to ten cases of suspected measles in a health facility/district with laboratory test (serum IgM) and continue to line list all cases.
Standard case definition	*Suspected case*: Any person with fever and maculopapular (non-vesicular) generalized rash and cough, coryza or conjunctivitis (red eyes) or any person in whom a clinician suspects measles. *Confirmed case*: A suspected case with laboratory confirmation (positive IgM antibody) or epidemiological link to confirmed cases in an outbreak.
Respond to alert threshold	One suspected case in a geographical location: • Report suspected case to the next level. • Collect blood sample for confirmation • Treat cases with oral rehydration, vitamin A, and antibiotics for prevention of bacterial super-infection. Use airborne isolation precautions where feasible. • Investigate the case or outbreak to identify causes for outbreak.
Respond to action threshold	If an outbreak is confirmed, defined as at least 1 confirmed case among 5 total cases, or 3 confirmed in a district within a month: • Improve routine vaccine coverage through the EPI, and lead supplemental vaccination activities in areas of low vaccine coverage. • Mobilize the community early to enable rapid case detection and treatment. • Provide Vitamin A: • Dose 1: immediately, Dose 2: next day • Age: 0-6mo=50,000IU, 7-11 mo = 100,000IU; ≥12mo=200,000IU
Analyze and interpret data	Time: Graph weekly cases and deaths. Construct epidemic curve for outbreak cases. Place: Plot location of case households. Person: Count total cases and analyze by age group and immunization status.
Laboratory confirmation	Diagnostic test: Presence of IgM antibodies to measles virus in serum. Specimen: Serum

	When to collect the specimen • Collect specimens between the 3rd day of the rash and 28th day after onset of rash or, at first opportunity. • Collect blood samples on 5-10 suspected measles cases. How to prepare, store, and transport the specimen • For children, collect 1 to 5 ml of venous blood depending on size of child. Collect into a red top tube. • Store serum at 4-8°C. • Transport serum samples using appropriate packaging to prevent breaking or leaks during transport. • Avoid shaking of specimen. Results • The specimen should arrive at the laboratory within 3 days of being collected. • Results are usually available after 7 days. • If as few as 3 out of 5-10 suspected measles cases are laboratory confirmed, the outbreak is confirmed.
Resources	• Using surveillance data and outbreak investigations to strengthen measles immunization programs, Geneva, World Health Organization. WHO/EPI/GEN/96.02 • WHO Guidelines for Epidemic Preparedness and Response to Measles Using surveillance data and outbreak investigations to strengthen measles immunization programs, Geneva, World Health Organization. WHO/EPI/GEN/96.02 • WHO Guidelines for Epidemic Preparedness and Response to Measles Outbreaks WHO/CDS/CSR/ISR/99.1

11.15 Meningitis

Background	Neisseria meningitidis, Haemophilus influenzae type b (Hib), and Streptococcus pneumoniae constitute the majority of all cases of bacterial meningitis and 90% of bacterial meningitis in children. • Meningococcal meningitis is the main form of meningitis to cause epidemics and remains a major public health challenge in the African meningitis belt, an area that extends from Senegal to Ethiopia. In these countries, large outbreaks may occur during the dry season (e.g., November through May). Outside of the meningitis belt, including in Liberia, smaller outbreaks may occur year-round. • Before 2010, epidemics in the meningitis belt had been associated with Neisseria meningitides serogroup A. Serogroup C is now the more common cause of epidemics in the meningitis belt. In 2002 an epidemic due to N. meningitidis serogroup W135 occurred in Burkina and in 2006 N. meningitidis serogroup X was isolated in Niger. • Human-to-human disease transmission is via large respiratory droplets from the nose and throats of infected people. • Incubation period is 2 to 10 days. • Attack rates are highest among children aged less than 15 years. Case fatality rates are usually 8-15% among treated patients, and >70% among untreated cases. Many survivors suffer long-term sequelae including mental retardation, hearing loss and loss of limb use. • Oily chloramphenicol is the drug of choice during epidemics because a single dose of this long-acting formulation has been shown to be effective. Antimicrobial resistance to chloramphenicol has not yet been detected in Africa, however, resistance to sulphonamides is widespread. • The current response to meningitis epidemics consists of reactive mass vaccination campaigns with bivalent (A and C) and/or trivalent polysaccharide vaccine (A, C, and W135) as soon as possible after an epidemic has been declared. Polysaccharide vaccines do not protect very young children (<2 years) and only provide protection for up to three years for those over 2 years of age resulting in repeated meningitis outbreaks. There is no vaccine for serogroup X. • A meningococcal A conjugate vaccine (MenAfriVac) has been developed which is immunogenic in both infants and adults and is expected to confer long-term protection. With its introduction in 2010 serogroup A epidemics as well as reported cases of meningitis due to this serogroup have almost disappeared from the meningitis belt.
Surveillance goal	• To promptly detect meningitis outbreaks and to confirm etiology of meningitis outbreaks. • To use the data to plan for treatment and vaccination supplies and other prevention and control measures. • To assess and monitor the spread and progress of the epidemic and the effectiveness of control measures. • To monitor the situation including serogroup shifts throughout the year. • To perform periodic susceptibility testing for penicillin and chloramphenicol.
Standard case definition	*Suspected case*: Any person with sudden onset of fever (>38.5ºC rectal or 38.0ºC axillary) and one of the following signs: neck stiffness, altered consciousness or other meningeal signs. *Confirmed case*: A suspected case confirmed by isolation of N. meningitidis, H. influenza, or S. pneumoniae from CSF or blood.

Respond to alert threshold	Alert threshold: • 2 suspected cases in a district per week Response: • Inform next level of health system • Record cases on a line listing form • Investigate and laboratory confirm the cases • Treat all suspected cases with appropriate antibiotics as recommended by the National Therapeutic Guidelines for Liberia. • Intensify surveillance for additional cases in the area • Prepare to conduct a mass vaccination campaign
Respond to action threshold	Action threshold: • For populations between 30 000 and 100,000: an attack rate of 15 cases per 100 000 inhabitants per week. When the risk of an epidemic is high (no epidemic during last 3 years, alert threshold reached in dry season), epidemic threshold is 10 cases per 100,000 inhabitants per week. • For populations less than 30 000 inhabitants: 5 cases in 1 week or the doubling of the number of cases over a 3-week period. Response: • Immediately vaccinate the epidemic district as well as any contiguous districts in alert phase. • Mobilize community to permit early case detection and treatment, and improve vaccine coverage during mass vaccination campaigns for outbreak control. • Continue data collection, transmission and analysis. • Maintain regular collection of 5-10 CSF specimens per week throughout the epidemic season in all affected districts to detect possible serogroup shift. • Treat all cases with appropriate antibiotics as recommended by National protocol.
Analyze and interpret data	Time: In meningitis belt countries during epidemic season, graph weekly cases and deaths. Otherwise, graph monthly trends in cases and deaths. Construct an epidemic curve for outbreak cases. Place: In epidemics (not in endemic situations), plot location of case households and estimate distance to the nearest health facility. Person: Count total sporadic and outbreak cases. Analyze age distribution.
Laboratory confirmation	Diagnostic test • Microscopic examination of CSF for Gram negative diplococci Culture and isolation of meningitis, H. influenza, or S. pneumoniae from CSF or blood Specimen: Cerebral spinal fluid (CSF) Note: CSF is the specimen of choice for culture and microscopic exam. If CSF not available, collect blood (10 ml adults, 1-5 ml for children) for culture into blood culture tubes. When to collect the specimen • Collect specimens from 5 to 10 cases once the alert or epidemic has been reached. How to prepare, store, and transport the specimen • When a lumbar puncture kit, transport medium and laboratory capacity for

	bacteriology are available, collect a CSF specimen • Prepare the patient and aseptically collect CSF into sterile test tubes with tops. • Immediately place 1 ml of CSF into a pre-warmed bottle of trans-isolate medium. • Incubate at body temperature (36C to 37C). • Never refrigerate specimens that will be cultured. When capacity for bacteriology is available and bacteraemia is suspected or CSF culture is not available, collect blood into culture tubes.
Resources	• Weekly Epidemiological Record N 38, September 2000 (http://www.who.int/wer/pdf/2000/wer7538.pdf) • WHO Regional Office for Africa Standard Operating Procedures for Enhanced Meningitis Surveillance in Africa, August 2009 • Control of epidemic meningococcal disease. WHO Practical Guidelines, 2nd Edition. WHO/EMC/BAC/98.3. • Laboratory Methods for the Diagnosis of Meningitis Caused by Neisseria meningitidis, Streptococcus pneumoniae and Haemophilus influenza. WHO document WHO/CDS/EDC/99.7 WHO, Geneva

11.16 Monkey Pox

Background	• Monkeypox is a rare, viral, zoonotic orthopoxvirus disease that has a similar but milder disease presentation as (now eradicated) smallpox in humans. It is usually a self-limiting disease, but the case-fatality rate can be up to 10%, particularly among children. • Monkeypox primarily occurs in the rain forests in West and Central Africa. The primary animal reservoir is unknown, but it has been detected in a range of small mammal species, particularly rodents, and monkeys. Animal species in which evidence of monkeypox virus has been found include C. gambianus (Gambian pouched rat), different squirrel species of the genus Funisciurus and Heliosciurus, G. kelleni (African dormice) and various species of non-human primates. • Communities living in the West and Central African rainforest regions need to be educated about avoiding direct contact with animals, especially wild species. Efforts to prevent transmission in endemic regions should focus on thoroughly cooking all animal products (blood, meat) before eating. • Human-to-human transmission is limited (no evidence that this mode of transmission alone can sustain monkeypox in human populations) and occurs via prolonged contact with respiratory droplets and contact with lesions or bodily fluids that contain the virus. Household members and health care workers are at highest risk during an outbreak. • Monkeypox is an emerging disease which has become the most prevalent orthopoxvirus since the global eradication of smallpox that was declared by the World Health Assembly in 1980. This is partly because smallpox vaccination which was cross-protective for other orthopoxviruses was discontinued at the time which means younger people no longer have vaccine-induced immunity. • Human monkeypox was first identified in humans in 1970 in the Democratic Republic of Congo which remains the country that routinely reports the highest number of cases (>1,000) annually since 2005. Other countries that have reported human cases since 1970 include Sierra Leone, Liberia, Cote d'Ivoire, Nigeria, Cameroon, Gabon, Republic of Congo, Central African Republic and Sudan (in an area that is now South Sudan). Since late 2016 there have been increasing reports of monkeypox cases from countries that have not seen any for the past 40 years. • Clinical recognition, particularly differential diagnosis with other rash and fever illnesses such as chickenpox, laboratory-based diagnosis and prevention remain critical challenges in endemic areas. Two distinct clades or subtypes have been identified. It is believed that infection with a West African strain of monkeypox virus causes a less severe infection, fewer deaths, and lower rates of human-to-human transmission as compared to outbreaks involving Central African strains. • The incubation period of monkeypox is 6-16 days (range 5–21). The infection can be divided into two periods: (1) invasion period (0-5 days) characterized by fever, intense headache, lymphadenopathy (swelling of the lymph node), back pain, myalgia (muscle ache) and an intense asthenia (lack of energy); and (2) skin eruption period (1-3 days after appearance of fever) where the various stages of the rash appears, often beginning on the face and then spreading elsewhere on the body. • The most distinguishing symptom of monkeypox is lymphadenopathy. The face (in 95% of cases), and palms of the hands and soles of the feet (75%) are most affected by the rash. Evolution of the rash from maculo-papules (lesions with

	a flat bases) to vesicles (small fluid-filled blisters), pustules, followed by crusts occurs in approximately 10 days. Three weeks might be necessary before the complete disappearance of the crusts. • Varicella (chickenpox) is often confused with monkeypox but can be distinguished from monkeypox and smallpox by its much more superficial lesions, their presence more on the trunk than on the face and extremities, and by the development of successive crops of lesions in the same area. Fever and rash occur simultaneously in chickenpox and develop more rapidly; with death being a rare complication. Coinfection with both, varicella and monkeypox virus, has been reported. However, the frequency of this phenomenon, relationship and impact between the viruses' pathogenesis and epidemiology is not clear.
Surveillance goal	To detect and immediately respond to any suspected case of monkeypox
Standard case definition	*Suspected case*: An acute illness with fever > 38.3°C (101 F), intense headache, lymphadenopathy, back pain, myalgia, and intense asthenia followed one to three days later by a progressively developing rash often beginning on the face (most dense) and then spreading elsewhere on the body, including soles of feet and palms of hand. *Probable case*: A case that meets the clinical case definition, is not laboratory confirmed, but has an epidemiological link to a confirmed or probable case. *Confirmed case*: A clinically compatible case that is laboratory confirmed. *Differential diagnosis*: Alternative causes of clinical symptoms that must be considered include other rash illnesses, such as, smallpox, chickenpox, measles, bacterial skin infections, scabies, syphilis, and medication-associated allergies
Respond to alert threshold	If a single case is suspected: • Report case-based information immediately to the appropriate levels. • Ensure patient is isolated Implement airborne infection control precautions, and, if possible, allow health personnel vaccinated against smallpox to attend patients. • Treat and manage the patient with supportive care and symptom-specific management. • Collect and transfer specimen (prefer swab of rash) under strict safety conditions to confirm the case. • Implement risk communication, community engagement, contact tracing and contact management. • Conduct active surveillance to identify additional cases. • Notify WHO.
Respond to action threshold	If a single case is confirmed: • Maintain strict infection control measures practices throughout the duration of the outbreak. • Mobilize the community for early detection and care. • Conduct community education about the confirmed case, how the disease is transmitted, and how to implement infection control in the home care setting and during funerals. • Conduct active searches for additional cases. Request additional help from national and international levels
Analyze and interpret data	Time: Graph cases and deaths daily/weekly/monthly. Construct an epidemic curve. Place: Map location of case households. Person: Immediate case-based reporting of cases and deaths. During the outbreak, count and report cases (including suspected and confirmed) and deaths. Analyze age and sex distribution. Assess risk factors (contact with wild animals or

	another active confirmed case) immediately.
Laboratory confirmation	
Diagnostic test	Polymerase chain reaction (PCR) assay identification of monkeypox DNA in a clinical specimen – preferred Note: Level C or D laboratories only.
Specimen	Optimal specimens: vesicular swabs of lesion exudate or crusts that can be in the following forms: 1) Biopsy specimens* 2) Scabs*, 3) Vesicular fluid swab* 4) Lesion skin (roof)* 5) Pustule material* Blood/serum samples – mostly for serology because viremia is short-lived. Requires detailed case and illness dates and information for appropriate interpretation Note: blood samples from person where severe, dense rash may be difficult to draw as the skin may slough off. A central line may be needed for access in cases where a peripheral blood draw is difficult. * preferred specimens for diagnosis of acute illness during rash phase
When to collect	A suspected case of monkeypox is a public health and medical emergency. Collect samples from every suspected case at earliest available times to achieve specimen types recommended.
How to prepare, store, and transport	Typical practices associated with collection of patient specimens are appropriate for collection of orthopoxvirus lesions as well. These include wearing personal protective equipment, including gloves and sanitizing the site prior to collection. If alcohol is used to prepare the lesion for collection it is important to allow the lesion to dry before it is collected. *Biopsy specimens:* Aseptically place two to four portions of tissue into a dry, sterile, leakproof, freezable container. Storage -20°C to -70°C. Transport ~6h at 4°C. *Note: package non-formalin lesion biopsy for shipping on dry ice, leave formalin fixed biopsy at room temperature. Do not freeze formalin fixed biopsy sample.* *Scabs*: Aseptically place scrapings/material into a dry, sterile, leak-proof, freezable container. No viral transport media. Storage -20°C to -70°C. Transport ~6h at 4°C. *Vesicular fluid*: Collect fluid from separate lesions onto separate sterile swabs. Be sure to include cellular material from the base of each respective vesicle. Storage -20°C to -70°C. Transport ~6h at 4°C. No viral transport media. *Blood* Draw 10 ml of blood into a plastic marble-topped tube, or a plastic yellow-topped serum separator tube. *Note: approval must be obtained prior to the shipment of potential monkeypox patient clinical specimens to a reference laboratory.*
Results	Diagnostic services for monkeypox are not routinely available at present. Advance arrangements are usually required for monkeypox laboratory diagnostic services. Contact the appropriate national authority or WHO.
Resources	WHO Fact Sheet on Monkeypox: http://www.who.int/mediacentre/factsheets/fs161/en/

11.17 Neonatal Death

Background	The death of a baby that occurs at birth or within 28 days of life • This includes the first day and first week of life which are the periods of greatest risk of death and still births • Globally, the number of deaths in children under five years of age has dropped significantly, from nearly 12 million in 1990 to about 6.3 million in 2013. • Unfortunately, globally, the proportion of child deaths occurring in the neonatal period has increased with neonatal deaths accounting for approximately 44% in 2012 of all child deaths. • Though Liberia is among countries that have achieved Millennium Development Goals, the proportion of under five deaths occurring in the neonatal period in 2013 was estimated at 26%. • Asphyxia, sepsis, preterm births are the leading causes of newborn deaths in Liberia. • The majority of newborn deaths can be prevented through cost effective, high impact interventions • Greater investment and attention to the Newborn period, including the prevention of preterm births, stillbirths and the scale up of effective, low cost interventions such as antenatal corticosteroids, cord care and kangaroo mother care are needed to improve neonatal survival. • Trends over the years showed 22.3% decrease in neonatal deaths in Liberia. • According the 2013 DHS report, neonatal deaths have declined from 41/1,000 live births in 2007 to 26/1,000 live births in 2012. See Annex 9V for the neonatal death variable list.
Surveillance goal	The overall goal of the Maternal Neonatal Death Surveillance and Response (MNDSR) protocol is to guide an effective implementation and scale up of MNDSR in a systematic standardized and integrated manner.
Surveillance objective	• Estimate and monitor neonatal mortality rates, including stillbirth rates. • Identify risk factors for neonatal mortality to inform program decisions. • Investigate all neonatal deaths including still birth in facilities and communities and take necessary action
Standard case definition	The death of a baby at birth or within the first 28 days of life.
Recommended public health action	Action threshold: • A case of neonatal death is a trigger for action at all levels (communities, health facilities, districts, counties, and national). Response: • The health facility should contact the district authority and provide information about the IDSR Case Alert form. • The form is completed and submitted electronically when possible; if not it is delivered by telephone or on paper. • The initial notification should be followed by a written report using a Newborn (neonatal) death review form/case investigation form. (Annex 11) • Continue / complete epidemiological investigation including screening for vaccination status • Monitor trends and respond to each alert • All health care providers (professional and non-professional) should be trained on these protocols. • Increase availability and use of antenatal care, safe birthing, integrated

	management of childhood illnesses, and neonatal care. • Support interventions to improve recognition and response to high-risk pregnancies at the community level • Provide specialized training to professional birth attendants around neonatal care. • Prompt treatment of newborn infections and educating on hygiene, warmth and exclusive infant breastfeeding. • Community outreach and education to make educational materials available to the community.
Analyze and interpret data	Time: Graph cases to construct an epidemic curve throughout the year in order to identify trends. Place: Plot the location of cases and analyze the distribution. Person: Line list all deaths. Analyze the distribution of cases by age (hours or days from birth) and other demographic factors.
Laboratory confirmation	Routine laboratory confirmation for surveillance is not required.
Resources	• Newborn Health WHO http://www.afro.who.int/fr/groupes-organiques-et-programmes/ddc/surveillance-integree-de-la-maladie/1542-.html • Children: reducing mortality. WHO http://www.who.int/mediacentre/factsheets/fs178/en/

11.18 Neonatal Tetanus

Background	A neuromuscular toxin-mediated illness caused by the anaerobic spore-forming soil bacterium Clostridium tetani. The disease is transmitted when spores enter open wounds (injections, cutting the umbilical cord) or breaks in the skin. • While tetanus may occur in adults, infection primarily affects newborns. Neonatal tetanus has decreased dramatically in countries with improved maternal tetanus immunization rates; maternal antibody is transferred across the placenta and prevents tetanus in the neonate. As a result, tetanus is targeted for elimination in many African countries. • Incubation period is 3 to 21 days, with an average of approximately 6 days. • Risk factors: Unclean umbilical cord care practices during delivery for neonates. Lack of antibody protection in incompletely immunized mothers See Annex 9T for the neonatal tetanus investigation form.
Surveillance goal	• Detect cases of neonatal tetanus immediately to confirm the case and prevent additional cases by immunizing at least pregnant women in area around the confirmed case. • Identify high risk areas and target tetanus toxoid campaigns to women of childbearing age.
Standard case definition	*Suspected case*: Any newborn with a normal ability to suck and cry during the first two days of life, and who, between the 3rd and 28th day of age, cannot suck normally, and becomes stiff or has convulsions or both. *Confirmed case*: Cases are confirmed through clinical investigation using the AFRO standard investigation form in Annex 11P. No laboratory confirmation recommended.
Respond to alert threshold	If a single case is suspected: • Report case-based information immediately to the next level. • Conduct an investigation to determine the risk for transmission • Treat and manage the case according to national recommendations, usually with supportive care and, if feasible, in intensive care. No routine isolation precautions are needed.
Respond to action threshold	If a case is confirmed through investigation: • Immunize the mother and other pregnant women in the same locality as the case with at least 2 doses of tetanus toxoid. • Conduct a supplemental immunization activity for women of childbearing age in the locality. • Improve routine vaccine coverage through EPI and maternal immunization program activities. • Educate birth attendants and women of childbearing age on the need for clean cord cutting and care. Increase the number of trained birth attendants.
Analyze and interpret data	Time: Graph cases and deaths monthly. Target should reflect elimination target for each district. Place: Plot location of case households and location of birth attendants. Person: Count monthly cases and deaths. Analyze each case of NNT by cord care practices.
Laboratory confirmation	Laboratory confirmation is not required.
Resources	• Field manual for neonatal tetanus elimination. Geneva, World Health Organization. WHO/V&B/99.14 • UNICEF Maternal and Neonatal Tetanus. http://www.unicef.org/immunization/23245_mnt.html

11.19 Severe Acute Respiratory Syndrome (SARS)

Background	Severe acute respiratory syndrome (SARS) was first recognized as a global threat in 2003 when international spread resulted in 8,098 SARS cases in 26 countries, with 774 deaths. • Nosocomial transmission of SARS-CoV was a striking feature of the SARS outbreak. • The majority of the cases were adults. The case fatality ratio of SARS is estimated to range from 0% to more than 50% depending on the age group affected and reporting center, with a crude global CFR of approximately 9.6%. • The mean incubation period is 5 days, with the range of 2-10 days. Patients initially develop influenza-like prodromal symptoms including fever, malaise, myalgia, headache and rigors. Cough (initially dry), dyspnoea and diarrhea may be present in the first week but more commonly reported in the second week of illness. • Severe cases develop rapidly progressing respiratory distress. Up to 70% of the patients develop diarrhea. • Disease transmission occurs mainly during the second week of illness. • The SARS coronavirus (SARS-CoV) which causes SARS is believed to be an animal virus that crossed the species barrier to humans recently. • In the inter-epidemic period, all countries must remain vigilant for the recurrence of SARS and maintain their ability to detect and respond to the possible re-emergence of SARS • Immediate Notification to WHO is formally required by IHR (Annex 2C).
Surveillance goal	Early detection and investigation of individuals with clinically apparent SARS-CoV.
Standard case definition	*Suspected case* of SARS is an individual with: • A history of fever, or documented fever = 38 °C AND • One or more symptoms of lower respiratory tract illness (cough, difficulty breathing, shortness of breath) AND • Radiographic evidence of lung infiltrates consistent with pneumonia or ARDS or autopsy findings consistent with the pathology of pneumonia or ARDS without an identifiable cause AND • No alternative diagnosis can fully explain the illness *Confirmed case* of SARS: An individual who tests positive for SARS-CoV infection by the WHO recommended testing procedures
Alert threshold	SARS ALERT • An individual with clinical evidence of SARS AND with an epidemiological risk factor for SARS-CoV infection in the 10 days before the onset of symptoms OR • Two or more health-care workers with clinical evidence of SARS in the same health- care unit and with onset of illness in the same 10-day period OR • Three or more persons (health-care workers and/or patients and/or visitors) with clinical evidence of SARS with onset of illness in the same 10-day period and epidemiologically linked to a health-care facility. Respond to suspected case • Report case-based information immediately to the appropriate levels. • Practice infection control precautions for an acute respiratory disease with epidemic/pandemic potential immediately and enhance Standard Precautions throughout the health care setting. • Treat and manage the patient according to national guidelines.

	• Collect and transport laboratory specimens from case-patient and from symptomatic contacts and arrange for laboratory testing. • Review clinical history and exposure history during 2-10 days before disease onset. • Identify and follow-up close contacts of case-patient. • Conduct active searches for additional cases. • Expedite the diagnosis (WHO will assist in the investigation of SARS trigger as appropriate, including facilitating access to laboratory services)
Analyze and interpret data	Time: Graph cases and deaths daily/weekly/monthly. Construct an epidemic curve during the outbreak. Place: Plot locations of case households and work sites using precise mapping. Person: Immediate case-based reporting of cases and deaths. During the outbreak, count and report cases and deaths. Analyze age and sex distribution. Assess risk factors immediately.
Laboratory confirmation	Diagnostic test Confirmed positive PCR for SARS virus: • At least 2 different clinical specimens (e.g. nasopharyngeal and stool) OR • The same clinical specimen collected on 2 or more days during the course of the illness (e.g. 2 or more naspharyngeal aspirates) OR • 2 different assays or repeat PCR using the original clinical sample on each occasion of testing Seronconversion by ELISA or IFA: • Negative antibody test on acute serum followed by positive antibody test on convalescent serum OR • Four-fold or greater rise in antibody titer between acute and convalescent phase sera tested in parallel. Virus isolation: • Isolation in cell culture of SARS-Cov from any specimen; plus PCR confirmation using a validated method Specimen Nasopharyngeal wash/aspirate specimen of choice for respiratory viruses. • Nasopharyngeal swabs or oropharyngeal swabs • Stool • Serum When to collect: • The respiratory tract specimen can be collected at any time but are best taken during the acute phase of illness. • The time collection of paired blood samples is very important: Collect an acute illness sample at first contact with the patient at days 7, 14, 28 and 90 after onset where possible. Collect blood on discharge if collection of a convalescent sample is unlikely. How to prepare, store, and transport • SARS specimens should be handled according to appropriate biosafety practices in order to avoid laboratory-related infections and spread of disease to close contacts. Clinical samples from patients should be collected by trained personnel. • Nasopharyngeal wash/aspirate: have the patient sit with the head titled

	slightly backward. Instill 1.5 ml non-bacteriostatic sterile saline (pH 7.0) into one nostril. Flush a plastic catheter or tubing (e.g. mucus trap tubing) with 2-3 ml of saline. Insert the tubing into the nostril parallel to the palate. Aspirate nasopharyngeal secretions. Repeat for the other nostril. Collect aspirates in sterile vial or mucus trap. Remove tubing and discard in plastic bag. • Nasopharyngeal or oropharyngeal swabs: use only sterile Dacron or rayon swab with plastic shafts. Place each swab immediately in a tube containing Virus Transport Media (VTM). • Serum collection: Collect 5-10 ml of whole blood in a serum separator tube. Allow blood to clot. • Respiratory / stool / blood/serum specimens: Refrigerate immediately (4°C). • If transport/shipping will be international or will occur > 5 days after collection of last specimen, freeze the specimens at – 20°C (serum), -20/-70°C (respiratory specimens) for planned shipping with dry ice if available. • Fixed tissues (formalin fixed) from all major organs: Store and ship fixed tissue at room temperature.
Results	Diagnostic services for SARS are not routinely available. Advance arrangements are usually required for SARS diagnostic services. Contact the appropriate National authority or WHO. If there is a high level of suspicion, WHO will support countries to contact a reference laboratory if necessary.
Resources	• WHO Guidelines for the Global Surveillance of SARS, Updated Recommendations, October 2004 • WHO Interim Guidelines, Infection Prevention and Control of Epidemic- and Pandemic-Prone Acute Respiratory Diseases in Health Care, June 2007. WHO/CDS/EPR/2007.6. • Use of laboratory methods for SARS diagnosis, WHO • WHO Biosafety guidelines for handling of SARS specimens • A practical Guide for SARS laboratories: from samples collection to shipment. WHO, 29 Dec 2003.

11.20 Severe Acute Watery Diarrhea (Cholera)

Background	Acute illness with profuse watery diarrhea caused by Vibrio cholerae serogroups O1 or, very rarely if ever in Liberia, O139. The disease is transmitted mainly through the fecal-oral route; that is through eating or drinking contaminated food or water. • Cholera causes over 100 000 deaths per year. It may produce rapidly progressive epidemics or worldwide pandemics. In endemic areas, sporadic cases (less than 5% of all non-outbreak-related diarrhea cases) and small outbreaks may occur. • Incubation period is from a few hours to 5 days, usually in the range of from 2 to 3 days. • There has been a resurgence of cholera in Africa since the mid-1980s, where over 80% of the world's cases occurred in 1999. The majority of cases occurred from January through April. A large cholera outbreak occurred in Liberia in 2003. • Cholera may cause severe dehydration in only a few hours. In untreated patients with severe dehydration, the case fatality rate (CFR) may exceed 50%. If patients present at the health facility and correct treatment is received, the CFR is usually less than 1%. At least 90% of the cases are mild, and they remain undiagnosed. • Risk factors: eating or drinking contaminated foods such as uncooked seafood or shellfish from estuarine waters, lack of continuous access to safe water and food supplies, attending large gatherings of people including ceremonies such as weddings or funerals, contact with persons who died of cholera. • Other enteric diarrhea may cause watery diarrhea, especially in children less than 5 years of age. See Annex 9W for the cholera variable list.
Surveillance goal	• Detect and respond promptly and appropriately to cases and outbreaks of watery diarrhea. To confirm an outbreak, collect and transport stool specimens transported in Carey-Blair medium. • Do immediate case-based reporting of cases and deaths when an outbreak is suspected.
Standard case definition	*Suspected case:* • In an area where the disease is not known to be present a patient aged 5 years or more develops severe dehydration or dies from acute watery diarrhea • In an area where there is a cholera epidemic, a patient aged 5 years or more develops acute watery diarrhea, with or without vomiting *Confirmed case:* A suspected case in which *Vibrio cholerae* O1 or O139 has been isolated in the stool.
Respond to alert threshold	If a single case is suspected: • Report case-based information immediately. • Manage and treat the cases: • If no or moderate dehydration: use ORS for cases. If severe dehydration: consider intravenous fluids and antibiotics. • Enhance strict hand-washing and isolation procedures. • Conduct case-based investigation to identify similar cases not previously reported. • Obtain stool specimen from 5 patients within 5 days of onset of acute watery diarrhea, and before antibiotic treatment is started. See laboratory guidelines

	for information on how to prepare, store and transport the specimens.
Respond to action threshold	If a suspected case is confirmed: • Establish treatment center in locality where cases occur. Treat cases onsite rather than asking patients to go to standing treatment centers elsewhere. • Strengthen case management including treatment. • Mobilize community early to enable rapid case detection and treatment. Survey the availability of clean drinking water. • Work with community leaders to limit the number of funerals or other large gatherings for ceremonies or other reasons, especially during an epidemic. • Reduce sporadic and outbreak-related cases through continuous access to safe water. • Promote safe preparation of food (especially seafood, fruits, and vegetables). • Promote safe disposal of human waste.
Analyze and interpret data	Time: Graph weekly cases and deaths and construct an epidemic curve during outbreaks. Report case-based information immediately and summary information monthly for routine surveillance. Place: Plot the location of case households. Person: Count weekly total cases and deaths for sporadic cases and during outbreaks. Analyze distribution of cases by age and according to sources of drinking water. Assess risk factors to improve control of sporadic cases and outbreaks.
Laboratory confirmation	Diagnostic test • Isolate V. cholerae from stool culture and determine O1 serotype using polyvalent antisera for V. cholerae O1. Specimen Liquid stool or rectal swab When to collect the specimen For each new area affected by the outbreak, a laboratory confirmation should be done. Collect stool sample from the first suspected cholera case. If more than one suspected case, collect until specimens have been collected from 5 to 10 cases. Collect stool from patients fitting the case definition and: • Onset within last 5 days, and • Before antibiotics treatment has started Do not delay treatment of dehydrated patients. Specimens may be collected after rehydration (ORS or IV therapy) has begun. If possible, specimens should be collected from 5 – 10 suspected cases every 1 – 2 weeks to monitor cessation of the outbreak, changes in serotypes, and antibiotic sensitivity patterns of V. cholerae. How to prepare, store, and transport the specimen • Place specimen (stool or rectal swab) in a clean, leak proof container and transport to lab within 2 hours. • If more than 2- hour delay is expected, place stool-soaked swab into Carey-Blair transport medium. • Carey-Blair transport media is stable and usually good for at least one year after preparation. It does not require refrigeration if kept sterile and in properly sealed container. If color changes (media turns yellow) or shrinks (indents), do not use the media. • If Carey-Blair transport medium is not available and specimen will not reach

	the lab within 2 hours, store at 4°C to 8°C • Do not allow specimen to dry. Add small amount of 0.85% NaCl if necessary • To transport, transport in well-marked, leak proof container • Transport container in cold box at 4ºC to 8ºC container. Results • Cholera tests may not be routinely performed in all laboratories. • Culture results usually take 2 to 4 days after specimen arrives at the laboratory. • Carey-Blair transport medium is stable and usually good for at least one year after preparation. It does not require refrigeration if kept sterile and in properly sealed If color changes (medium turns yellow) or shrinks (depressed meniscus), do not use the medium. • The O139 serotype has not been reported in Africa and only in a few places in southwest Asia. • Serological determination of Ogawa or Inaba is not clinically required. It is also not required if polyvalent antisera results are clearly positive.
Resources	• Management of the patient with cholera, World Health Organization, 1992. WHO/CDD/SER/91.15 Rev1 (1992) • Epidemic diarrheal disease preparedness and response--Training and practice. Facilitator and participant manuals. World Health Organization, 1997. WHO/EMC/DIS/97.3 and WHO/EMC/DIS/97.4 • Laboratory Methods for the Diagnosis of Epidemic Dysentery and Cholera. CDC/WHO, 1999 CDC, Atlanta, GA, USA

11.21 Smallpox (*Variola*)

Background	• Smallpox is an acute contagious disease caused by Variola virus, a member of the Orthopoxvirus family. Other members of the genus include cowpox, camelpox, and monkeypox. Monkeypox virus has caused the most serious recent human poxvirus infections. Both smallpox and monkeypox are vaccine preventable diseases using the same vaccine. • Smallpox killed as many as 30% of those infected. In 1967, when WHO launched an intensified plan to eradicate smallpox, the disease threatened 60% of the world's population and killed every fourth patient. • The global eradication of smallpox was certified by a commission of eminent scientists in December 1979 and subsequently endorsed by the World Health Assembly in 1980. • Smallpox had two main forms: Variola major and Variola minor. The disease followed a milder course in Variola minor, which had a case-fatality rate of less than 1 per cent. The fatality rate of Variola major was around 30%. There are two rare forms of smallpox: hemorrhagic and malignant. In the former, invariably fatal, the rash was accompanied by hemorrhage into the mucous membranes and the skin. Malignant smallpox was characterized by lesions that did not develop to the pustular stage but remained soft and flat. It was almost invariably fatal. The incubation period of smallpox is usually 12–14 days (range 7–17) during which there no evidence of viral is shedding. During this period, the person looks and feels healthy and cannot infect others. • The incubation period is followed by the sudden onset of influenza-like symptoms. • Two to three days later, the temperature falls and the patient feels somewhat better, at which time the characteristic rash appears, first on the face, hands and forearms and then after a few days progressing to the trunk. Lesions also develop in the mucous membranes of the nose and mouth, and ulcerate very soon after their formation, releasing large amounts of virus into the mouth and throat. The centrifugal distribution of lesions, more prominent on the face and extremities than on the trunk, is a distinctive diagnostic feature of smallpox and gives the trained eye cause to suspect the disease. • Lesions progress from macules to papules to vesicles to pustules. All lesions in a given area progress together through these stages. From 8 to 14 days after the onset of symptoms, the pustules form scabs which leave depressed depigmented scars upon healing. • Varicella (chickenpox) can be distinguished from smallpox by its much more superficial lesions, their presence more on the trunk than on the face and extremities, and by the development of successive crops of lesions in the same area. <u>Smallpox is transmitted from person to person</u> by infected aerosols and air droplets spread in face-to-face contact with an infected person after fever has begun, especially if symptoms include coughing. The disease can also be transmitted by contaminated clothes and bedding, though the risk of infection from this source is much lower. The frequency of infection is highest after face-to-face contact with a patient after fever has begun and during the first week of rash, when the virus is

	released via the respiratory tract. In the absence of immunity induced by vaccination, humans appear to be universally susceptible to infection with the smallpox virus. Vaccine administered up to 4 days after exposure to the virus, and before the rash appears, provides protective immunity and can prevent infection or ameliorate the severity of the disease.
Surveillance goal	To detect and immediately respond to any suspected case of smallpox.
Standard case definition	*Suspected case*: An illness with acute onset of fever > 38.3°C (101°F) followed by a rash characterized by vesicles or firm pustules in the same stage of development without other apparent cause. *Probable case*: A case that meets the clinical case definition, is not laboratory confirmed, but has an epidemiological link to a confirmed or probable case. *Confirmed case*: A clinically compatible case that is laboratory confirmed.
Respond to alert threshold	If a single case is suspected: • Report case-based information immediately to the appropriate levels. • Implement airborne infection control precautions. • Treat and manage the patient with supportive care. • Collect specimen safely to confirm the case. • Implement contact tracing and contact management. • Conduct active surveillance to identify additional cases. • Notify WHO.
Respond to action threshold	If a single case is confirmed: • Maintain strict infection control measures practices throughout the duration of the outbreak. • Mobilize the community for early detection and care. • Conduct community education about the confirmed case, how the disease is transmitted, and how to implement infection control in the home care setting and during funerals. • Conduct active searches for additional cases. • Request additional help from national and international levels. • Establish isolation ward to handle additional cases that may be admitted to the health facility.
Analyze and interpret data	Time: Graph cases and deaths daily/weekly/monthly. Construct an epidemic curve. Place: Map location of case households. Person: Immediate case-based reporting of cases and deaths. During the outbreak, count and report cases and deaths. Analyze age and sex distribution. Assess risk factors immediately.
Laboratory confirmation	Diagnostic test • Isolation of smallpox (Variola) virus from a clinical specimen OR • Polymerase chain reaction (PCR) assay identification of Variola DNA in a clinical specimen Note: Level C or D laboratories only. Specimen Preferred specimens for diagnosis of acute illness during rash phase: • Biopsy specimens • Scabs • Vesicular flu • Lesion skin (roof) • Pustule material

	Blood samples Note: blood samples from person with severe, dense rash may be difficult to draw as the skin may slough off. A central line may be needed for access in cases where a peripheral blood draw is difficult. When to collect: A suspected case of smallpox is a public health and medical emergency. Collect samples from every suspected case at available times to achieve specimen types recommended. How to prepare, store, and transport Typical practices associated with collection of patient specimens are appropriate for collection of orthopoxvirus lesions as well. These include wearing personal protective equipment, including gloves and sanitizing the site prior to collection. If alcohol is used to prepare the lesion for collection it is important to allow the lesion to dry before it is collected. Biopsy specimens: Aseptically place two to four portions of tissue into a sterile, leakproof, freezable container. Storage -20°C to - 70°C. Transport ~6h at 4°C. Note: package non- formalin lesion biopsy for shipping on dry ice, leave formalin fixed biopsy at room temperature. Do not freeze formalin fixed biopsy sample. Scabs: Aseptically place scrapings/material into a sterile, leakproof, freezable container. Storage -20°C to - 70°C. Transport ~6h at 4°C. Vesicular fluid: Collect fluid from separate lesions onto separate sterile swabs. Be sure to include cellular material from the base of each respective vesicle. Storage -20°C to - 70°C. Transport ~6h at 4°C. Draw 10 cc of blood into a plastic marble-topped tube, or a plastic yellow-topped serum separator tube. Note: approval must be obtained prior to the shipment of potential smallpox patient clinical specimens to a Reference laboratory.
Results	Diagnostic services for smallpox are not routinely available. Advance arrangements are usually required for smallpox diagnostic services. Contact the appropriate National authority or WHO.
Resources	WHO Fact Sheet, Smallpox. http://www.who.int/mediacentre/factsheets/smallpox

11.22 Tuberculosis (TB)

Background	• Infection of the lungs and other organs usually caused by Mycobacterium tuberculosis transmitted person-to-person by droplet infection through coughing, sneezing or spitting. Clinically, the pulmonary form of the disease is more common than the extra-pulmonary form. The cardinal symptoms of pulmonary TB are chronic cough, weight loss, fever, loss of appetite and night sweats. • Tuberculosis (TB) is a leading cause of infectious illness and death worldwide with over 8 million new cases and 3 million deaths per year. In African countries, approximately 1.6 million of the new cases and over 600 000 cases occur each year. It is also estimated that between 30 and 50% of all new TB cases detected are infected with HIV and 40% of all AIDS deaths are due to TB. Those who are at highest risk of dying from TB include people with HIV/AIDS, malnutrition and other immuno-compromising conditions, the very young, and old. • The global HIV pandemic has been a major cause of increasing TB cases, especially in African countries. • Incubation period is approximately 1 to 3 months. • WHO recommends the Directly Observed Therapy, Short-course (DOTS) strategy to maximize compliance and treatment efficacy and to reduce development of drug-resistant strains. The DOTS strategy has been implemented by at least 40 of 46 Member States in the African Region. Varying degrees of success have been achieved in controlling TB where resources and motivation for diagnosis, treatment, and patient follow up are adequate. • Clinically, bacterial pneumonia, malaria, trypanosomiasis, HIV/AIDS and a variety of other bacterial, parasitic, and viral infections may cause similar syndromes of fever, cough, fatigue, and weight loss, or may themselves precipitate active TB in an already infected individual. Abdominal or other extra-pulmonary sites of infection may occur after ingestion of un-pasteurized cow's milk (M. bovis).
Surveillance goal	• Early detection of persons with infectious lung disease to improve chances of clinical improvement and reduce transmission of TB. • Improve percentage of TB cases confirmed by microscope
Standard case definition	*Suspected case:* Any person with a cough of 3 weeks or more. *Confirmed case:* Smear-positive pulmonary TB: a) a suspected patient with at least 2 sputum specimens positive for acid-fast bacilli (AFB), or b) one sputum specimen positive for AFB by microscopy and radiographic abnormalities consistent with active PTB as determined by the treating medical officer, or c) one positive sputum smear by microscopy and one sputum specimen positive on culture for AFB. Smear negative PTB: a patient who fulfils all the following criteria: a) two sets taken at least 2 weeks apart of at least two sputum specimens negative for AFB on microscopy, radiographic abnormalities consistent with PTB and a lack of clinical response despite one week of a broad spectrum antibiotic, a decision by a physician to treat with a full course of anti-TB chemotherapy, or b) a patient who fulfils all the following criteria: severely ill, at least two sputum specimens negative for AFB by microscopy, radiographic abnormalities consistent with extensive pulmonary TB (interstitial and miliary), a decision by a physician to treat with a full course of anti-TB chemotherapy, or c) a patient whose initial sputum smears were negative, who had sputum sent for culture initially, and whose subsequent sputum culture result is positive.

Respond to alert threshold	If you observe that the number of cases or deaths is increasing over a period of time: • Report observed trends to the next level, or according to national guidelines. • Treat individual cases with direct observation (DOTS) including a treatment supporter. • Where feasible, isolate persons using respiratory infection control practices, especially if multi-drug resistant TB is suspected. • Investigate cause of increase, including performance of DOTS program in your area.
Respond to action threshold	If the number of cases or deaths increases to two times the number usually seen in a similar period in the past: • Assess health worker performance with detection and treatment of smear-positive PTB and improve practices as needed. • Assess DOTS program and take action to make identified improvements. • Conduct drug susceptibility tests to establish patterns of resistance
Analyze and interpret data	Time: Graph cases and deaths monthly. Place: Plot distribution of case households and workplaces. Person: Count monthly cases and deaths. Analyze age and sex distribution quarterly
Laboratory conformation	
Diagnostic test	Microscopy: Presence of acid fast bacillus (AFB) in Ziehl Neelsen (ZN) stained smears Culture and identification Drug susceptibility test: Anti-tuberculosis drug resistance occurs when a strain of Mycobacterium tuberculosis isolate is resistant to one or more antimicrobial agents as evidenced by internationally recommended methods for susceptibility tests) MDR =Resistance to Isoniazid and Rifampicin; X-DR= Resistance to Isoniazid and Rifampicin (MDR); plus additional resistance to a fluoroquinolone and a second-line injectable agent
Specimen	Deep-chest sputum Aspirates
When to collect specimen	Collect sputum (not saliva) for direct smear microscopy and examine at least two stained specimens taken on different days.
How to prepare, store, and transport the specimen	Smear should be examined at health facility where the specimen is taken. TB cultures should be packaged in leak proof containers, wrapped in cotton wool. Transport in waterproof container to reference lab.
Results	TB microscopy is read daily. Quantification of observed mycobacterium are reported using various reporting methods. Refer to the criteria used by the examining laboratory. *Culture*: after 6-8 weeks *Anti-tuberculosis drug resistance*: The national reference laboratory should be linked to a Supranational reference laboratory by strain exchange to ensure quality control
Resources	• Treatment of Tuberculosis: Guidelines for National Programs. WHO/TB/97.230 • Policy Statement of Prevention Therapy Against TB in People Living with HIV, WHO/TB/98.255 • Laboratory Services in Tuberculosis Control, Parts I, II and III. WHO publications WHO/TB/98.258 • Guidelines to surveillance of drug resistance in tuberculosis 4th ed. WHO/HTM/TB/2009.422

11.23 Viral Hemorrhagic Fever (VHF)

(including Ebola Virus Disease and Marburg Virus Disease)

Background	The Ebola and Marburg viruses are both RNA viruses in the family of filoviruses. • The first Ebola outbreaks occurred simultaneously in Sudan and DRC in 1976. Other outbreaks have occurred in Cote d'Ivoire, Gabon, Uganda and Congo. • In 2013, an EVD outbreak began in West Africa spreading between countries. By January 2016 there were over 28,637 cases of EVD and 11,315 died worldwide. International spread occurred with a few travelers. • More than 500 cases of Marburg with over 400 deaths were reported during outbreaks of Marburg virus that occurred in DRC in 1998-2000), then Angola and Uganda. • The natural reservoir of Ebola virus is an insect-eating bat whereas, fruit bats are considered to be natural hosts of Marburg virus. Marburg virus has never been identified in West Africa, but the type of fruit bat that may carry the virus exists in Liberia and some other West African countries. • These viruses are transmitted by direct contact with the blood, secretions, organs or other body fluids of infected persons or animals, or with surfaces and materials (e.g. bedding, clothing) contaminated with these fluids. Sexual transmission has been documented among survivors of Ebola Virus Disease. • Close contact with a severely ill person, during care at home or in hospital, and burial practices involving washing or touching of a deceased person are common routes of transmission. Infection acquired via contaminated injection equipment or through needle-stick injuries is associated with more severe disease. • The incubation period for Ebola is 2 to 21 days whereas for Marburg it is 3 to 9 days. • Epidemics can be dramatically amplified in health care facilities with inadequate infection control precautions/barrier nursing procedures. • Persons become increasingly infectious as their illness progresses. • High case fatality ratios have been reported during Ebola outbreaks (25% to 90%) and during Marburg outbreaks (25% to 80%). All age groups are susceptible to infection, but most cases have occurred among adults • Persistence of viral particles in breast milk, semen, and the central nervous system in survivors has been documented in EVD but the transmissibility is unclear. See Annex 9X for the VHF Generical Investigation Form.
Surveillance goal	• Early detection of cases and outbreaks, rapid investigation, and early laboratory verification of all suspected cases. • Investigation of all suspected cases with contact tracing and safe burial. • Support of prevention efforts such as social distancing and vaccination when available. • Monitoring case fatality assess spread of illness (chains of transmission), and death. • To guide the support and care of survivors.
Standard case definition	Routine setting *Suspected case*: Any person, alive or dead, with onset of fever and no response to treatment for the usual causes of fever in the area AND at least one of the following signs: Bloody diarrhea, bleeding from gums, bleeding into skin (purpura), bleeding into eyes or urine OR clinical suspicion for Ebola or Marburg Virus Disease. *Confirmed case*: A suspected case with laboratory confirmation (Positive IgM antibody, positive PCR from blood), or epidemiologic link to confirmed cases or outbreak. For outbreak setting case definition may be changed to correspond to event. Outbreak setting (more sensitive case definition) *Suspected case:* • Any person (alive or dead) with sudden onset of high fever and at least three of the

	following symptoms: headaches, vomiting, anorexia/loss of appetite, diarrhea, lethargy, stomach pain, aching muscles or joints difficulty swallowing, breath difficulties, hiccups; OR • Any person with acute fever and inexplicable bleeding; OR • Any sudden, inexplicable death; OR • Clinical suspicion of VHF OR • A person (alive or dead) suffering or having suffered from a sudden onsite of high fever and having had contact with: a dead or sick animal (for Ebola); a mine (for Marburg) Note: During epidemics, most infected patients do not show hemorrhagic symptoms, therefore, the case definition for suspected or confirmed case does not include it. *Probable case:* A suspected case (alive or dead) evaluated by a clinician or surveillance team having an epidemiological link with a confirmed case. *Confirmed case:* A suspected case with laboratory confirmation (positive IgM antibody, positive PCR or viral isolation).
Respond to alert threshold	If a single case is suspected: • Report case-based information immediately (phone or text with information from generic case investigation form) to the appropriate levels. • Collect specimen to confirm the case(s). Carefully complete specimen request form and mark containers to warn laboratory of risk. • Suspected cases should be isolated from other patients and strict barrier nursing techniques implemented. Eliminate body fluid exposure and wear VHF appropriate PPE. • Standard precautions should be enhanced throughout the healthcare setting. • Conduct case-contact follow-up (using case investigation form) and active case search for additional cases. Begin contact tracing (see contact tracing forms) • Begin or enhance death reporting and surveillance.
Respond to action threshold	If a single case is confirmed: • Maintain strict VHF infection control practices throughout the outbreak. Refer to the VHF Infection control practices for Liberia called “Keep Safe Keep Serving”. • In the event of an outbreak. Refer to Section 6 of these guidelines about response as well as the Liberian National Epidemic Preparedness and Response Plan for standard operating procedures for infection control, border controls, social distancing, and safe and dignified burial practices. • Honest reporting of symptoms and contacts in community is essential to contain the outbreak. Therefore, mobilize the community for early detection and care of cases and conduct community education about how the disease is transmitted and how to implement infection control in the home care setting and during funerals. Consider social distancing policies. • Psychosocial support for family, community, and staff. • Begin screening procedures for fever and VHF-like symptoms at the entrances to health care facilities with hand washing. • Establish isolation ward (ETU) to handle additional suspect and confirmed cases that may come to the health centre. • Conduct case contact follow-up and active searches for additional cases that may not come to the health care setting. • Quarantine high-risk contacts with home support during the incubation period. Low risk contacts under daily follow-up should be encouraged to limit their movements • In the case of an outbreak, population movements can contribute to the spread of

	infection to non-affected areas. • No licensed vaccines are available yet, but two potential vaccines are undergoing human safety testing for Ebola and may be used in the event of an outbreak in a "ring vaccination" approach and for health care workers. • Begin surveillance and screening of dead bodies including: any individual aged 5 years or more, dying within 14 days of symptom onset from an indeterminate cause, OR still births.) Request additional help from other levels as needed. National level will notify WHO per International Health Regulations.
Analyze and interpret data	Person: Implement immediate case-based reporting of cases and deaths. Line list of contacts. Analyze age and sex distribution. Assess risk factors and plan disease control interventions accordingly. Time: Graph cases and deaths daily/weekly. Construct an epidemic curve during the outbreak. Place: Map locations of cases' households and their movements during incubation period.
Laboratory confirmation	Diagnostic services for EVD and MVD are not routinely available in all laboratories. See Annex 5E which includes a list of reference laboratories that confirm priority diseases. Test results usually take 2 days after the specimen arrives at the laboratory. Diagnostic test In Liberia, RT-PCR for Ebola virus. Other possible diagnostic tests include RT-PCR for Marburg virus and detection of IgM antibody against Ebola virus or Marburg virus. Specimen For viral detection by PCR: Whole blood or post-mortem oral swab. Rapid diagnostic tests (RDT) are being introduced into Ebola outbreak management. Their availability and use will be determined in context. Reactive samples with RDT must be re-tested using RT-PCR. When to collect Collect specimen from all suspected cases, alive or dead, as soon as the case is suspected. How to prepare, store, and transport HANDLE AND TRANSPORT SPECIMENS FROM SUSPECTED VHF PATIENTS WITH EXTREME CAUTION. WEAR PROTECTIVE CLOTHING AND USE BARRIER PRECAUTIONS. See Annex 6Dfor Infection Prevention and Control procedures. For PCR: Whole blood into an EDTA purple top tube Post-mortem oral swab placed into viral transport medium For ELISA: Blood sample into red top tube for serum For RDT: Post-mortem oral swab tested on-site Store specimens at refrigerated (4-8°C) temperatures Package to prevent breakage and leaks Transport in well-marked container at 4-8°C
Case Management	• Suspect cases should be isolated and treated for more common conditions with similar symptoms, in particular malaria, typhoid, fever, louse-borne typhus, relapsing fever or leptospirosis. • Avoid nosocomial transmission by strict implementation of barrier nursing. If barrier nursing material is not available, avoid any invasive procedure (e.g. blood sampling,

	injections, placement of infusion lines, or nasogastric tubes) and put on at least one layer of gloves for any direct contact with the patient; double gloving is advised during invasive procedures (e.g., surgery) that poses an increased risk for blood exposure. • Standard droplet and contact precautions with eye protection for the duration of illness • Fluid-resistant gowns. • Confirmed patients with VHF should be in an isolation ward. • There is no specific treatment for either disease. Severe cases require intensive supportive care, as patients are frequently dehydrated and in need of intravenous fluids or oral rehydration with solutions containing electrolytes. • For EVD, a range of potential treatments including blood products, immune therapies and drug therapies are currently being evaluated.
Resources	• Infection prevention and control guidance for care of patients in health-care settings, with focus on Ebola Interim guidance. Dec 2014. WHO/HIS/SDS/2014.4 Rev.1 http://www.who.int/csr/resources/publications/ebola/filovirus_infection_control/en/ • WHO Fact Sheet Ebola No. 103. January 2016-0216 http://www.who.int/mediacentre/factsheets/fs103/en/ • WHO Fact Sheet, Marburg haemorrhagic fever, revised March 2012 http://www.who.int/mediacentre/factsheets/fs_marburg/en/ • Case definition recommendations for Ebola or Marburg Virus Diseases. August 2014. http://www.who.int/csr/resources/publications/ebola/ebola-case-definition- contact-en.pdf • WHO recommended Guidelines for Epidemic Preparedness and Response: Ebola Haemorrhagic Fever (EHF). WO/EMC/DIS/97.7. • Emergency guidance: surveillance strategy during Phase 3 of the Ebola response. 2015. WHO/EVD/Guidance/Sur/15.1 http://apps.who.int/iris/handle/10665/192997

11.24 Yaws and endemic syphilis or bejel

Background	• Endemic trepanometoses in the WHO African Region include two Neglected Tropical Diseases caused by two different sub species of *Treponema pallidum (T.p.):* yaws, due to *T. p. pertenue* and bejel caused by *T. p. pallidum* • Yaws initially presents as a papilloma teemed with bacteria (primary yaws). The papilloma is a typical presentation of yaws and clinical diagnosis is straightforward. Without treatment, the papilloma will ulcerate. Papilloma and ulcers are very infectious and in the absence of treatment can quickly spread to other persons. Other clinical forms of yaws exist but they are not very infectious. Apart of papilloma and ulcers, other lesions of yaws and bejel range from macules, papules, nodules, plaques to secondary yaws that occurs weeks to months after the primary infection and typically presents with multiple raised yellow lesions or pain and swelling of long bones and fingers (dactylitis). • Yaws spreads in inter-tropical areas, in humid and warm zones such as equatorial rain forests and their surroundings, while bejel is found in most dry and arid regions such as the Sahel trip • Children from 2 to 14 years old are the most affected age-group, especially in school-age children where outbreaks of yaws or bejel could be observed • Yaws treatment which was based on single injection of long-lasting penicillin (benzathine benzyl penicillin) has improved greatly by the confirmation of the efficacy of a single dose of Azithromycin for curing yaws lesion in 2010. Further to this confirmation, the WHO has designed a yaws eradication strategy, titled "The Morges Strategy" from the name of a city near Geneva, where the Strategy was drafted in 2012. This eradication strategy consists mainly in mass administration of azithromycin (MAA) to at-risk communities and achieving at least 90% coverage of targeted populations • The mode of transmission is through direct contact with skin lesions or items already contaminated by primary lesions (papilloma and ulcers) • Confirmation of diagnosis is done by dual treponemal and non-treponemal rapid tests, a syphilis test which is not specific for yaws followed by a dual path platform (DPP) test which is specific for *T. p; pertenue*. These rapid tests can be performed in the fields and are able to detect recent and past infections
Surveillance goal	Yaws is targeted for eradication by 2020, eradication being defined as complete interruption of transmission (zero new case of yaws) globally. The surveillance goals are to 1) ensure detection of any new case of yaws in a given area for implementing the eradication strategy and 2) after stopping transmission, maintain active case search for at least three years to certify yaws eradication
Standard case definition	*Suspected case*: a person with a history of residence in an endemic area (past or present) who presents with clinically active (visible) yaws lesions Confirmed case: a suspected case with a positive serological test (rapid treponemal test for syphilis confirmed by DPP test) *Imported case:* a person who presents with clinically active yaws serologically confirmed in an area where yaws is not known to be endemic *Index case*: first case of yaws which is detected in a community *Contact of a case:* a person who has close, frequent contact with the infected person. A contact for the purpose of yaws eradication is the household, classmates or close playmates as identified by the contact
Respond to alert threshold	If a single case is suspected: • Report the suspected case to the appropriate level of the health system (peripheral health facility or health district) for serological confirmation and exclusion of imported case.

	If the suspected case is not confirmed: • Maintain surveillance for three years during the post-elimination of transmission period
Respond to action threshold	If a single case is confirmed and importation excluded: • The area is confirmed endemic and eradication strategy is implemented If a single case is confirmed and is an imported case: • Treat the case and his contacts as identified by the case and re-start post-elimination of transmission surveillance for again a three-year period
Analyze and interpret data	Time: Graph of cases by year of diagnosis, graph of cumulative number of cases. Place: Plot cases by location of households and color shade endemic districts Person: Count newly detected cases which were treated and number of contacts identified and treated Estimate the number of persons in endemic communities or districts and calculate treatment coverage of Mass Azithromycin Administration (at least 90%)
Laboratory confirmation	Diagnostic test Positive rapid Syphilis test confirmed by positive dual path platform (DPP) test Specimen Blood from finger stick for serological tests Swab samples from papilloma and ulcerated lesions for PCR When to collect Specimens should be collected from suspected patient with clinical symptoms (papilloma and ulcers mainly How to prepare, store, and transport During collection of specimen for PCR test, it is important to avoid cross contamination between the collection of samples Materials: Dry swabs and recipients. Types of specimens: swabs from papilloma and ulcers, stored at 4°C Results Positive Rapid Syphilis test and positive DPP test Positive PCR for Treponema pallidum pertenue for yaws or Treponema pallium pallidum for bejel Evidence of causative organisms in histo-pathological samples
Resources	• Global epidemiology of yaws: systematic review. Mitjà O, Marks M, Konan DJ et al. Lancet. 2015 Jun;3(6):e324-31. doi: 10.1016/S2214-109X(15)00011-X. http://www.ncbi.nlm.nih.gov/pubmed/26001576 • Haemophilus ducreyi as a cause of skin ulcers in children from a yaws-endemic area of Papua New Guinea: a prospective cohort study. Mitja O, Lukehart SA, Pokowas G, et al. Lancet Global Health 2014; 2: e235-241 http://www.thelancet.com/journals/langlo/article/PIIS2214-109X%2814%2970019-1/abstract • Sensitivity and specificity of a rapid point-of-care test for active yaws: a comparative study. Ayove T, Houniei W, Wangnapi R et al. Lancet global health 2014; 2 (7): e415-e421 http://www.thelancet.com/journals/langlo/article/PIIS2214-109X%2814%2970231-1/abstract • Molecular differentiation of Treponema pallidum subspecies in skin ulceration clinically suspected as yaws in Vanuatu using real-time multiplex PCR and serological methods. Chi KH, Danavall D, Taleo F, Pillay A, Ye T, Nachamkin E, et al. Am J Trop Med Hyg. 2015 Jan;92(1):134-8. doi: 10.4269/ajtmh.14-0459. Epub 2014 Nov 17.

	http://www.ncbi.nlm.nih.gov/pubmed/25404075 • Mass Treatment with Single-Dose Azithromycin for Yaws.br/> Mitjà O, Houinei W, Moses Penias, Kapa A, Paru R, Hays R et al. New England Journal of Medicine. 2015;372-8. http://www.nejm.org/doi/pdf/10.1056/NEJMoa1408586 • Challenges and key research questions for yaws: eradication. Marks M, Mitjà O, Vestergaard LS, Pillay A, Knauf S, Chen CY et al. Lancet Infect Dis. 2015 October ; 15(10): 1220–1225. doi:10.1016/S1473-3099(15)00136-X http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4668588/pdf/emss-66182.pdf • Eradicating successfully yaws from India: The strategy & global lessons. Jai P. Narain, S.K. Jain, D. Bora, and S. Venkatesh. Indian J Med Res. 2015 May; 141(5): 608–613. doi: 10.4103/0971-5916.159542 http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4510759/ • Eradication of yaws – The Morges Strategy Weekly Epidemiological Record, 20, 2012, 87: 189-200 • Infection prevention and control guidance for care of patients in health-care settings, with focus on Ebola Interim guidance. Dec 2014. WHO/HIS/SDS/2014.4 Rev.1 http://www.who.int/csr/resources/publications/ebola/filovirus_infection_control/en/ • WHO Fact Sheet Ebola No. 103. January 2016-0216 http://www.who.int/mediacentre/factsheets/fs103/en/ • WHO Fact Sheet, Marburg haemorrhagic fever, revised March 2012 http://www.who.int/mediacentre/factsheets/fs_marburg/en/ • Case definition recommendations for Ebola or Marburg Virus Diseases. August 2014. http://www.who.int/csr/resources/publications/ebola/ebola-case-definition- contact-en.pdf • WHO recommended Guidelines for Epidemic Preparedness and Response: Ebola Haemorrhagic Fever (EHF). WO/EMC/DIS/97.7. • Emergency guidance: surveillance strategy during Phase 3 of the Ebola response. 2015. WHO/EVD/Guidance/Sur/15.1 http://apps.who.int/iris/handle/10665/192997

11.25 Yellow Fever

Background	• Acute viral hemorrhagic disease caused by a flavivirus transmitted in urban settings in a human-mosquito-human transmission cycle via the domestic species of Aedes mosquitoes (Urban epidemics) or in forested areas in a zoonotic cycle with humans replacing the usual non-human primate [NHP]-mosquito-NHP transmission cycle (Sylvatic cycle). • This is a vaccine preventable disease. • Large scale outbreaks occur every 3 to 10 years in villages or cities in the absence of large-scale immunization. Sporadic cases can occur regularly in endemic areas. Resurgence of disease in Africa since mid-1980s. True incidence far exceeds reported cases. • Incubation period 3 to 6 days after the bite from an infected mosquito. About 15% of infections progress to fever and jaundice. • While only the minority of cases are severe, case fatality rate may be 25% to 50% among patients with syndrome of hemorrhage, jaundice, and renal disease. • Risk factor: sporadic cases often linked to occupation or village location near woods or where monkeys are numerous. Also non-vaccinated persons. • International reporting to WHO required within 24 hours. • Viral hemorrhagic fevers (VHF) including dengue hemorrhagic fever, EVD and MVD and other parasitic (such as malaria), viral (such as Zika virus, chikungunya, heptatis A-E, Epstein-Barr virus, West Nile virus), or bacterial diseases (such as leptospirosis, rickettsial diseases, gastro-intestinal and septicemic anthrax), and toxic exposures may mimic yellow fever. • Infection and disease can be prevented by vaccination. With a vaccine efficacy > 95% and duration of immunity of at least 10 years. See Annex 9M for the IDSR line list during an outbreak.
Surveillance goal	• Seek confirmation of yellow fever and rule out other possible etiologies of fever with jaundice • Provide information in order to adopt appropriate control measures • Identify populations at risk of yellow fever • Monitor the epidemiology of the disease and the impact of control measures • Support operational research and innovation
Standard case definition	*Suspected case:* Any person with acute onset of fever, with jaundice appearing within 14 days of onset of the first symptoms. *Probable case*: A suspected case AND one of the following: • Epidemiological link to a confirmed case or an outbreak • Positive post-mortem liver histopathology • Presence of yellow fever IgM antibody in the absence of yellow fever immunization within 30 days before onset of illness *Confirmed case:* A probable case and absence of yellow fever immunization within 30 days before onset of illness; and one of the following: • Detection of YF-specific* IgM • Detection of four-fold increase in YF IgM and/or IgG antibody titres between acute and convalescent serum samples • Detection of YFV-specific* neutralizing antibodies OR one of the following: • Detection of YF virus genome in blood or other organs by PCR • Detection of YF antigen in blood, liver or other organs by immunoassays • Isolation of the yellow fever virus

	*YF-specific means that antibody tests (such as IgM or neutralizing antibody) for other prevalent flavivirus are negative. This testing should include at least IgM for Dengue and West Nile and may include other flavivirus depending on local epidemiology.
Respond to alert threshold	If a single case is suspected: • Fill out Alert notification form, include clinical information, check vaccination history and travel history • Take blood specimen for laboratory confirmation. You may obtain convalescent specimen from patient(s). • Treat patient(s) with supportive care. • Notify immediately to the next level. In the case of probable case inform nearby health units • Strengthen surveillance (apply the community case definition, i.e., fever and jaundice) • Initiate a preliminary field investigation if cluster of cases with fever and jaundice. Obtain information to determine source of infection. Determine vaccination coverage of the community and start planning for vaccination (in case of a cluster) • Strengthen routine yellow fever immunization
Respond to action threshold	In addition to alert threshold response If a single case is confirmed: • Continue / complete epidemiological investigation including screening for vaccination status • Initiate entomological investigation if indicated • Determine vaccination coverage in affected area (routine EPI, recent outbreak responses or preventive campaigns) • Initiate social mobilization for interventions selected • Continue risk communication and action to reduce risk including vector control if indicated • Initiate vaccination in affected villages, district or town/city based on epidemiological findings • Notify to WHO through Central Authorities using IHR decision instrument • Continue to strengthen routine yellow fever immunization, especially for hard-to- reach areas
Analyze and interpret data	Time: Generate Weekly Graphs of cases and deaths. During outbreaks, construct epidemic curves (to monitor daily then weekly trends). Place: Plot location of case households and occupation with precise mapping. Person: Report immediate case-based information for cases and deaths. Report summary totals weekly. During outbreak, count cases and deaths daily as they occur, then weekly when the epidemic matures or ends. Analyze by person variables (age, sex, occupation…). Assess risk factors to improve prevention of sporadic outbreaks.
Laboratory confirmation	Diagnostic test ELISA for the presence of yellow fever Specific IgM antibodies. Exclusion of Dengue, West Nile virus, Zika virus, and other locally prevalent flavivirus will be necessary for the confirmation of yellow fever. PCR, YF specific seroneutralization, virus isolation or histopathology Specimen Serum in the acute and convalescent phases of the illness; In the event of death, postmortem liver specimen.

	When to collect the specimen • Within 14 days of onset of first symptoms • Collect specimen from at least the first to 10th suspected cases of yellow fever. Collect specimen from last cases (based on epidemic curves) to decide on the end of the epidemic. How to prepare, store, and transport the specimen • Collect 10 ml of blood from adults, 1-5 ml from children a red top tube. • Store sample at 4-8°C. • Transport specimen using appropriate packaging to prevent breaking or leaks during transport. • The specimen should arrive at the laboratory within 3 days of being collected. • Avoid shaking of specimen. • Transport in a well-marked container at 4-8°C Results Laboratory results should be received within 7 days of reception of the specimen in the laboratory.
Resources	• District guidelines for yellow fever surveillance. WHO 1998 WHO/GPVI/EPI/98.09 • Yellow Fever. 1998. WHO/EPI/Gen/98.11 • Recommendation of Expert Meeting on Yellow Fever Surveillance and Response in • http://www.who.int/csr/disease/yellowfev/case-definition/en/

11.26 Unexplained Cluster of Health Events or Deaths

Background	Many public health events that have shaped history started at the local level as an outbreak, spread with travel, and were due to unknown causes until they were later explained. It is the willingness to call an alert about uncertain and worrying events that is the sign of a functional public health system.
	
	By their nature these events cannot be precisely described but scenarios have been used to help illustrate what might raise concern. The IHR regulations contain a "decision instrument" to guide WHO members (Refer to Annex 2A of these guidelines). A "yes" answer to any two of the following four questions means that an event potentially constitutes a public health emergency of international concern that the WHO member must notify to WHO: (1) Is the public health impact of the event serious? (2) Is the event unusual or unexpected? (3) Is there a significant risk of international spread? (4) Is there a risk of restrictions on international travel or trade?
	
	The report that there is a possible outbreak or unusual event may come from different sources including:
	• routine analysis of surveillance data (e.g. from routine reporting indicates an unexpected increase in cases of a notifiable disease
	• a health worker (doctor, nurse or CHA, Environmental health Technician (EHT)) who reports a cluster of patients with a certain disease at their HCF or in the community
	• a community leader who notices an unusual health event in their community and reports it to the authorities
	
	Continued reporting of these events from the local level are contingent on the willingness of the district, County and National levels to listen and give credibility to the local levels. The responsiveness of the system to these triggers will define the likelihood that they will be reported and vigilance continues.
	
	A literature review into the important obstacles for reporting Public Health Events of International concern found the following:
	• Lack of knowledge among clinicians of the reporting process, including not knowing what diseases are reportable and not knowing what to report. Often there is confusion over who is responsible for reporting between the hospital and laboratory as well as confusion over whether laboratory confirmation is required prior to reporting.
	• A lack of understanding of how information acquired through reporting is used and a perception that reporting diseases is a useless endeavor.
	• The effect of actual or perceived negative consequences associated with reporting, such as extra work, intrusive requests for further information, media attention, judgment, punishment or blame, was stressed as an obstacle by multiple respondents.
	
	Strategies to enhance completeness of notifiable disease reporting and IHR events include the following:
	• Provide clear information to frontline staff about
	  • Why report unusual events?
	  • What events are reportable?
	  • How to report an unusual event?

	• What happens after you report? • Examples of event reporting • Strengthen the ability to ask questions and get immediate feedback between clinicians and other key partners to encourage more complete reporting, such as by providing access to public health professionals in the case of emergencies and establishing a 24-hour toll free phone number for reporting. More frequent field visits or phone conferences can help as well. • Feedback to clinicians and others in the reporting chain, showing them that preventative action is being taken as a result of their notification, helps emphasize the need for timely and complete reporting. Providing feedback to those reporting could increase trust and transparency in the exchange of information about unusual events, improve the perception of how reported information is used and demonstrate the consequences of not reporting • All surveillance is built on good personal relationships or knowledge of the individuals involved in reporting. Encourage relationship building. How reported information is handled: The IHR has national focal points that contact their counterparts at WHO regional offices. These regional offices enter epidemiological and other information necessary for risk analysis and management into an event management system that stores the information and makes it available. Feedback to countries through a national IHR focal point completes the reporting link and, if countries require support in outbreak response, a request is transmitted back to the WHO. This most recent guidance from WHO/AFRO focuses on Public Health Events (PHE) of initially unknown etiology, which are PHEs for which the cause has not yet been determined. For such events, the One Health approach is recommended, where the ministry of health works in close collaboration with other ministries and multisectoral partners to enhance teamwork and improve efficiencies in preparedness, response, and monitoring and evaluation (M&E). See Annex 9M for the IDSR line list during an outbreak. Forms may be developed for specific investigations.
Surveillance goal	• The assessment of whether an event may potentially be of international significance occurs at the national level, guided by Annex 2 of the IHR (2005) which is not intended to be used sub-nationally. • In this definition of an “event” or death sensitivity is prioritized to facilitate reporting and to reduce delays, emphasizing the fact that there should be no negative consequences for a potentially false signal. • Detect cases. • Immediate case-based reporting of all cases. Weekly summary reporting of cases for routine surveillance and outbreaks.
Standard case definition	*These events are not well detailed or standardized at this time*. In the IHR 2005 two events were chosen to help guide the surveillance functionality and allow early detection and response. • Unexplained deaths • Clusters of illness *Community Alert Triggers* Unknown health problems grouped together. Any health problem that you don’t know about that is happening to many people or animals in the same

	community. Examples include: • *any outbreak or cluster*: A group of people are sick (or die) with similar symptoms in one place (community, school, or health facility) at the same time • *any unusual death or cluster of deaths*: two or more people die of unknown cause after suffering from similar symptoms in one place (e.g. village, school, or HCF) at the same time • a group of people that become sick or have another unusual reaction after consuming the same food or drinking from the same water source • any person that becomes sick with symptoms that have not seen before or not seen for a long time (e.g. an emerging infectious disease is suspected) • community member(s) become sick around the time that animals are sick or die in their village • Sick or dead animals of unknown cause *Health Facilities* The proposed definition for events to be reported by clinicians and health care facilities is: "Any outbreak of disease, OR any uncommon illness of potential public health concern, OR any infectious or infectious-like syndrome considered unusual by the clinician, based on frequency, circumstances of occurrence, clinical presentation, or severity". Any infectious or infectious-like syndrome considered unusual by the clinician based on: • Frequency- e.g., a sudden unexplained, significant increase in the number of patients, especially when it occurs outside the normal season. • Circumstances of occurrence – e.g., many patients coming from the same location or participating in similar activities. • Clinical presentation- e.g., a patients health rapidly deteriorating out of proportion to the presenting symptoms and diagnosis. • Severity – e.g., a number of patients failing to respond to treatments. • Patient with history of exposure to animals (wild or domestic) that presents with unusual clinical presentation The proposed definition of a reportable event for laboratories is: • "Any situation considered unusual related to received samples (frequency, circumstances of occurrence or clinical description) OR test results (unexpected number of the same species/subspecies, strain type/subtype or antimicrobial resistance pattern, or failure/uncertainty in diagnostics)".
Respond to alert threshold	If a single unexplained death or cluster of deaths or illness is suspected: • Report the suspected case or cases immediately using IDSR alert form • Begin active surveillance • Conduct a case-based investigation. • Notice events that cluster by person, place or time that are of concern
Respond to action threshold	If a case is validated by DHO/CHO: The County or national level will decide which actions to take. They may include the following response measures for routine outbreaks until RRT's may be involved. See Section 6 of these IDSR guidelines. • Infection control measures using standard precautions among cases and with health workers.

	• Safe and dignified burial • If animals are involved, communicate and coordinated with County Livestock Officer or Ministry of Agriculture official
Analyze and interpret data	Time: Track onset of illness or symptoms and time (date) of death. Place: Plot location of cases by household and community. Investigate the circumstances and possible modes of transmission in each case thoroughly. Examine the possibility of other involved areas. Look for environmental associations. Establish if there is a travel history. Plot cases on a map and look for clusters or relationships between the location of the cases and the health event being investigated Person: Count cases and track demographic factors. Analyze age distribution, occupational association and recent exposures. Assess risk factors.
Laboratory confirmation	Diagnosis of public health events of international concern including unexplained death and clusters of illness are made by their appearance or after considering other more familiar options. There is no specific test that can be done.
Resources	• MacDonald et al.: Detection of events of public health importance under the international health regulations: a toolkit to improve reporting of unusual events by frontline healthcare workers. BMC Public Health 2011. 11:713. • International Health Regulations 2005 http://www.who.int/ihr/9789241596664/en/ 2nd edition. ISBN: 9789241580410 • Public health events of initially unknown etiology: A framework for preparedness and response in the African Region. WHO Regional Office for Africa, 2014. ISBN: 978 929023 2476 (NLM Classification: WA 105)

Annexes

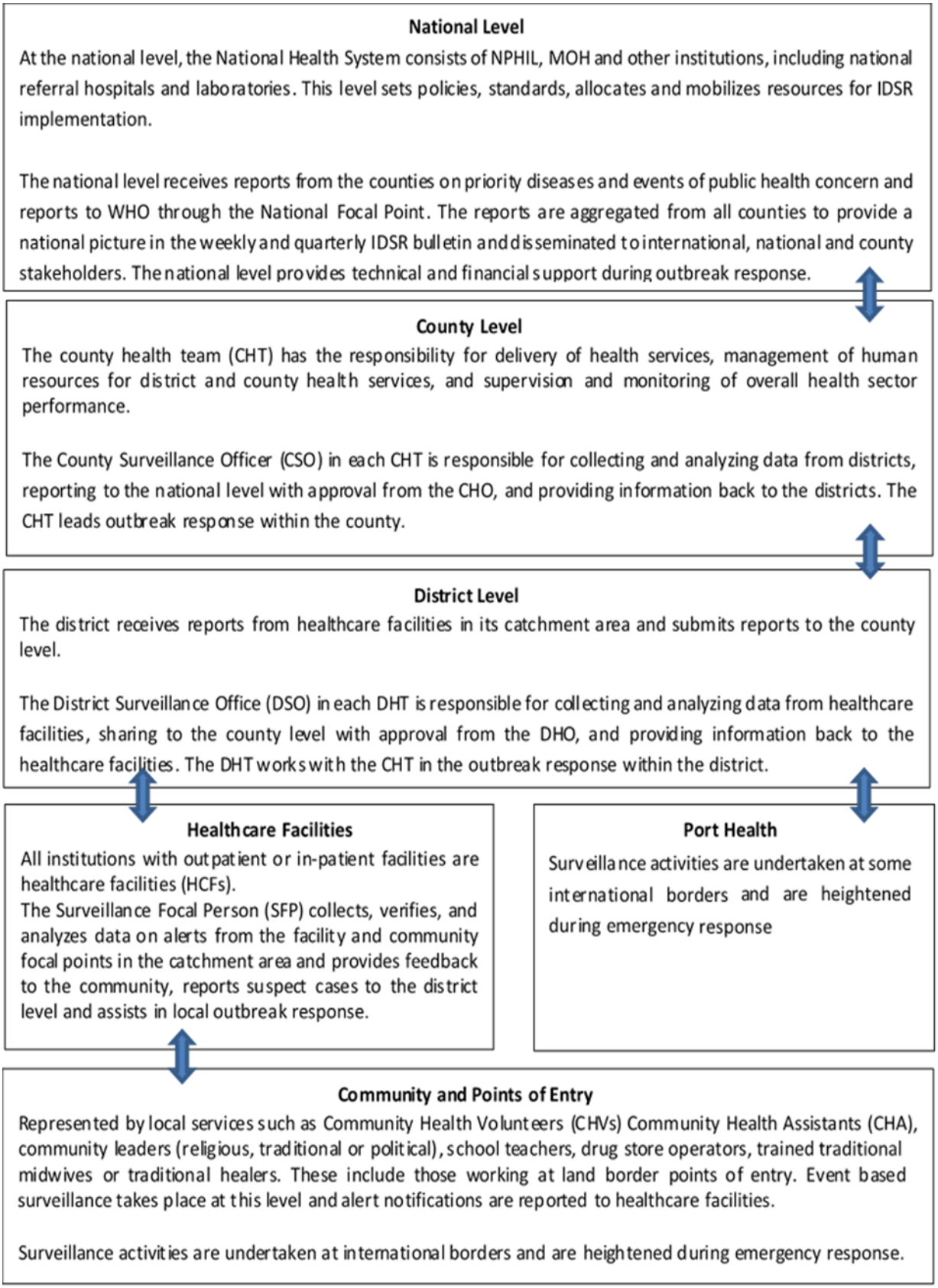
Annex 1A: Priority reportable diseases, conditions, and events, Liberia 2021

Immediately reportable epidemic prone diseases/conditions and events	Diseases or events of international concern that are notifiable under IHR 2005	Monthly reportable diseases or conditions of public health importance
1. Acute Bloody Diarrhea (*Shigella*) 2. Acute Flaccid Paralysis (AFP) 3. Burili ulcer 4. Cholera (Severe Acute Watery Diarrhea (AWD)) 5. Coronavirus Disease (COVID-19) 6. Dengue fever 7. Human Rabies 8. Lassa Fever 9. Maternal Deaths Measles 10. Meningitis[1] 11. Monkeypox 12. Neonatal Deaths 13. Neonatal Tetanus 14. Tuberculosis 15. Viral Hemorrhagic Fevers (including Ebola Virus Disease and Marburg Virus Disease) 16. Yaws 17. Yellow Fever 18. Unexplained cluster of health events 19. Unexplained cluster of deaths 20. Adverse events following immunization (AEFI)*	1. Guinea Worm (Dracunculiasis) 2. Human Influenza (due to a new subtype) 3. Severe Acute Respiratory Syndrome (SARS) 4. Smallpox 5. Other PHEIC include: infectious, zoonotic, food borne, chemical, radio nuclear, or due to unknown condition	1. Acute Watery Diarrhea 2. Acute Viral Hepatitis 3. Adverse Events Following Immunization (AEFI) 4. Cataract 5. Diabetes 6. Diarrhea with dehydration in <5 years 7. Encephalitis 8. Epilepsy 9. HIV/AIDS (new cases) Hypertension 10. Hookworm 11. Injuries (Road Traffic Accidents (RTAs), domestic violence) 12. Malaria 13. Malnutrition < 5 years 14. Mental Health 15. Onchocerciasis 16. Pertussis (Whooping cough) Severe Pneumonia <5 years Schistosomiasis 17. Sexual Assault 18. Sexually Transmissible Infections (STIs) 19. Trachoma 20. Trypanosomiasis 21. Tuberculosis 22. Typhoid Refer to Health Management Information Systems monthly reporting tools (DHIS2)

Note: Disease specific summary pages are available in section 11 of this guide.

[1] Includes *Hemophilus influenzae* type b (Hib), *Neisseria meningitidis*, and *Streptococcus pneumoniae*)

Annex 1B: IDSR flow of information at each level of Liberia's public health system



Annex 1C: Required surveillance and response core capacities as described in the international Health Regulations

According to IHR, member states shall use existing national structures and resources to meet their core capacity requirements. These requirements include capacity for surveillance, reporting, notification, verification, response, and collaboration activities. Each part is expected to assess the ability of existing national structures and resource to meet the minimum requirements. Based on the results of the assessment, each member state should develop and implement action plan to ensure that these core capacities are present and functioning throughout the country.

Annex 1 Part A of the IHR (2005) defines the core capacity requirements for surveillance and response. The regulations recognize the following three levels of the health care system:

- Community or primary public health response level
- Intermediate public health response levels
- National level

Community or Health facility level response

At the local community level and health facility level, the capacities are:

- To detect events involving disease or death above expected levels for the particular time and place in all areas within the country
- To report all available essential information immediately to the appropriate level of healthcare response. At the community level, reporting shall be to local community health- care institutions or the appropriate health personnel. At the primary public health response level, reporting shall be to the intermediate or national response level, depending on organizational structures.
- To implement preliminary control measures immediately.

For the purposes of these guidelines, essential information includes the following:

- Clinical descriptions
- Laboratory results
- Sources and type of risk
- Numbers of human cases and deaths
- Conditions affecting the spread of the disease and the health measures employed

Intermediate public health response levels – District and County Level

The international Health Regulations are implemented through IDSR in Liberia. Detailed information about the core capacity requirements and functions of the district and county levels in Liberia is described in the surveillance matrix. Refer to Annex A. Enabling the IHR functions of prevent, detect, respond to be fulfilled. This intermediate level is the liaison between the community, health facilities, and National level.

The core capacity requirements at intermediate levels are the following:

- to confirm the status of reported events and to support or implement additional control measures; and

- to assess reported events immediately and, if found urgent, to report all essential information to the national level. For the purposes of this Annex, the criteria for urgent events include serious public health impact and/or unusual or unexpected nature with high potential for spread

National Level: Assessment and notification

The response at national level consists of two functions - assessment and notification:

- Assessment of all reports of urgent events within 48 hours; and
- Notification to WHO immediately through the National IHR Focal Point when the assessment indicates the event is notifiable under paragraph 1 of Article 6 of IHR and the decision instrument for the assessment and notification of events that may constitute a PHEIC in Annex 2 of IHR and to inform WHO as required pursuant to Article 7 and paragraph 2 of Article 9 of these Regulations.

At the national level, the public health response requires the capacity to:

- determine rapidly the control measures required to prevent domestic and international spread;
- provide support through specialized staff, laboratory analysis of samples (domestically or through collaborating centers) and logistical assistance (e.g. equipment, supplies and transport);
- provide on-site assistance as required to supplement local investigations;
- provide a direct operational link with senior health and other officials to approve rapidly and implement containment and control measures;
- provide direct liaison with other relevant government ministries;
- provide, by the most efficient means of communication available, links with hospitals, clinics, airports, ports, ground crossings, laboratories and other key operational areas for the dissemination of information and recommendations received from WHO regarding events in the State Party's own territory and in the territories of other States Parties;
- establish, operate and maintain a national public health emergency response plan, including the creation of multidisciplinary/multisectoral teams to respond to events that may constitute a public health emergency of international concern; and
- provide the foregoing on a 24-hour basis.

During several consultations at global level the core capacities were summarized into eight components: legislation; policy and coordination; surveillance; preparedness; response; risk communications; laboratory; and human resources. These eight components are all important for IDSR as well.

Annex 1D: International Health Regulations capacities

Capacities	Indicators
National Legislation, Policy and Financing	P.1.1 Legislation, laws, regulations, administrative requirements, policies or other government instruments in place are sufficient for implementation of IHR.
	P.1.2 The state can demonstrate that it has adjusted and aligned its domestic legislation, policies and administrative arrangements to enable compliance with the IHR (2005)
IHR Coordination, Communication and Advocacy	P.2.1 A functional mechanism is established for the coordination and integration of relevant sectors in the implementation of IHR.
Antimicrobial Resistance	P.3.1 Antimicrobial resistance (AMR) detection
	P.3.2 Surveillance of infections caused by AMR pathogens
	P.3.3 Healthcare associated infection (HCAI) prevention and control programs
	P.3.4 Antimicrobial stewardship activities
Zoonotic Disease	P.4.1 Surveillance systems in place for priority zoonotic diseases/pathogens
	P.4.2 Veterinary or Animal Health Workforce
	P.4.3 Mechanisms for responding to zoonoses and potential zoonoses are established and functional
Food Safety	P.5.1 Mechanisms are established and functioning for detecting and responding to foodborne disease and food contamination.
Biosafety and Biosecurity	P.6.1 Whole-of-Government biosafety and biosecurity system is in place for human, animal, and agriculture facilities
	P.6.2 Biosafety and biosecurity training and practices
Immunization	P.7.1 Vaccine coverage (measles) as part of national program
	P.7.2 National vaccine access and delivery
National Laboratory System	D.1.1 Laboratory testing for detection of priority diseases
	D.1.2 Specimen referral and transport system
	D.1.3 Effective modern point of care and laboratory-based diagnostics
	D.1.4 Laboratory Quality System
Real-Time Surveillance	D.2.1 Indicator and event-based surveillance systems
	D.2.2 Inter-operable, interconnected, electronic real-time reporting system
	D.2.3 Analysis of surveillance data
	D.2.4 Syndromic surveillance systems
Reporting	D.3.1 System for efficient reporting to WHO, FAO and OIE
	D.3.2 Reporting network and protocols in country
Workforce Development	D.4.1 Human resources are available to implement IHR core capacity requirements
	D.4.2 Field Epidemiology Training Program or other applied epidemiology training program in place
	D.4.3 Workforce strategy
Preparedness	R.1.1 Multi-hazard National Public Health Emergency Preparedness and Response Plan is developed and implemented
	R.1.2 Priority public health risks and resources are mapped and utilized.
	R.2.1 Capacity to Activate Emergency Operations
	R.2.2 Emergency Operations Center Operating Procedures and Plans

	R.2.3 Emergency Operations Program
	R.2.4 Case management procedures are implemented for IHR relevant hazards.
Linking Public Health and Security Authorities	R.3.1 Public Health and Security Authorities, (e.g. Law Enforcement, Border Control, Customs) are linked during a suspect or confirmed biological event
Medical Countermeasures and Personnel	R.4.1 System is in place for sending and receiving medical countermeasures during a public health emergency
	R.4.2 System is in place for sending and receiving health personnel during a public health emergency
Risk Communication	R.5.1 Risk Communication Systems (plans, mechanisms, etc.)
	R.5.2 Internal and Partner Communication and Coordination
	R.5.3 Public Communication
	R.5.4 Communication Engagement with Affected Communities
	R.5.5 Dynamic Listening and Rumor Management
Points of Entry (PoE)	PoE.1 Routine capacities are established at PoE.
	PoE.2 Effective Public Health Response at Points of Entry
Chemical Events	CE.1 Mechanisms are established and functioning for detecting and responding to chemical events or emergencies.
	CE.2 Enabling environment is in place for management of chemical Events
Radiation Emergencies	RE.1 Mechanisms are established and functioning for detecting and responding to radiological and nuclear emergencies.
	RE.2 Enabling environment is in place for management of Radiation Emergencies

Annex 2 Tool assessing surveillance

Most countries have used an assessment tool developed by WHO/AFRO to assess their national surveillance, epidemic preparedness and response systems and to identify where improvements are needed. Others have used newly developed tools such as the JEE as a means of assessing country capacity to prevent, detect and respond to public health events. The assessment provides results that can be used to solve problems with resources, quality and timeliness of surveillance data, and use of information. The national strategic plan could also be used as reference while preparing a district-specific action plan. For other countries, which have undergone JEE, the National Action Plan for Health Security can also be used.

The Integrated Disease Surveillance and Response is not proposing the establishment of a new system, but rather providing guidance on how to prepare to conduct surveillance and response activities. However, if the district has the resources and skills to conduct an assessment to document the situation of surveillance and response activities within the district, or wishes to update the district profile, then they may use the checklist below after adapting it to the local context. This tool could guide districts in identifying activities to improve their performance and capacity for disease surveillance and response.

Case and event identification

1. Determine availability and knowledge of standard case definitions for reporting suspected priority diseases and conditions, including events of public health concern.

2. Define the sources of information about health events in the district, including points of contact the community has with health services. For example, list the following sources on a list of district reporting sites:

   (a) Health facilities and hospitals
   (b) Laboratories (including non-public ones: private for profit, military, NGOs, faith-based)
   (c) PoE
   (d) Community health workers (including community animal health workers)
   (e) Community volunteers or focal points (shopkeepers, market women, barbers, farmers, etc.)
   (f) Birth attendants
   (g) Traditional healers
   (h) Rural community leaders who have knowledge of health events in the community (for example, the village elders, traditional healers, school teachers and leaders of faith-based communities)
   (i) Public health officers

(j) Private sector practitioners
(k) Public safety officers from the fire, rescue or police departments
(l) Animal health and veterinary structures and services
(m) Industry, food safety and environmental health laboratories
(n) Mass media, web sites and health news search applications
(o) Others, including NGOs.

It is important to also have and maintain a logbook of rumors to report events and feedback loop to confirm or dispel rumors.

3. Identify surveillance focal points for each source of information. Identify and specify opportunities for community involvement in surveillance of health events.

Reporting

4. Specify the priority events, diseases and conditions for surveillance within the district and those directed by national policy. List diseases that are:

   (a) epidemic prone or events, such as unexplained cluster of illness or deaths, which require immediate reporting;
   (b) targeted for eradication and elimination;
   (c) of public health importance, including non-communicable diseases.

5. For each priority event, disease or condition, review the minimum data elements that health facilities and other sources should report. State when they should be reported, to whom and how. State the information that should be reported from inpatient and outpatient sources. For example, a minimum requirement would be to report all cases and deaths for the selected diseases and conditions.

   (a) State the diseases or conditions that require immediate reporting and communicate the list to health facilities in the district.
   (b) Define the means for reporting data to the district (by phone, form or voice). If there is electronic reporting, do all facilities have access to computers and modems? Specify how electronic reporting should be done and if paper forms will be used to collect data, how transcription will occur from paper to electronic form.
   (c) Define how often the required data should be reported.
   (d) Define a feedback mechanism from district to higher levels (county and district levels).

6. Define the data management tools available in the district and how they should be used in an integrated system. Define how frequently the tools should be used for reporting

diseases, conditions or events. The tools may include:

(a) Case-based surveillance reporting forms;
(b) Diagnostic (if point of care is used) and lab-specimen-based surveillance reporting forms;
(c) Specimen tracking forms/logbooks (within the laboratory) and also forms/logbook for referral of specimens;
(d) Line lists for use in outbreaks while also ensuring comprehensive capture of variable from other non-human sectors;
(e) Contact tracing forms;
(f) Tables for recording summary totals:
    (i) Routine weekly reporting forms
    (ii) Routine monthly reporting forms
    (iii) Routine quarterly reporting forms
    (iv) Graphs for time analysis of data
    (v) Maps for place analysis of data
    (vi) Charts for data analysis by person

7. Periodically update the availability of relevant supplies at each reporting site for conducting surveillance. (Note: If a reporting site has the capacity for electronic reporting, there should be an electronic format that is compatible with the methods used at the district, county and national levels. In most countries, where there is eIDSR, the District Health Information System version 2 (DHIS2) has frequently been used as a data system. If electronic reporting is not available, ensure that the focal points responsible for managing data have a reliable supply of data collection forms, paper, colored pencils, graph paper, and log books.

8. Define mechanism to ensure that data is collected as per given timelines and introduce mechanism for accountability if reports are not submitted on time.

Data analysis

9. Define the data management requirement for each reporting site. For example, develop and disseminate the procedures, including deadlines, so that reporting sites know that they must report each reporting period (for example, monthly).

(a) Tally, compile and report summary totals
(b) Periodically check data quality and eventually clean them
(c) Analyze data: produce weekly/monthly/quarterly/annual summaries in tables,

graphs or maps

(d) Provide some interpretation to the next higher level

(e) Submit data to the next level (SMS, e-mail, fax/case-based forms, and line list)

(f) File and secure back-up copies of the data

(g) Provide feedback and recommendations to the community focal points, all relevant reporting sites and community leaders, and track implementation of recommendations.

10. Decide if current forms address the priorities of integrated disease surveillance and response. For example, do current forms provide the information necessary for detecting problems and signaling a response to priority diseases targeted for surveillance?

11. Gather and present relevant data about your district that can be used to advocate for additional resources for improving surveillance and response activities. (Example: Health workers are able to document an increase in malaria cases; they know that an effective response is available with insecticide-treated bed nets. The DSO used data to show the expected reduction in malaria cases if some of the community's bed net cost could be supported by local businesses).

Investigation and confirmation of suspected cases, outbreaks or events:

12. Describe the laboratory and diagnostic referral network for confirming priority diseases and conditions in the district. For example, list the following:

    (a) Public, private or NGO district facilities which have point-of-care diagnostics or use Rapid Diagnostic Tests laboratory services.

    (b) Public, private or NGO district facilities with reliable laboratory services for confirming priority diseases.

    (c) Prevention, control or special surveillance activities in the district with laboratory access (for example, any HIV sentinel surveillance sites in the district).

13. Describe the methods or mechanism for active case search, and where appropriate, the procedures for searching for contacts.

Preparation for response to outbreaks and other public health events

14. Update the policies of the district RRT so that assessing preparedness becomes a routine agenda item for the team. Refer to Section 5 for composition of the public health emergency RRT.

15. Identify a coordination mechanism which will oversee the meetings for preparedness

and response. Refer to Section 5 on how to formulate a coordination mechanism and the composition of the team, which will lead the response and planning process for meetings. Specify and disseminate schedules for:

(a) meetings to routinely assess preparedness for public response and discuss current problems or activities. Put mechanisms such as reminders in place to ensure that meetings take place as planned;
(b) meetings to discuss outbreak response, including reviewing key recommendations and actions, and status of implementation.

16. For each priority event, disease or condition selected, state the available public response activity and develop a contingency plan for the particular priority event, disease or condition. Identify possible activities and interventions for which the district would require help from outside. Refer to Sections 4, 5, 6 and 9 for key standard elements needed in the preparedness and response activities.

17. For each disease or condition that the district can respond to, specify the target and alert threshold, or analyze results that would trigger an action.

18. Define methods for informing and supporting health workers in the implementation of integrated disease surveillance by:

(a) listing the current opportunities for training health workers in surveillance, response or data management in the district.
(b) coordinating training opportunities between disease programs that take advantage of overlapping skills such as supervision, report writing, budgeting, data analysis, and using data to set priorities.
(c) defining the training needs for each category of health workers, based on supervision, or during response to a particular event. Decide whether this will be an initial training in surveillance and response skills or a refresher training on how to integrate surveillance activities.
(d) establishing indicators of quality (management) performance of health workers and regularly assess the performance of health workers.

19. Describe how communication about surveillance and response takes place between the district and the surveillance focal points and other focal points from animal and other key relevant sectors. Clarify who is responsible for periodic reporting at each level. Include methods such as monthly meetings, newsletters and telephone calls.

20. Review and update feedback procedures and methods between the district, health

facilities and community, as well as between the district and higher levels. Specify the feedback methods and update as necessary:

(a) Bulletins summarizing data reported by health facilities to the district.
(b) Periodic meetings to discuss public health problems and recent activities.
(c) Supervisory visits.

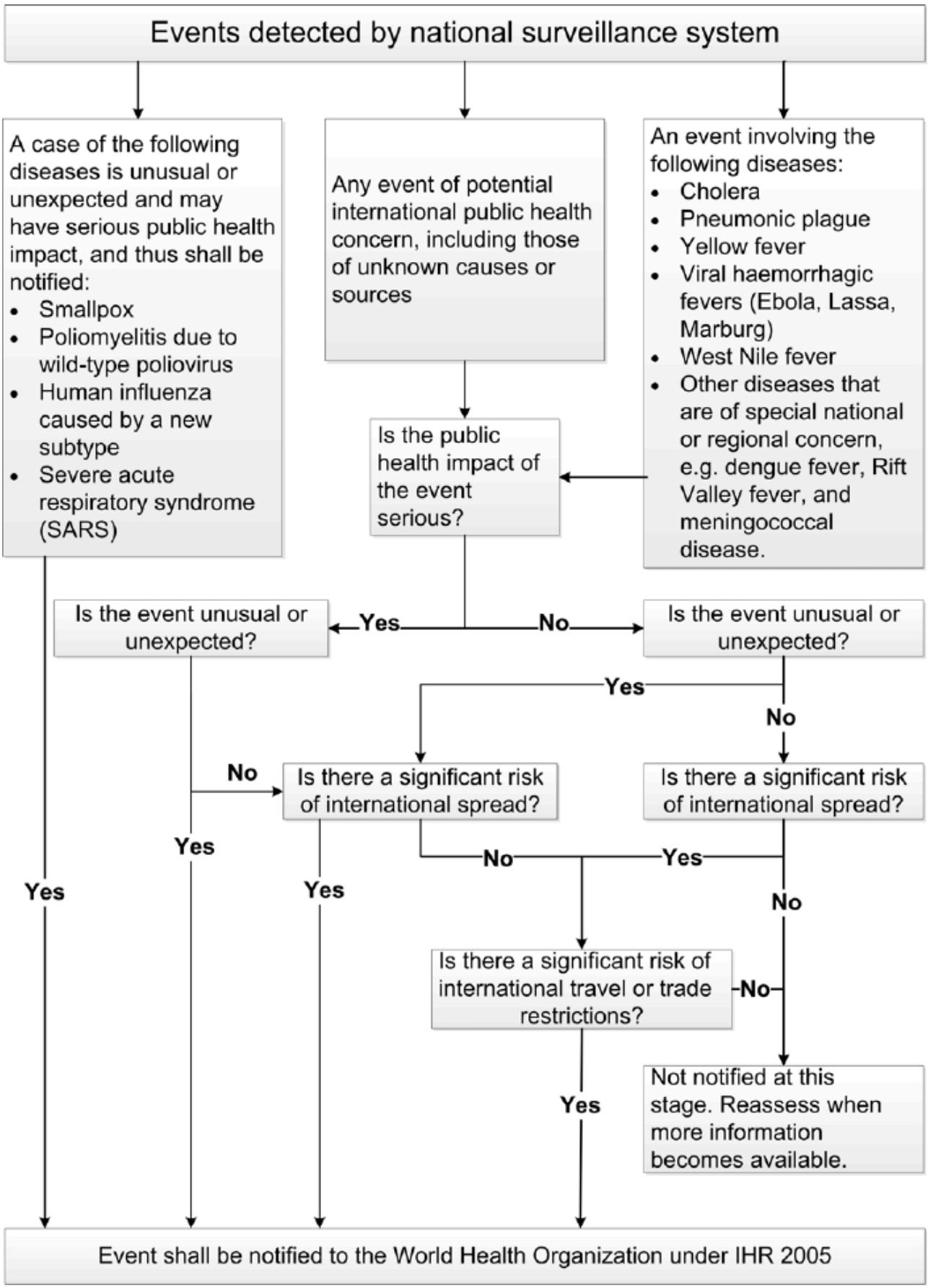
21. Outline the communication mechanism available, including protocols and guidelines for risk communication. Identify a spokesperson and ensure training has been done on required protocols. Develop a mechanism of linkage between the community and health facilities with the epidemic preparedness and response committee that can be activated during an outbreak and for routine activities. Refer to Sections 7.4 of the guidelines on the key elements for risk communication before, during and after the outbreak.

Evaluation and improvement of the surveillance system

22. Decide if additional indicators will be evaluated and plan on how to monitor and evaluate timeliness and completeness of reporting.

23. State three or more objectives you would like to achieve for improving surveillance in your district over the next year, based on evidence.

Annex 2A: International Health Regulations 2005 decision instrument



Annex 2B: Events of potential health concerns requiring reporting to WHO under International Health Regulations (2005)

Surveillance on specific risks

The control or containment of known risks to public health is one of the most powerful ways to improve international public health security. The threat posed by known risks constitutes the vast majority of events with a potential to cause public health emergencies that fall within the scope of the International Health Regulations (2005). There are control programs which address infectious diseases and food and environmental safety and contribute significantly to the WHO global alert and response system.

Environmental hazards include, but are not limited to:

(a) Chemicals
(b) Food
(c) Ionizing radiation
(d) Non-ionizing radiation

Technical information on these risks can be obtained from various sources (See the references at the end of this document). Areas of interest for the purpose of capacity-building of integrated surveillance should include partnerships to address the following:

1. Environmental health emergencies such as:

(a) Natural events
(b) Technological incidents
(c) Complex emergencies
(d) Deliberate events

2. Chemical risks in food:
Acute and chronic dietary exposure (environmental or intentional pollution).

3. Zoonosis:

(a) Emerging zoonosis
(b) Neglected zoonosis

Topics for surveillance on specific risks

1. Infectious disease hazards
Known, new and unknown infectious disease threats

2. Zoonotic disease events
Using a One Health approach is critical to linking human health to animal health at the human-animal-environment interface. Coordinating, collaborating, and communicating across sectors and One Health partners allows us to maximize resources while achieving optimal health for people and animals living in a shared environment. Detecting diseases

that affect animals is important, as they may pose a risk to human health and could save lives.

3. Food safety events
Food and waterborne diarrheal diseases are the leading causes of illness and death in less developed countries, killing approximately 1.8 million people annually, mostly children. The identification of the source of an outbreak and its containment are critical to the IHR.

4. Chemical events
The detection and control of chemical, toxic and environmentally-induced events are critical for the implementation of the IHR.

5. Radiological and nuclear events
A radio-nuclear emergency at a nuclear facility may be caused by accidental spills or the result of a deliberate act. It may also be detected as the result of clinical examination, when patients with radiation injuries are admitted to a health care facility, even if the source of exposure has not been confirmed.

Source: A guide for assessment teams. International Health Regulations (2005): Protocol for assessing national surveillance and response capacities for the International Health Regulations (IHR) in accordance with Annex 1A of the regulations. February 2009.

Annex 2C: Guide for establishing community-based surveillance and response

Community-Based Surveillance (CBS) is a simple, adaptable and low-cost public health initiative managed by communities in coordination with the formal surveillance structures. Communities and designated community focal points are trained and empowered to be aware of potential health risks, including emerging events that might indicate a new health risk. They are also to ensure close monitoring for notifiable and seasonal diseases or signs of an existing disease outbreak. An event that appears 'unusual, odd or inexplicable' to the community might be to a health-trained professional an early warning sign of a more serious and larger health risk or public health event.

Two different strategies of community-based surveillance can be used to collect community information:

(a) CEBS relies on reporting of unusual events and is designed to rapidly identify problems in the community. Information may be incomplete, unconfirmed or even a rumor. The definition of an 'unusual event' changes from one community to another, and needs to be defined in each context. It can be one event, or a cluster of events, that may be unusual for a specific community or during a certain time of year. For example, an unusual event could be "a cluster of deaths from an unknown cause in the same household or adjacent households".

(b) Community-indicator based surveillance (CIBS). This type of surveillance is used to identify/report events, based on agreed indicators (case definitions). Information from the community may come from people, including CBS volunteers, who have already received guidance on the indicators.

CIBS relies on reporting a suspected case or the trend of specific diseases, using a community case definition. A community case definition is two or three easily identified symptoms associated with a specific disease. It is a more basic form of syndromic (symptom) reporting that is used by health professionals in national/IDSR and other disease surveillance systems. Examples include influenza, whose community case definition is "sudden illness, fever, cough and difficulty in breathing, and acute flaccid paralysis (AFP), defined as sudden onset of paralysis/weakness in any part of the body of a child less than 15 years of age.

Both systems should be established to ensure that all information from the community is captured and reported quickly to a designated surveillance focal person at the next level for follow up. These two elements of surveillance should also be integrated at the community level.

Steps for establishing community-based surveillance (CIBS)

A crucial step in establishing the community-based surveillance is to ensure buy-in of both national and subnational level authorities. This will enable the CBS system to be recognized formally as part of the National Surveillance System and people will then be designated. A

designated health facility manager or surveillance officer responsible for coordinating CBS activities should therefore:

(a) determine within the facility, the availability and knowledge of standard community case definitions for reporting suspected priority diseases and conditions and events of public health concern;

(b) sensitize community leaders, elders and other influencers about the need for CBS, what information is needed, how the information will be used, the process being proposed, the characteristics of successful CBS focal persons, the financial or human resource support being offered by the district, and what the community gains by participating;

(c) define the sources of information about health events in the community, including points of contact that the community has with health services. A key informant selected from these sources can form community networks that support the CBS focal persons in early detection of alerts (for example, sensitizing the women and men that often visit the grain milling or tea drinking places). The sources of information include:

(i) Home visits - where CBS focal persons are expected to visit all homes in their catchment area regularly to inquire about the priority diseases, any deaths that might have occurred since their last visit.

(ii) Gathering places - Another way to pick up information on priority events will be for CBS to frequently go to village gathering/meeting places. This will not serve as a substitute to the home visits, but rather, another approach to ensuring that all priority events are identified in good time. Gathering or meeting places in the community are where people gather to talk and share news by word of mouth. Examples include community wells, pumps or rivers, where women gather every to collect drinking water or wash clothes. While they work, women exchange news about their families and neighborhood.

(iii) Grain milling or grain pounding places - In some communities, women gather every day at the same place to mill, grind or pound grain into flour. They often exchange news about their families and the neighborhood as they work.

(iv) Beer, palm wine or tea drinking places - In some communities, men gather every day at bottle shops, other drinking places, in a home or shop, or in the shade under a special tree, to drink and socialize. As they drink, they sometimes tell each other the news about their families, friends and neighbors.

(v) At the market - A good deal of information and news is exchanged at the market. People who go there spend some of their time buying or selling things and the rest of their time talking to friends and neighbors.

(vi) At churches, mosques or temples - Sometimes religious leaders make announcements before or after the service to let people know about things happening in the neighborhood. Also, people who attend church or go to the

mosque often talk together before or after the service to exchange news about their families, friends and neighbors.

(vii) At the home of the village chief or the place where the village elders meet - The village chief and elders are usually kept informed about things that happen in their community. They often gather to talk about community news or to discuss problems and make decisions.

(viii) At schools and in school yards - Teachers and pupils often share information and news about their families and friends when they see each other at school or when they play in the school yard.

(d) identify surveillance focal persons for each source of information, in collaboration with the community. Identify and specify the opportunities for community involvement in surveillance of health events and the role of the CBS focal persons(s). Focal persons should be people trusted by the community and committed to 'zero-case' reporting. They should be reassured that reporting bad news won't get them into trouble, hence they do not need to falsify data;
(e) specify the alerts, events, diseases and conditions for surveillance within the catchment area and those directed by national policy; also specify the trigger mechanisms;
(f) compile a list of epidemic-prone diseases, those targeted for eradication and elimination, and other diseases of public health importance including non-communicable ones;
(g) define methods for informing and supporting focal points in the implementation of CBS. These may be through monthly meetings, or telephone calls. List the current opportunities for training focal persons in surveillance and response;
(h) define training needs. Develop and pre-test picture-based/simplified training material development for non-literate/semi-literate populations for surveillance and reporting; develop picture and game-based job aids and illustrative daily/weekly schedules;
(i) train CBS focal persons in surveillance and response skills as well as improved interpersonal skills, using interactive training, adult learning techniques and role playing. Use of cell phone-based opportunities to show MP3s or other video clips can be helpful during training and in the community;
(J) describe how communication about surveillance and response takes place and will be tracked between the health facility/surveillance officer and the CBS focal persons. For literate CBS focal persons, design simple alert forms (See Annex 2B) and show them how to fill out information; and for those who are non-literate, develop mechanisms for capturing information on events from them. Think of mechanisms such as identifying a family member who can assist with actual writing;
(k) Include methods such as monthly meetings and telephone calls to ensure tracking of CBS focal persons;

(l) review and update procedures and methods of supportive supervision and feedback between the health facility and the community focal persons. Regular refresher trainings should also occur to ensure that community focal points understand which and how alerts should be reported;

(m) describe the communication links between the community focal points and health facilities with the epidemic management committee that can be activated during an outbreak and for routine activities;

(n) develop general, pictorial, and social mobilization materials for community, youth-based or school-based awareness;

(o) conduct periodic meetings between the health facility surveillance focal points, CBS focal persons and community leaders, to discuss progress, issues, concerns and provide two-way feedback;

(p) State three or more objectives you would like to achieve for improving surveillance in your community over the next year.

Formalized CBS framework

CBS should be implemented in a formalized framework where participants are well versed in what constitutes an unusual type of event (an alert) to report (unexplained cluster of similar severe illnesses within one week, high absenteeism at school) and how and when to report (for instance, through messages or mobile calls). The framework should be supported by a trained facility or dedicated district staff and should be regularly evaluated.

Community representatives that can be members of CBS team

Community members who gain the trust of the community can be CBS focal persons. They should be selected by the communities they live in so as to increase empowerment and ownership of CBS. Representation could be from basic village-level services such as CHVs, community health workers, trained birth attendants, community or village health agents, or similar care providers, village leaders (religious, traditional or political), school teachers, veterinarians, health extension workers, chemical sellers, and traditional healers and in other communities, a respected non-health person such as the barber, shopkeeper or grandmother who regularly talks to community members are all effective focal points.

Once selected, the CBS focal persons should receive training and carry out their role on how to recognize certain diseases or health conditions for the purpose of reporting suspect cases.

CBS supervision

The goal of supervision is to improve timeliness of reporting, fine-tune understanding of case definitions, and improve interpersonal communication skills. It is important that supervision is done with evidenced-based approaches so as to know what to improve in the surveillance. All activities for implementation by CBS should be coordinated by a surveillance officer or health facility manager in his or her locality. He or she will:

(a) prepare a list of priority diseases, events or conditions for inclusion in the CBS, based on the adapted IDSR technical guidelines;

(b) share, as appropriate, a list of simplified community case definitions to facilitate case detection, event detection and monitoring;

(c) develop, test and provide pictorial-based training materials and job aids;

(d) develop an interactive training module;

(e) build capacity of CBS focal persons in all aspects of surveillance and response;

(f) regularly strengthen the skills and practices of focal points in all appropriate aspects of surveillance and investigation, particularly the handling and dissemination of data;

(g) establish feedback loops, which is a critical action for ensuring that CBS continues to work. Ensure that constructive and position supervision is done, where they are credited and praised for the good job done; and pinpoint areas for improvement;

(h) disseminate simplified case definitions and alerts, using posters or any other latest intervention methods (banners, leaflets, etc. that have been shown to work in that area) to relevant places within the community, as appropriate;

(i) monitor surveillance and response activities, including timeliness and completeness of reporting;

(j) supervise activities of the CBS focal points, including fine-tuning understanding of the case definitions. In case CBS focal points are used for contact tracing, ensure that the facility-based person leads the process, in collaboration with the health facility-based person;

(k) identify and map key health determinants in the area;

(l) provide regular and timely feedback to CBS teams and ensure a two-way process for feedback, to build trust between the CBS and the health facility person.

Sources of information for CBS

A functioning CBS should establish relationships with key sources of information. This includes, but is not limited to, the following sources of information:

(a) All community-based health workers, community volunteers, including traditional birth attendants, school teachers, pharmacists, who have relationships of trust with the local community. They are often located in remote areas where access to primary health care is scarce. Families often share information with a trusted and known health worker.

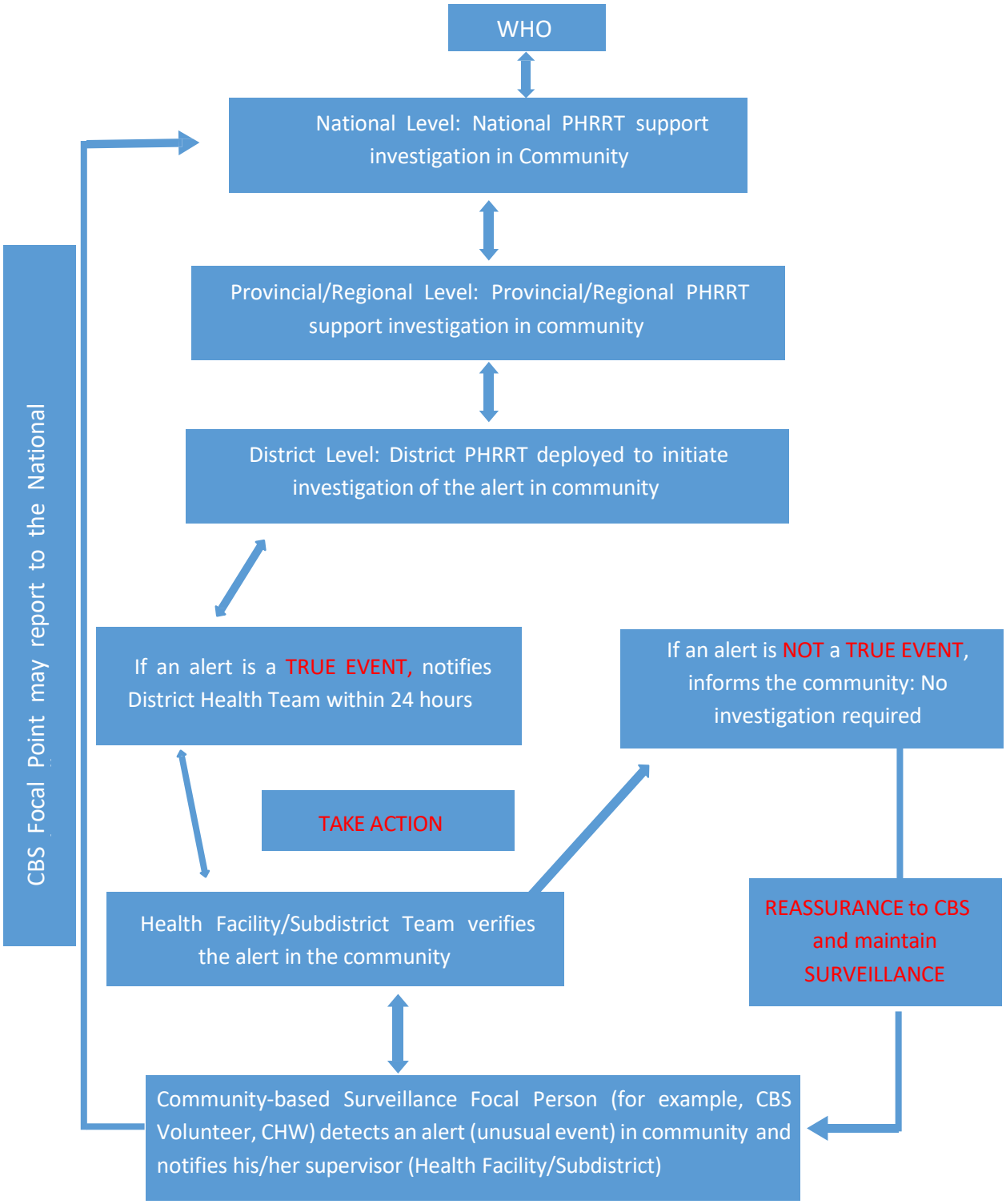
(b) Community, traditional, youth or religious leaders and civil society: these individuals and groups may provide informal reports of unusual health events or health risks that they witness in their communities.

(c) Local, national and international media are important sources of information for CBS. Events such as clusters of human cases, outbreaks or unexpected and unusual deaths may be covered by local newspapers (printed or available through the Internet) or radio reports before they are detected and reported by local health services.

(d) Traditional medicine, traditional health practitioners and healers and shrine keepers. In some African countries, a large number of the population depends on traditional medicine for primary health care. Traditional medicine has been used for thousands of years, and these practitioners may constitute a valuable information source. Families with sick members often seek spiritual guidance at shrines known for healing.

(e) Alternative medicine (herbalists, for example), complementary medicine and non-conventional medicine, including health care practices that are not integrated into the dominant health care system.

Annex 2D: Reporting structure for community alert and verification



Annex 2E: Required surveillance and response core capacities as described in the International Health Regulations

According to IHR, member States shall use existing national structures and resources to meet their core capacity requirements. These requirements include capacity for surveillance, reporting, notification, verification, response and collaboration activities. Each part is expected to assess the ability of existing national structures and resources to meet the minimum requirements. Based on the results of the assessment, each Member State should develop and implement an action plan to ensure that these core capacities are present and functioning throughout the country.

Annex 1 Part A of the IHR (2005) defines the core capacity requirements for surveillance and response. The regulations recognize the following three levels of the health care system:

(a) Community or primary public health response level
(b) Intermediate public health response level
(c) National level public health response level

Liberia uses the below four levels of the health system:

A. Health facility and community (local community or primary public level response
B. District level public health response
C. County level public health response
D. National level public health response

Local community or primary public health level response

At the local community level and/or primary public health response level, the capacities are to:

(a) detect events involving disease or death above expected levels for the particular time and place in all areas within the country;

(b) report all available essential information immediately to the appropriate level of healthcare response (within 24 hours). At the community level, CBS focal persons shall report to the appropriate health facility in their respective catchment areas. At the primary public health response level, reporting shall be to the intermediate or national response level, depending on organizational structures.

For the purposes of these guidelines, essential information includes the following:

(a) Clinical descriptions of cases.
(b) Laboratory results.
(c) Sources and types of risk.
(d) Numbers of human cases and deaths.
(e) Conditions affecting the spread of the disease, which may include environmental issues such as water and sanitation; personal travel history and that of neighbors; behavior issues, such as burial practices; distance to health facility/care; efforts to seek care before detection; weather and accessibility; floods; insecurity; and

migrant/IDPs/refugee population. Public health measures employed, including any bylaws instituted; and implementation of hygiene measures.

Intermediate (county) public health response levels

The intermediate public health level response core capacities requirement will need to be adapted to the context of each county. Many countries have more than one intermediate level (sub district; district/county and county) while other smaller countries may have only one level (district or country level).

The core capacity requirements and functions of the health system may differ from country to country. For example, while in countries with large federal States, the functions of intermediate levels may be close to the core capacity requirements described under "National level", in smaller States with only one level, the functions of the intermediate level may be close to the community level and/or primary public health response level.

The core capacity requirements at the intermediate (county or district) level are:

(a) Confirming the status of reported events and supporting or implementing additional control measures;

(b) Assessing reported events immediately and, if urgent, reporting all essential information to the national level within 24-48 hours. For the purposes of this Annex, the criteria for urgent events include serious public health impact and/or unusual or unexpected nature with high potential for spread.

National level: Assessment and notification

The response at national level consists of two functions - assessment and notification:

(a) Coordinate with World Organization for Animal Health focal person and the International Food Safety Authorities Network focal person and other sectors to ensure coordination in assessment and notification of events.

(b) Assess all reports of urgent events within 48 hours.

(c) Notify WHO immediately through the National IHR focal point when the assessment indicates that the event is notifiable under paragraph 1 of Article 6 of the IHR, and the decision instrument assessing and notifying events that may constitute a PHEIC in Annex 2 of the IHR, and inform WHO as required, pursuant to Article 7 and paragraph 2 of Article 9 of these Regulations.

At the national level, the public health response requires the capacity to:

(a) coordinate by establishing a coordination mechanism which may include setting up a PHEOC or a similar coordination structure, and activating the Incident Management System

(b) determine rapidly the control measures required to prevent domestic and international spread;

(c) provide support through specialized staff, laboratory analysis of samples (domestically or through collaborating centers) and logistical assistance (equipment, supplies and transport);

(d) provide on-site assistance, as required, to supplement local investigations;

(e) provide a direct operational link with senior health and other officials for rapid approval;

(f) implement containment and control measures;

(g) provide direct liaison with other relevant government ministries;

(h) provide, by the most efficient means of communication available, links with hospitals, clinics, airports, ports, ground crossings, laboratories and other key operational areas for the dissemination of information and recommendations received from WHO regarding events in the State party's own territory and in the territories of other States parties;

(i) establish, operate and maintain a national public health emergency response plan, including the creation of a One Health team to respond to events that may constitute a public health emergency of international concern;

(j) provide the foregoing on a 24-hour basis.

During several consultations at the global level, the core capacities were summarized into eight components: legislation; policy and coordination; surveillance; preparedness; response; risk communications; laboratory; and human resources. These eight components are all important for IDSR as well.

Annex 2F: Roles and responsibilities of various actors in IDSR

Roles and responsibilities of a community-based surveillance focal person (community health worker)

Using lay, simplified case definitions to identify priority diseases, events, conditions or other hazards in the community, the focal person:

(a) conducts household visits on a regular basis;

(b) meets with key informants on a regular basis;

(c) attends local ceremonies and events and follows up on any unusual occurrence, such as someone expected to show up but did not;

(d) records priority diseases, conditions, or unusual health events in the reporting forms and tools (tally sheets) and reports immediately within 24 hours;

(e) participates in verbal autopsies by performing interview questions prepared by the supervisor at the health facility;

(f) sends rapid notification, to the nearest health facility and other relevant sectors, of the occurrence of unexpected or unusual cases of disease or death in humans and animals for immediate verification and investigation according to the International Health Regulations and in line with the IDSR strategy (within 24 hours);

(g) involves local leaders in describing disease events and trends in the community;

(h) raises the community's awareness about reporting and seeking care for priority diseases, conditions and unusual events;

(i) supports health workers during case or outbreak investigation and contact tracing;

(j) mobilizes local authorities and community members to support response activities;

(k) participates in risk mapping of potential hazards and in training, including simulation exercises;

(l) participates in containment and response activities in coordination with the district level;

(m) participates in response activities, which could include, home-based care, social or behavior change of traditional practices, logistics for distribution of drugs, vaccines or other supplies. Providing trusted health education in a crisis is a useful contribution.

(n) gives feedback to community members about reported cases, events and prevention activities;

(o) verifies if public health interventions took place as planned, with the involvement of the community. Participates in meetings organized by the community, health facility, district, and higher-level authorities.

Roles and responsibilities of health facility staff at PoE

The health facility staff:

(a) Identify cases of priority diseases using the standard case definitions;

(b) Record case-based information and report for immediately notifiable diseases, conditions and events to the next level;

(c) Liaise with the district on how to conduct immediate laboratory investigation of suspected cases;

(d) Deal with case treatment/referral;

(e) Prepare for and participate in outbreak investigation and response and case treatment;

(f) Report summary and case based (weekly report) data on time to the next level;

(g) Conduct simple data analysis (graphs, table, charts) at point of collection;

(h) Communicate diagnosis for outbreak-prone diseases to district/community;

(i) Convene district RRT

(j) Identify resources (human, financial, commodities, phone cards) and timeline for deployment.

Roles and responsibilities of surveillance officer at district level

The role of the surveillance officer is to:

(a) Investigate and verify possible outbreaks, collect diagnostic samples, advise on treatment/prevention protocols;

(b) Prepare and analyze weekly surveillance reports and submits promptly to higher authorities;

(c) Ensure that surveillance sites maintain surveillance reports and ledgers/logbooks properly;

(d) Maintain a list of all reporting sites;

(e) Establish and maintain database of all trained and registered health care workers, who can serve as surveillance focal persons at the reporting sites as well as other CBS FPs;

(f) Ensure adequate supply of data collection and reporting tools at the surveillance reporting sites;

(g) Ensure that the IDSR standard case definitions for all the priority diseases are understood and used by health care workers at the site. Provide on-the-spot training if needed;

(h) Monitor the performance indicators (such as timeliness and completeness) of the IDSR, as stipulated in the IDSR guidelines;

(i) Periodically update graphs, tables and charts, and compare current data with previous ones, in months and quarters or even weeks or years (important for seasonal events) and makes recommendations for response;

(j) Personally provide weekly or monthly feedback to surveillance reporting sites, on implementation of the IDSR;

(k) Call the reporting sites to ensure that they report data on time;

(l) Conduct regular supportive supervision visits to surveillance sites, including health facilities, border entries and communities, and build their capacity to analyze and interpret their data, to guide decisions. Sign and date the inpatient and outpatient record books, registries or phone entries, to document your visit and also write your recommendations for improvement;

(m) Support HCF to verify alerts from the community;

(n) Arrange and lead investigation of verified cases or outbreaks;

(o) Maintain an updated line list of suspected cases;

(p) Assist health care facility in safe collection, packaging, storage and transport of laboratory specimens for confirmatory testing;

(q) Receive laboratory results from county and give to HCF;

(r) Conduct/coordinate on-the-job trainings for surveillance sites with new staff;

(s) Review the quality of surveillance data from time to time by conducting data quality audits and come up with appropriate measures to improve data quality in the district;

(t) Maintain a rumor logbook to record events for the surveillance site;

(u) Ensure cross-border (district-district) coordination and collaboration on surveillance issues and provide notification of any outbreaks in the neighboring district. International or cross-border notification should also be done if needed;

(v) Document the value added of IDSR and advocate to health management team to support IDSR activities;

(w) Participate in outbreak investigations and ensure that there is an updated register/line list.

Roles and responsibilities of the District Health Management Team

The role of the DHT or DHO is to:

(a) Liaise, through the DHO, with the District Commissioner/CHO on overall surveillance activities and plans;

(b) Support the Surveillance Officer at the district level to implement planned activities;

(c) Ensure that surveillance activities are included in the District Health Planning of overall activities;

(d) Liaise with the district officials to mobilize funds (at district level) for surveillance activities;

(e) Ensure timely release of funds for surveillance activities;

(f) Monitor IDSR performance and outputs of data analysis and monitoring tool;

(g) Participate in risk mapping of the district and also in development of plan of action, based on the findings;

(h) During outbreaks, assist the PHEMC in organizing the rapid response teams and ensure functionality)

(i) Report finding of initial investigation to county;

(j) Participate in risk mapping and community assessment;

(k) Participate in establishment and ensure functionality of the emergency preparedness and response committees;

(l) Design, train, and set up implementation of community health education programs;

(m) Participate in and support response training for health care facility and community;

(n) Together with county, select and implement appropriate public health response;

(o) Plan timely community information and education activities;

(p) Document response activities;

(q) In case of outbreaks, send daily district SitRep.

Roles and responsibilities for other political leaders at district level

Political leaders such as village, ward or district officers are very important people, who assist in fostering behavioral change on disease surveillance. They can play the following roles:

(a) Support any declarations of a public health emergency;

(b) Develop an inventory and identify local human/financial/logistics support. A quick response will often prevent spread;

(c) Ensure that principles of hygiene and sanitation are followed (environmental cleanliness, availability of latrines and their utilization, advocacy for drinking of clean and safe water, personal hygiene and sanitation measures, including hand washing);

(d) Report clusters of illness/death to a nearby health facility;

(e) Implement the bylaws to enhance principles of hygiene and sanitation;

(f) Take an active role in sensitizing community members on how to promote, maintain and sustain good health;

(g) Facilitate community-based planning, implementation and evaluation of health programs within the ward (IDSR is among the programs);

(h) Follow up on outbreaks, in collaboration with health care providers and other extension workers at ward level;

(i) Provide administrative back up to health care providers at ward and village level;

(j) Support enforcement of relevant legislations so as to prevent/control outbreak of infectious diseases;

(k) Supervise subordinates in ensuring that principles of hygiene and sanitation are followed;

(l) Ensure regular convening of public health care committee meetings (or set up one) when an outbreak occurs;

(m) Discuss disease patterns and their implications for action, as part of regular meetings with District Medical Officer;

(n) Ensure that various committees are established and resourced to perform activities;

(o) Solicit resources from various sources to respond to disasters, including epidemics;

(p) Conduct advocacy on health matters in different campaigns carried out in the district.

Roles and responsibilities of the County Health Team

(a) Through the CHO, liaise with county superintendent /district commissioner as well as the chief medical officer/OIC, health at national level, on overall surveillance activities and plans for the county and districts;

(b) Support the CSO and DSOs to implement planned activities in their respective districts;

(c) Ensure that surveillance activities are included in the county health planning of overall activities, as well as in respective districts in their plans;

(d) Liaise with county officials to mobilize funds for surveillance activities and ensure timely release of funds for surveillance and response activities for the entire region;

(e) Monitor district IDSR performance and outputs of data analysis and monitoring tool;

(f) Participate in risk mapping of the districts and assist districts in developing plan of action, based on the findings;

(g) During outbreaks, assist the PHEMC in organizing the public health emergency county rapid response teams and ensure functionality for both county and districts levels (see Section 5 for details);

(h) Report findings of initial investigation to national level;

(i) Participate in establishment and ensure functionality of the county and respective districts emergency preparedness and response committees;

(j) Assist districts in risk mapping and community assessment;

(k) Assist districts in design and implementation of community health education programmes;

(l) Participate in and support response training for districts;

(m) Assist districts in implementing appropriate public health response and also facilitate cross-border district surveillance and response initiatives

Role of Ministry of Health (MOH)/national level

a) Set up a public health emergency operation center or similar coordination mechanism for coordination of preparedness and response activities of a public health event, including an incident management system, plans and procedures. Refer to Section 5 for details;

(b) Identify spokesperson and outline risk communication plan, including engagement of media, for sharing information before, during and after a public health emergency;

(c) Set standards, policies and guidelines for IDSR and update the emergency preparedness and response (EPR) plans based on simulations and AARs

(d) Assess available capacity at national level and rectify accordingly, while ensuring inclusion of surge capacity in the EPR plan;

(e) Identify domestic resources and mobilize and coordinate external support for implementation of IDSR;

(f) Conduct overall supervision, monitoring and evaluation of IDSR activities;

(g) Produce and disseminate epidemiological bulletins;

(h) Monitor implementation of inter country, county and international agreements/protocols;

(i) Support investigation of suspected epidemics detected through surveillance;

(j) Provide national level data management and analytic support.

Role of WHO and other partners (United Nations agencies, GIZ CDC, USAID, local and international NGOs Médecins Sans Frontières, Red Cross)

(a) Contribute to setting standards and developing guidelines

(b) Provide technical assistance, expertise, and other material support to strengthen country's disease surveillance, and laboratory and health information systems

(c) Support Ministry of Health in mobilizing resources for surveillance and response activities

(d) Support supervision, monitoring and evaluation of IDSR

(e) Provide management support (writing funding proposals, for instance)

(f) Support capacity-building, training, equipment etc.

(g) During public health emergencies, support by sending technical experts, surge staff (if needed during response) and provide portable laboratories and other equipment and vaccines

Annex 2G: Guide for establishing surveillance and response at Point of Entry

(a) Purpose

The purpose of the International Health Regulations (IHR 2005) is to prevent, protect against, control and provide public health response to the international spread of diseases in ways that are relevant and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade. It calls for strengthening national capacity for surveillance and control, including sites such as PoE, namely ports, airports and ground crossings; prevention, alert and response to international public health emergencies; global partnerships and international collaboration. In addition to the IHR, it is essential for border health activities to be sustainable and align with other surveillance activities under IDSR.

A system to detect, report, and appropriately respond to ill travelers is appropriate. The long-term strategy is to work towards full compliance with IHR at official PoEs, while ensuring that the PoEs also have contingency plans. All designated PoEs must have routine capacities for surveillance and response.

(b) Key partners

Ministry of Health, local government, airline and maritime authorities, port authorities, ministries responsible for communication or infrastructure, ministry of home affairs, WHO, International Organization for Migration, CDC and other key partners.

(c) Key areas for surveillance and response at PoE

1. Routine measures should be in place at PoE for the detection of ill travelers; reporting to health authorities; rapid public health assessment; and access to healthcare for severely ill travelers or those whose symptoms suggest a risk to public health, including safe transportation from the PoE to a healthcare facility.

2. Detection of ill travelers should include, at least, the following:

   (i) Reporting of ill travelers or deaths on board international aircraft, ships or ground crossing points, who arrive at PoE stipulated by various guidelines;

   (ii) Port health officers and/or immigration officers who are present at select PoE should be trained to recognize ill travelers they encounter during their routine assessments as well as to conduct an initial assessment of whether or not the illness poses a potential public health risk.

3. Arrangements for the initial response to an ill traveler, if detected at a PoE, should include, at least, the following:

   (i) The ability to rapidly isolate the ill traveler from others, to avoid potential spread of disease.

   (ii) Standby health teams should be available, either in person or remotely by telephone, to conduct a rapid assessment of ill travelers detected at PoE to determine if communicable disease of public health concern is suspected.

   (iii) A healthcare facility located close to the PoE should be designated to provide medical care as needed to severely ill travelers or those with a suspected

communicable disease of public health concern. The designated facility should have adequate infection prevention and control capacity to prevent spread of disease to staff or other patients, and diagnostic capacity, including access to laboratory diagnostics.

(iv) Ambulance service or other safe transportation should be available to facilitate transport of ill travelers from the point of entry to the designated healthcare facility.

4. As needed, during a declared public health emergency affecting international travelers or with the potential for international spread of disease, there should also be capacity to implement at short notice, traveler screening or other border health measures, as recommended by the WHO.

Role of competent authorities

(a) Report all events and diseases with epidemic potential detected at points of entry to the next higher level immediately. Notification should also be done at the same time at the national level, with a copy of the report for the National IHR focal point, to assess use of the decision algorithm. If yellow fever is being suspected, include yellow fever vaccination for those cases originating from endemic or risk areas.

(b) If a traveler is a suspect case, immediately fill the passenger locator form/alert notification form. Ensure that the traveler/suspect case is kept separate from others, including family members, and transferred to the nearest holding room.

(c) If a suspected traveler is recognized and may not be symptomatic at the time of travel, be sure to take appropriate details and transfer that information to a nearby health facility for close monitoring. The health facility will liaise with the community focal point for close follow-up.

(d) Be responsible for monitoring baggage, cargo, containers, conveyances, goods, postal parcels and human remains departing and arriving from affected areas, so that they are maintained in such a condition that they are free of sources of infection or contamination, including vectors and reservoirs.

(e) Ensure, as far as practicable, that facilities used by travelers at points of entry are maintained in a sanitary condition and kept free of sources of infection or contamination, including vectors and reservoirs.

(f) Be responsible for the supervision of any de-ratting, disinfection, or decontamination of baggage, cargo, containers, conveyances, goods, postal parcels and human remains or sanitary measures for persons, as appropriate, under these regulations.

(g) Advise conveyance operators, as far in advance as possible, of their intent to apply control measures to a conveyance, and provide, where available, written information concerning the methods to be employed.

(h) Report suspected cases to the HCF as soon as possible, so that transport may be arranged.

(i) Ensure that all completed forms are stored securely. Create a database for events, if a computer is available. Keep a record or register of all events.

During an emergency or outbreak response, cross-border coordination should include:

(a) Partners' meeting as soon as the epidemic or event is recognized

(b) Assessing the need for, and request support from, the county or NEPRC or rapid response teams when necessary

(c) Meeting regularly to assess the status of the outbreak or epidemic as indicated

(d) Regularly sharing surveillance data, addressing case counts (including zero cases if applicable) and status of contact tracing (if indicated)

(e) Sharing information on travel history of cases and identified contacts to facilitate coordinated response on both sides of the border

(f) Regularly reviewing the epidemic response and taking action to improve epidemic control actions as indicated

(g) Documenting and communicating epidemic response actions escalating notifications as needed.

Annex 3: Terms of References for key committees and technical working groups

TOR for Steering Committee (County OHSC)

Shall advocate for multi-sectorial approaches to addressing public health challenges through efforts to build relevant capacity (e.g., integration of a veterinary component into the Liberian Field Epidemiology Training Program), enacting legislation to institutionalize One Health action (e.g., regulating points of entry to reduce risk of imported illnesses), and general awareness-raising (e.g., carrying out education campaigns on the importance of maintaining hygienic environments to reduce contact with disease-causing rodents).

TOR for the One Health Technical committee (Not applicable to County level)

The OHTC will serve as a supervisory body for the technical working groups (TWGs) and membership shall be composed of the heads of the various TWGs, and other technicians. Members of the OHTC will take recommendations, as deemed appropriate, from the Technical Working Groups to Heads of relevant agencies and advocate for action in line with the objectives of the OHCP in Liberia and One Health institutionalization throughout the county. Moreover, the OHTC will serve as a link between the TWGs and the OHSC.

TOR for One Health Surveillance Technical Working Group

- Develop technical and operational tools to support the strengthening of national disease control strategies (IDSR, ADSR, Wildlife);
- Serve as an inter-ministerial, multi-disciplinary technical group with oversight and ensure technical capacity for human-animal-ecosystem interface for the surveillance system;
- Establish a mechanism for effective exchange of information;
- Improve collaboration among governments, organizations, institutions, agencies engaged in human-animal-ecosystem interface to reduce its impact on the health of people and livestock and pursue integrated cost effective approaches to prevention and control programs;
- Shall develop SOPs and operationalize preparedness and management of zoonotic disease epidemics;
- Enhance efforts to prevent and control zoonotic infection;
- Work with the relevant offices to develop a One Health Communication Strategy, and review curricula of pre-service training institutions; and
- Provide update to the OHTC on trends and analyses of events (Human, animal and Environmental) linked to JEE score on country's performance.

TOR for One Health Laboratory Technical Working Group

- Shall address lab-related issues in country. The scope is to address all five-strategic global action plan objectives, which have been adopted and adapted in country with prioritizing activities in a stepwise approach:
- Improve diagnostic capacity through training opportunities for laboratory technicians

(long-and short-term) including revision of curriculum for in-service and pre-service institutions and the conduct of regular supervision and on-site mentoring;

- advocate to institutionalize a laboratory training program within the University of Liberia (Master and PhD level);
- Support and ensure laboratory facilities and/or institutions perform competent diagnostic procedures and calibration to obtain accurate testing results;
- Establish Quality Management System (QMS), including external quality assessment (EQA) and internal quality assessment (IQA);
- Develop and implement standard operating procedures (SOPs) for all testing and ensure adherence at public, private, charity, and concession facilities;
- Initiate and support mandatory licensing of all health facilities (public, private, charity and concession) using agreed upon criteria including networking for quality control standards and support;
- Strengthening knowledge and evidence base through laboratory and research;
- Conduct inventory for all laboratory equipment in country for human, animal and environmental facilities and ensure functionality;
- advocate got reagents and supplies to ensure continuous diagnostic capacity and avoid stock-outs;
- regular preventative and curative maintenance of laboratory equipment including generators, air-
- conditioning, water supply, and management and disposal of all waste to support infection prevention;
- Build sustained partnerships nationally and internationally to facilitate development of in-country workforce capacity for laboratory diagnosis;
- Ensure regular information sharing using standard data collection and reporting tools as well as institute effective communication and coordination strategies among all stakeholders (constituencies, sectors and disciplines);
- Monitor and coordinate national and sub-national activities for establishment of laboratory policies, strategies and plans

TOR for Preparedness and Response Technical Working Group

- Advocate for the development and dissemination of protocols, guidelines and manuals for different professional levels (human, animal and environmental);
- Jointly develop a national integrated EPR plan prepared at different levels;
- Provide needed human resource capacity at different levels in the context of One Health (human, animal and environmental);
- Develop effective communication strategies and adequate community engagement

and participation in events;

- Document available human resource capacity at central, county, district, facility and community levels and suggest support needed to mitigate any gaps identified;
- Organize and hold regular cross-border and intra-county meetings to support information sharing for tracking events including effective networking, monitoring of potential threats and identifying opportunities to collaborate with stakeholders;
- Advocate for the availability of sufficient emergency stockpile (drugs, supplies etc..) to support preparedness and timely response for emergencies in the context of One Health (human, animal and environmental);
- Review and/or update contingency emergency operational manual to support processes for receiving funds during an event/outbreak to avoid bureaucratic procedures, through the Ministry of Finance development planning and development partners to ensure the availability of necessary and essential resources to support timely and prompt interventions/response;
- Provide and allocate all necessary materials and equipment and ensure that they are made available at the right time, and positioned at strategic areas;
- Document interventions/response linked to events from human, animal and environmental health for experiences and lessons learned to support action reviews for unknown event; and
- Support post-event interventions for psychosocial and mental health rehabilitation through counseling and support to those impacted by events.

Annex 4: Case definitions, alert triggers, and thresholds for immediately reportable diseases, conditions and events, Liberia, 2021

Disease or event	Alert triggers for community event-based surveillance (community case definition)	Healthcare facility case definition* (standard case definition)	Alert Threshold: district / week	Action/epidemic threshold
Acute Bloody Diarrhea (*Shigellosis*)	Any person passing bloody pu-pu or slimy (slippery) pu-pu with stomach pain	Suspected case: A person with (abdominal pain) and diarrhea with visible blood in stool. Confirmed case: Suspected case with stool culture positive for Shigella dysenteriae type 1.	5 suspected cases	1 confirmed case
Acute Flaccid Paralysis (Poliomyelitis)	Any person with weakness in the legs and arms and not able to walk	Suspected case: Any child under 15 years of age with acute flaccid paralysis or any person with paralytic illness at any age in whom the clinician suspects poliomyelitis Confirmed case: A suspected case with virus isolation in stool.	1 suspected case	1 confirmed case
Cholera (severe Acute Watery diarrhea)	Running stomach Any person passing three (3) or more water pu-pu a day	Suspected cholera case: In areas where a cholera outbreak has not been declared: A person aged 5 years or more with severe dehydration or death from acute watery diarrhea. In areas where a cholera outbreak is declared: Any patient aged two years and older presenting acute watery diarrhea and severe dehydration or dying from acute watery diarrhea.	1 suspected case	1 confirmed case

COVID-19	Any person with hot skin, cough, not breathing well, and/or who has travelled from outbreak area OR who has taken care of sick person	Any person with acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath), AND a history of travel to or residence in country or location reporting community transmission of COVID-19 disease during 14 days prior to symptom onset; OR A person with any acute respiratory illness AND having been in contact with a confirmed or probable COVID-19 case (see definition of contact) in the last 14 days prior to symptom onset; OR A person with severe acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath; AND requiring hospitalization) AND in the absence of an alternative diagnosis that fully explains the clinical presentation	1 suspected case	1 confirmed case
Dengue Fever		Dengue Fever Suspected case: Any person with acute febrile illness of 2-7 days duration with 2 or more of the following: headache, retro-orbital pain, myalgia, arthralgia, rash, hemorrhagic manifestations, leucopenia. Dengue Fever Confirmed case: A suspected case with laboratory confirmation (positive IgM antibody, four-fold or greater rise in IgG antibody titres, positive PCR or viral isolation).	1 suspected case	1 confirmed case

Human Rabies	Any person who is bitten by a dog or other animal	Suspected: A person with one or more of the following: headache, neck pain, nausea, fever, fear of water, anxiety, agitation, abnormal tingling sensations or pain at the wound site, when contact with a rabid animal is suspected. Confirmed: A suspected case that is laboratory confirmed	1 suspected case	1 confirmed case
Lassa Fever	Any person who has fever and two or more other symptoms (headache, vomiting, runny stomach, weak in the body, yellow eyes) or who died after serious sickness with fever or bleeding	Suspected case of Lassa Fever: Any person with fever (>38 C) and two or more of the following signs: malaise, headache, sore throat, cough, nausea, vomiting, diarrhea, myalgia, chest pain, hearing loss, bleeding, swollen neck or face, absence of a response after 48 hours of antimalarial treatment and/or broad spectrum antibiotic, history of contact with rodents or with a case of Lassa Fever Confirmed case of Lassa Fever: A suspected case that is laboratory confirmed (positive IgM antibody, PCR or virus isolation) or epidemiologically linked to a laboratory confirmed case.	1 suspected case	1 confirmed case
Maternal death	Big belly death Woman who dies with big belly or within 42 days (six weeks) after the baby is born or when the belly move.	The death of a woman while pregnant or within 42 days of the delivery or termination of pregnancy, regardless of the duration and site of the pregnancy, from any cause related to the pregnancy or its management but not from accidental or incidental causes.	1 confirmed case	

Monkey Pox		Suspected case: An acute illness with fever > 38.3 C (101 F), intense headache, lymphadenopathy, back pain, myalgia, and intense asthenia followed one to three days later by a progressively developing rash often beginning on the face (most dense) and then spreading elsewhere on the body, including soles of feet and palms of hand. Probable case: A case that meets the clinical case definition, is not laboratory confirmed, but has an epidemiological link to a confirmed or probable case. Confirmed case: A clinically compatible case that is laboratory confirmed. Differential diagnosis: Alternative causes of clinical symptoms that must be considered include other rash illnesses, such as, smallpox, chickenpox, measles, bacterial skin infections, scabies, syphilis, and medication-associated allergies.	1 Suspected case	1 confirmed case
Measles	Any person with hot skin (fever), spot-spot (rash), and/or red eyes	Suspected case: Any person with fever and maculopapular (non-vesicular) generalized rash and cough, coryza or conjunctivitis (red eyes) or any person in whom a clinician suspects measles. Confirmed case: A suspected case with laboratory confirmation (positive IgM antibody) or epidemiological link to confirmed cases in an outbreak.	1 suspected case	5 or more suspect cases OR 3 or more confirmed cases in a district in a month

Bacterial Meningitis	Any person with hot skin (fever) and stiff neck.	Suspected meningitis case: Any person with sudden onset of fever (>38.5 C rectal or 38.0 C axillary) and one of the following signs: neck stiffness, altered consciousness or other meningeal signs including bulging fontanelle in infants. Probable meningitis case: Any suspected case with turbid, cloudy or purulent cerebrospinal fluid (CSF); or with a CSF leukocyte count >10 cells/mm3 or with bacteria identified by Gram stain in CSF; or positive antigen detection (for example, by latex agglutination testing) in CSF In infants: CSF leukocyte count >100 cells/mm3; or CSF leukocyte count 10–100 cells/mm3 and either an elevated protein (>100 mg/dl) or decreased glucose (<40 mg/dl) level. Confirmed meningitis case: Any suspected or probable case that is laboratory confirmed by culturing or identifying (that is, polymerase chain reaction) a bacterial pathogen (Neisseria meningitidis, Streptococcus pneumoniae, Hemophilus influenzae type b) in the CSF or blood.	2 suspected cases	Population ≥30,000: 15 cases per 100,000 per week Population <30,000: 5 cases per week
Buruli ulcer (BU) (Mycobacterium ulcerans disease)		Suspected case: A person presenting a painless skin nodule, plaque or ulcer, living or having visited a BU endemic area Confirmed case: A suspected case confirmed by at least one laboratory test (ZN for AFB, PCR, culture or histology). Confirmation of presence of mycolactone in skin lesions		

Neonatal death	Young baby death Baby who dies at birth or within 28 days (four weeks) after birth	The death of a baby that occurred at birth or within 28 days of life.	1 confirmed case	
Perinatal deaths		A perinatal death is defined as the death of a baby of at least 28 weeks of gestation and/or 1,000 g in weight and early neonatal death (the first seven days after birth) A stillbirth is defined as any death of a baby before birth and with no signs of life at birth of at least 1 000 g birthweight and/or at least 28 weeks gestation and 35 cm long. Early neonatal death is defined as any death of a live newborn occurring before the first seven complete days of life. Day 1 is clinically considered the first day of life.		
Neonatal tetanus	Jerking sickness Baby who is normal at birth, then after two days is not able to suck, starts jerking	Any newborn with a normal ability to suck and cry during the first two days of life, and who, between the 3rd and 28th day of age, cannot suck normally, and becomes stiff or has convulsions or both.	1 suspected case	1 confirmed case (through investigation form Annex 9T)

Viral Hemorrhagic Fevers: (including Ebola Virus Disease)	Any person who has fever and two or more other symptoms (headache, vomiting, yellow eyes, runny stomach, weak in the body,) or who died after serious sickness with fever or bleeding	Suspected case: Any acute onset of fever less than 3 weeks in a severely ill person, alive or a dead person with no response to usual causes of fever in the area, and at least one of the following signs: bloody diarrhea, bleeding from gums, bleeding into skin (purpura), bleeding into eyes and urine OR clinical suspicion of EVD. Confirmed case: A suspected case with laboratory confirmation or epidemiologic link to confirmed cases or outbreak. Note: During an outbreak, case definitions may be changed to correspond to the local event. It is important to note that during outbreaks, most cases might not show hemorrhagic manifestation, a proper history taking is crucial	1 suspected case	1 confirmed case

Yellow Fever	Any person who has fever and two or more other symptoms (headache, vomiting, runny stomach, weak in the body, yellow eyes) or who died after serious sickness with fever or bleeding	Suspected case: Any person with acute onset of fever following; jaundice appearing within 14 days of onset of the first symptoms, Probable case: A suspected case AND One of the following: (a) Epidemiological link to a confirmed case or an outbreak (b) Positive post-mortem liver histopathology Confirmed case: A probable case AND One of the following (a) Detection of YF-specific* IgM (b) Detection of four-fold increase in YF IgM and/or IgG antibody titres between acute and convalescent serum samples (c) Detection of YFV-specific* neutralizing antibodies *YF-specific means that antibody tests (such as IgM or neutralizing antibody) for other prevalent flavivirus are negative. This testing should include at least IgM for Dengue and West Nile and may include other flavivirus depending on local epidemiology. OR One of the following: (a) Detection of YF virus genome in blood or other organs by PCR (b) Detection of yellow fever antigen in blood, liver or other organs by immunoassays Isolation of the yellow fever virus	1 suspected case	1 confirmed case

Tuberculosis		Suspected case: Any person with a cough of 3 weeks or more. Confirmed case: Smear-positive pulmonary TB: a) a suspected patient with at least 2 sputum specimens positive for acid-fast bacilli (AFB), or b) one sputum specimen positive for AFB by microscopy and radiographic abnormalities consistent with active PTB as determined by the treating medical officer, or c) one positive sputum smear by microscopy and one sputum specimen positive on culture for AFB.	1 suspected case	1 confirmed case
Unexplained cluster of health events or disease	Unknown health problems grouped together. Any health problem that you don't know about that is happening to many people or animals in the same community.	Includes: Several ill people from the same family, school or community with an onset of symptoms within a short period of time. Illness that occurs at same time as animals that are sick or die. Ill travelers who are ill or become ill soon after arriving. A person who becomes sick with symptoms that are unfamiliar or have not been seen for a long time and which lead to suspicion of infectious disease. A group of people who become sick with similar symptoms after exposure to a common source	1 suspected cluster	1 confirmed cluster
Unexplained cluster of deaths	Any death in human or group of animals that you don't know why it happened.	Human or animal deaths due to unknown or unidentifiable causes. Two or more people in the same community who die suddenly of unknown or infectious cause after suffering similar symptoms.	1 suspected cluster	1 confirmed cluster

Yaws		Suspected case: a person with a history of residence in an endemic area (past or present) who presents with clinically active (visible) yaws lesions Confirmed case: a suspected case with a positive serological test (rapid treponemal test for syphilis confirmed by DPP test) Imported case: a person who presents with clinically active yaws serologically confirmed in an area where yaws is not known to be endemic Index case: first case of yaws which is detected in a community	1 suspected case	1 confirmed case
Adverse Events Following Immunization (AEFI)		Any untoward medical occurrence which follows immunization and which does not necessarily have a causal relationship with the usage of the vaccine. The adverse event may be any unfavorable or unintended sign, abnormal laboratory finding, symptom or disease.	1 reported case	

*See IDSR Guidelines Annex 9 for more details on standard health care facility case definitions.

Annex 5: Event Based Surveillance (EBS)

Community Event-Based Surveillance is the organized and rapid collection of information from community events that are a potential risk to public health. Community event-based surveillance is an active process of community participation in detecting, reporting, responding to and monitoring health events in the community. CEBS is encouraged to create a sense of responsibility, urgency and ownership at to ensure maximum coordination and cooperation. The goal is to use it at the community level for early detection and action. This is done through identifying and acting on community alert triggers.

CEBS Objectives

- To establish a system for identifying priority disease transmission and events of public health importance at the earliest possible stage;
- To feedback information both to district and county surveillance officers to adapt and intensify real-time response;
- To empower communities to take action to stop chains of disease transmission;
- To improve health outcomes by increasing the timeliness in which suspected cases of all priority diseases are identified and treated;
- To monitor morbidity and mortality trends of priority diseases;
- To improve risk communication in communities through sensitization of public health risks and best practices;
- To better understand and map the risks and disease burden in Liberia.

Primary Roles and Responsibilities in CEBS

Community Health cadres include: Community Health Assistants (CHAs)/Community Health Volunteers (CHVs), Trained Traditional Midwives (TTM), and Point of Entry screeners (POEs)

The community workers aim to build relationships in the community and in doing so coordinate with community key informants, resource persons and existing formal and informal networks for information dissemination and reporting of potential cases and priority conditions. They will record deaths in the community, especially those that are maternal and neonatal deaths. These workers will identify and report priority diseases and/or event triggers that occur in the community, including early case detection through active case finding to the Community Health Service Supervisor (CHSS) or the OIC at the health facility.

HCW OIC

The OIC will verify the reported information from CHSS and will report potential alerts for priority diseases and events to the DSO, who will then determine whether district rapid response is needed.

Community Health Service Supervisor (CHSS)

The CHSS will organize and lead the CEBS training of the CHAs with the OIC and DSO, if needed. They will supervise the CHAs and provide regular positive reinforcement and feedback to the CHAs. Additionally, they may also receive alert triggers for potential cases of priority

diseases from the CHAs. The CHSS will receive and verify alerts and reported potential cases of priority disease coming from CHAs and CHVs.

District Surveillance Officer (DSO):

DSO will support and provide back-up in the training of CEBS to the Community Health Assistants (CHAs), which is organized and led by the Community Health Service Supervisor CHSS. Primarily, the DSO will screen the health reports for alerts and will discuss alerts with the CSO immediately. If needed, the DSO will escalate these alerts and perform district rapid response following standard procedures and providing appropriate care.

County Surveillance Officers (CSOs):

The CSOs will receive alerts that have reported from the DSO and investigate at the county level. They will further assist the district in screening the alerts and other activities in a rapid response if, needed. The CSOs will escalate alerts to the county response team if protocol requires escalation. CSOs will support the training of CHAs/CHVs and will attend regular meetings with the DSO, the OIC/CHSS, and the CHAs/CHVs.

EBS Procedures

Community Health Monitoring

The catchment area is routinely assessed, described, and updated. Through CEBS the Community workers will report to the CHSS. If the CHA/CHV becomes aware of a suspicious situation in their community and there is a corresponding event trigger, they will immediately report to their CHSS via mobile phone (i.e., SMS, text) or in person. If no event triggers have taken place in the community for that reporting week, the CHA/CHV will still report to the CHSS to inform them that no alert triggers have been identified. POE screeners will visually detect overt signs and symptoms of illness in travelers, ensure prompt notification of the illness within their supervisory channels and using the form, and refer ill travelers to the nearest health facility to the border crossings.

Community Health Monitoring Supervision

The CHSS will answer alert calls from the CHAs/CHVs. The CHSS will also establish a day and time (once per week) when the CHA/CHV is expected to report to their alerts and/or confirm whether there were no/zero alerts that week. If a CHA/CHV fails to check-in by the established time, the CHSS will attempt to contact that CHA/CHV. The CHSS will also keep track of reports (including zero reporting) that are submitted weekly to the CEBS Data Analysis Team. They will refer to this team regarding any issues raised by the CHA or they experienced themselves. Once an alert has been received by the CHSS, the CHSS will determine if the alert should be dismissed (i.e., doesn't fit an alert trigger, not a concern, etc.) or if they should notify the DSO. If the DSO brings an alert to the CHSS or the CSO, they will work together as a team to triage the alert and enact a district level rapid response.

District Level Rapid Response

CSO/CHSS and the DSO will use their best judgment and knowledge of a reported situation to decide whether to dismiss the alert, assess it further, or escalate it. If the alert needs to be escalated, the DSO will immediately activate the district health team via the alert hotline. The DSO will report any relevant situation information and communicate how the alert was reported through the CEBS structure. While waiting for the county response team to arrive, the DSO

(with support from the CSO) will issue a district level rapid response to further address the alert situation, including administering ORS or temporary safe isolation, if necessary.

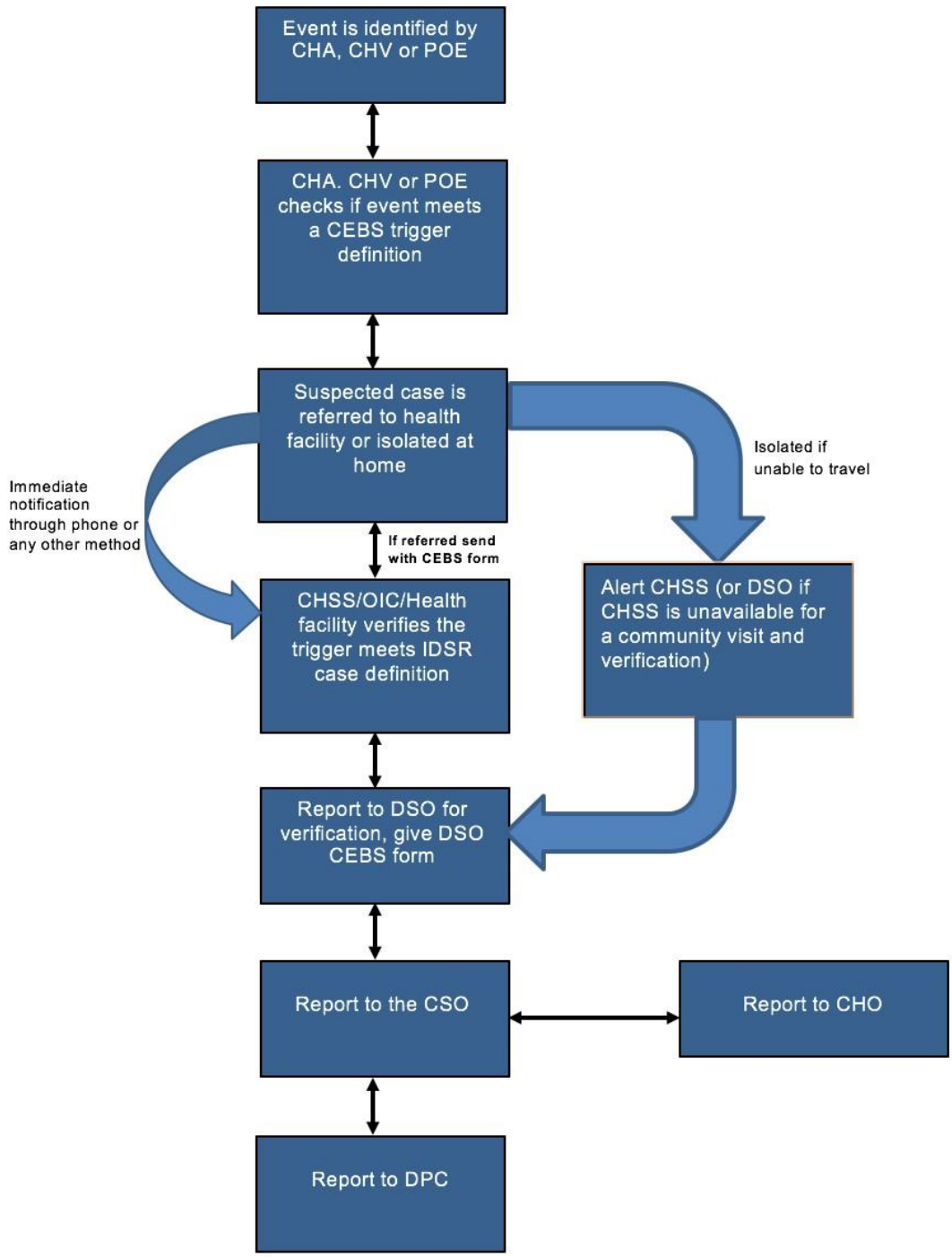
Upon arrival, the district and/or county response team will assess the alert situation and decide if the person needs to be transported to a district or county healthcare center/hospital for treatment. The responders will also coordinate specimen collection while the district response team will transport specimens to the appropriate location designated for the district/county. If the specimen is collected in a health center/hospital, the specimen will be transported to the nearest specimen collection pick-up point for delivery to the appropriate laboratory for testing. The DSO and CSO will decide if the community needs further education on the recent trigger/alert response. If so, they may notify the appropriate CHVs/CHAs and/or local leaders (i.e., chiefs, elders, ward supervisors, etc.) that live/work in that area.

Measurement and Evaluation

As information on alerts/clusters have been received from the EOC/dispatch center, the CEBS Data Analysis Team will follow-up on alerts to record case information. They also will receive information collected and submitted by the DSO or County Health Teams and will compile and add information to the data management system.

For CEBS, the Data Analysis Team will report the proportion of CHAs/CHVs that have completed reporting for the week (including zero reports) as well as a general report of any issues that were raised as a concern. Additionally, the analysis team will report the proportion of alerts escalated to the district level and the proportion of those escalated alerts that result in faster case identification.

EBS REPORTING AND FEEDBACK STRUCTURE



Additional reference materials for EBS can be found in the Event-Based Surveillance Manual

Annex 5A: Step for establishing EBS at national, county, district, and health facility

Step for Event Base Surveillance	National	County	District	Health facility
Step 1	**Establish EBS Hotlines** (PHEOC-4455) and Media Scanning for Alert Detection	Establish EBS Hotlines (PHEOC) and Media Scanning for Alert Detection	Establish EBS Hotlines and Media Scanning for Alert Detection	Establish EBS Hotlines
Step 2	**Alerts detection** ○ Through hotline, SMS, social media messaging or website chats ○ pre-determine alerts ○ register valid alerts in an alert logbook	Alerts detection ○ Through hotline, SMS, social media messaging ○ pre-determine alerts	Alerts detection ○ Through hotline, SMS, social media messaging ○ pre-determine alerts	Alerts detection ○ Through hotline, SMS, social media messaging ○ pre-determine alerts
Step 3	**Registration of EBS Alerts** ○ register valid alerts in a alert logbook ○ information should include: ○ Source/informant: Name, contact phone and time and date of the call/detection. ○ Alert: when it happened, who was affected (cases, deaths) and where it starts and spreads. ○ Follow-up of the alert: Triage, verification, risk assessment and response	Registration of EBS Alerts ○ register valid alerts in a alert logbook ○ information should include: ○ Source/informant: Name, contact phone and time and date of the call/detection. ○ Alert: when it happened, who was affected (cases, deaths) and where it starts and spreads. ○ Follow-up of the alert: Triage, verification, risk assessment and response.	Registration of EBS Alerts ○ register valid alerts in an alert logbook ○ information should include: ○ Source/informant: Name, contact phone and time and date of the call/detection. ○ Alert: when it happened, who was affected (cases, deaths) and where it starts and spreads. ○ Follow-up of the alert: Triage, verification, risk assessment and response.	Registration of EBS Alerts ○ register valid alerts in a alert logbook ○ information should include: ○ Source/informant: Name, contact phone and time and date of the call/detection. ○ Alert: when it happened, who was affected (cases, deaths) and where it starts and spreads. ○ Follow-up of the alert: Triage, verification, risk assessment and response.
Step 4	**Conduct triaging of EBS Alerts**	Conduct triaging of EBS Alerts	Conduct triaging of EBS Alerts	Conduct triaging of EBS Alerts

	Conduct assessment of alerts for verification	Conduct assessment of alerts for verification	Conduct assessment of alerts for verification	Conduct assessment of alerts for verification
Step 5	**Conduct Verification of EBS Alerts** ○ All alerts should be verified within 24 hours ○ Once an alert is verified and requires action, it is determined to be an event	Conduct Verification of EBS Alerts ○ All alerts should be verified within 24 hours ○ Once an alert is verified and requires action, it is determined to be an event	Conduct Verification of EBS Alerts ○ All alerts should be verified within 24 hours ○ Once an alert is verified and requires action, it is determined to be an event	Conduct Verification of EBS Alerts ○ All alerts should be verified within 24 hours ○ Once an alert is verified and requires action, it is determined to be an event
Step 6	**Conduct risk assessment and characterization** ○ The first risk assessment of an event should take place within 48 hours of the detection of one or more alerts	Conduct risk assessment and characterization ○ The first risk assessment of an event should take place within 48 hours of the detection of one or more alerts	Conduct risk assessment and characterization ○ The first risk assessment of an event should take place within 48 hours of the detection of one or more alerts	Conduct risk assessment and characterization ○ The first risk assessment of an event should take place within 48 hours of the detection of one or more alerts

Annex 5B: List of district reporting sites

It is useful to keep a list of contact information for the healthcare workers who may provide information to the district related to surveillance and outbreak events. It may be necessary for those offices to be contacted to provide further information. Include, for example, community health assistants, trained birth attendants, village leaders and public safety officials. This list is to be updated regularly to add new sites and delete defunct or non-participating sites.

EXAMPLE:

Name of health facility or point of patient contact with health service	Address or location of facility or point of contact	Designated focal person for surveillance and response	Telephone number (or other contact such as email)
Lima Health Center	Box 123 Mlima Zone	Dr. Moyo	Tel: 077 123 4567 or send

Annex 5C: Responsibilities of laboratory focal persons at all levels of the reporting system

National level laboratory focal person

- Coordinate all laboratory related activities in support of disease preparedness, surveillance and response
- Define laboratory testing conducted in-country and referred internationally and ensure that all stakeholders are provided with the relevant information
- Maintain an updated list of the laboratories performing required laboratory testing
- Establish agreements with international laboratories for provision of laboratory diagnosis/confirmation of priority diseases not yet available in country and coordinate appropriately
- Support the laboratory through advocacy with higher levels in accessing the necessary infrastructure, equipment and supplies to collect, handle, test, store, and ship specimens safely
- Ensure laboratory results are reported in a timely manner to all relevant stakeholders and used appropriately to inform public health action and patient clinical management

County surveillance or laboratory focal person

- Maintain an updated list of the laboratories that will perform required laboratory testing. (Annex 5E)
- Provide information to all health facilities for correct transport of specimens
- Ensure that laboratory confirmation procedures established at the national level are known and followed in the county and districts
- Ensure that specimen collection, transport materials and laboratory diagnostic tests are available to enable the timely detection of priority diseases (Annex 5F)
- Coordinate with HCFs and laboratory in collecting, safely packaging and reliably transporting the appropriate specimen for confirming the suspected case
- Receive results from the laboratory and report them promptly to all that require them for public health action and patient clinical care.
- Communicate with national laboratory focal person
- Communicate with reference laboratory and National Laboratory Coordinators as necessary

District surveillance or laboratory focal person

- Establish or strengthen routine communication with identified laboratories that receive specimens and health facilities or districts sending the specimens
- Ensure that procedures for specimen collection, transportation, confirming the disease or condition and reporting the results are clear and can be reliably carried out in the designated places
- Communicate with County laboratory focal person (county diagnostic officer, CDO)
- Communicate with the reference laboratory as required

Annex 5D: Laboratory functions by health system level

Level	Collect	Confirm	Report
Community or Healthcare Facilities	• Use standard case definitions to determine initiation of collection process • Assist First Contact Laboratory in specimen collection within approved guidelines • Document specimens with clinical history • Transport specimens to First Contact Laboratory and Referral Laboratory per approved guidelines, include the case-based laboratory reporting form	• Use standardized case definitions to initiate disease confirmation part of investigation • Handle specimens within approved guidelines	• Record details of specimen collection and transport
County, Regional Referral Hospital Laboratory	• Communicate collection policies and procedures to providers • Request additional specimen collection materials as needed • Store specimens per appropriate conditions pending transport or additional studies • Direct additional collection as needed based on outbreak investigation	• Perform laboratory studies for presumptive diagnosis as appropriate and available • Store representative samples for transport to and long-term storage at NRL from the outbreak as needed • Carry out routine analysis of laboratory results • Routinely examine the laboratory analysis for changes in trends	• Record, store and backup laboratory results and details of laboratory testing including all tests done and timeliness of analysis • Provide results to clinical staff and patients • Ensure regular receipt of Laboratory results from National/Regional level • Update line-lists with laboratory results and follow-up on any missing results with testing laboratory • Report results and timeliness details to next level • Report observed changes in trends during routine analysis of laboratory results to the CHT and MOH Use summary information in response to outbreaks

National Reference Laboratory (some laboratories may function as First Contact and as Referral Laboratories)	• Set specimen collection guidelines, policies and procedures with MOH and national reference laboratories • Distribute specimen collection kits for surveillance activities • Request additional specimen collection by laboratory or providers, as needed • Store specimens within approved conditions for further referral and analysis or additional research or investigation	• Set confirmation policies and procedures with MOH and national reference laboratories • Perform laboratories studies for confirmation as appropriate: microscopy, culture, antimicrobial susceptibility testing, serotyping, serological investigation, molecular detections and identification, genomic sequencing • Store representative isolates from the outbreak as needed • Carry out routine analysis of laboratory analysis, data and results and examine for changes in trends	• Record, store and backup laboratory results and details of laboratory testing including all tests done and timeliness of analysis • Report results to County Health Teams and all relevant stakeholders at National and County levels for onward dissemination to submitting health facility or laboratory • Report case-based and summary data to MOH • Report laboratory results from screening sentinel populations at target sites
Global Reference Laboratories	• Request additional specimens as required • Direct additional collection as needed based on outbreak investigation	• Perform additional analysis on referred specimens or isolates as appropriate	• Record, store and backup laboratory results and details of laboratory testing including all tests done and timeliness of analysis • Report laboratory results to National Reference Laboratory or National Laboratory Coordination Team for onward dissemination • Use summary information in response to outbreaks

Annex 5E: List of national laboratories for confirming epidemic prone diseases and conditions

This is the list of the laboratories that you use will for the reportable diseases in Liberia. These laboratories have been specified for confirming immediately reportable diseases and conditions in Liberia in 2016

Priority Disease, condition, or event	Specific test	Name of Lab, address, contact
Acute Flaccid Paralysis (Poliomyelitis)	RT-PCR on stool Viral culture	National Drug Service, Monrovia for referral - tested in Cote D'Ivoire
Cholera (severe acute watery diarrhea)	Culture on stool sample or rectal swab	National Reference Laboratory, Margibi librlab@gmail.com
Acute Bloody Diarrhea (Shigellosis)	Culture on stool sample or rectal swab	National Reference Laboratory, Margibi librlab@gmail.com
Human Rabies	RT-PCR on saliva detection of antibodies anti-rabies on serum or CSF (serology) Detection of rabies antigen on skin biopsy	Not currently performed or referred
Lassa Fever	RDT Antigen ELISA Antigen ELISA IgM ELISA IgG RT-PCR on whole blood	National Reference Laboratory, Margibi librlab@gmail.com
Measles	Serology by ELISA	National Reference Laboratory, Margibi librlab@gmail.com
Meningitis	Gram stain on CSF with culture on CSF (and blood culture)	National Reference Laboratory, Margibi librlab@gmail.com
Neonatal Tetanus	No laboratory test needed	
Viral Hemorrhagic Fever (EVD)	EVD: RT-PCR	National Reference Laboratory, Margibi, librlab@gmail.com Phebe Hospital Bong County Jackson F Doe Hospital Nimba ELWA III Laboratory, Montserrado Redemption Hospital, Montserrado
Yellow Fever	Detection of IgM on blood serum by ELISA Molecular Assay	National Reference Laboratory, Margibi librlab@gmail.com

Maternal Death	Laboratory tests depending of the suspected cause of death	National Reference Laboratory, Margibi librlab@gmail.com
Neonatal Death	Laboratory tests depending of the suspected cause of death	National Reference Laboratory, Margibi librlab@gmail.com
Cluster unexplained health events/illness	Laboratory tests depending of the clinical signs and symptoms.	National Reference Laboratory, Margibi librlab@gmail.com
Cluster unexplained Deaths	Laboratory tests depending of the clinical signs and symptoms	National Reference Laboratory, Margibi librlab@gmail.com

Annex 5F: Specimen for laboratory confirmation for epidemic prone diseases in Liberia

Suspected disease or condition	Diagnostic	Specimen	When to collect	How to prepare. Store and transport specimen	Results and diagnostic labs
Acute Bloody Diarrhea (Shigellosis, Dysentery: Shigella dysenteriae type 1 (SD1) and other shigella) Note: SD1 infections are epidemic-prone and associated with high levels of antibiotic resistance. SD1 is the most significant of the shigella due to the high levels of mortality in the young and elderly and due to its association with hemolytic uremic syndrome (HUS). In case SD1 is not detected *Entamoeba histolytica* should be tested REFERENCE: "Laboratory Methods for the Diagnosis of Epidemic Dysentery and Cholera". CDC/WHO, 1999 CDC, Atlanta, GA, USA	Isolate *Shigella dysenteriae* type 1 (SD1) in culture to confirm Shigella outbreak. If SD1 is confirmed, perform antibiotic sensitivity tests with appropriate drugs. Microscopy on wet preparation prepared from stool for trophozoites	Stool or rectal swab	• Collect specimen when an outbreak is suspected. Collect stool specimen from 5-10 patients who have bloody diarrhea AND have: onset within last 4 days, and before antibiotic treatment has started. • Preferably, collect stool specimen in a clean, dry container. Do not contaminate with urine. Sample stool with a swab, selecting portions of the specimen with blood or mucus. • If stool cannot be collected, obtain a rectal swab sample with a sterile, cotton swab.	• Place stool swab or rectal swab in Cary-Blair transport medium. Ship to laboratory refrigerated. • If Cary-Blair not available, send sample to lab within 2 hours in a clean, dry container with a tightly fitting cap. Specimens not preserved in Cary-Blair will have significant reduction of bacterial viability after 24 hours. • If storage is required, hold specimens at 4-8°C, do not freeze.	• Culture results are usually available 2 to 4 days after receipt by the laboratory. • SD1 isolates should be characterized by antibiotic susceptibility. • After confirmation of an initial 5-10 cases in an outbreak, sample only a small number of cases until the outbreak ends. • Refer to disease specific guidelines in Section 8 for additional information about the epidemic potential of Shigella dysenteriae
Human Rabies	Viral antigens or RNA detection with the direct fluorescent antibody (DFA) and PCR	Secretions, biological fluids (eg saliva, spinal fluid, tears) and tissues (skin biopsy specimen and hair follicles at the nape of the neck) can be used to diagnose rabies during life.	Three saliva samples taken at intervals of 3 to 6 hours, skin and hair follicles are the most sensitive specimens.	Ideally, specimen should be stored at -20°C or less. Serum should be collected from blood samples before freezing and stored at -20°C or less.	• Not currently performed • Diagnosis is very often clinic combined with a history of bite by a rabid animal. • The true disease burden and public health impact due to rabies remains underestimated due to lack of sensitive laboratory diagnostic methods
Lassa Fever	• Presence of LF antigen using RDT and ELISA	• For RDT whole blood or serum • ELISA: Whole blood or serum	Collect blood samples on suspected Lassa fever cases.	• Handle and transport specimen from suspected Lassa fever patients with extreme caution. Wear protective clothing and use barrier precautions.	• Lassa fever diagnostic services are not currently available in Liberia • RT-PCR capacity to test for Lassa Fever is currently being developed at the NRL

	• Presence of IgM and IgG antibodies Lassa (ELISA) • RT-PCR to detect presence of Lassa fever virus genetic material	• For PCR: Whole blood (venous)		• For ELISA or PCR: Refrigerate serum or whole blood	• Send specimens to the National Reference Lab (NRL) for shipment to the external referral lab in Sierra Leone
Measles REFERENCE: WHO Guidelines for Epidemic Preparedness and Response to Measles Outbreaks WHO/CDS/CSR/lSR/99.1	Presence of IgM antibodies to measles virus in serum.	Serum	Collect blood samples on every suspected measles cases. Collect serum for antibody testing at first opportunity or first visit to the health facility.	• For children, collect 1 to 5 ml of venous blood depending on size of child. Collect into a test tube, capillary tube or micro-container. • Separate blood cells from serum: Let clot retract for 30 to 60 minutes at room temperature. Centrifuge at 2000 rpm for 10-20 minutes and transfer serum into a clean glass tube. • If no centrifuge, put sample in refrigerator overnight (4 to 6 hours) until clot retracts. Transfer serum the next morning. • If no centrifuge and no refrigerator, let blood sit at an angle for at least 60 minutes (without shaking or being driven in a vehicle). Transfer serum into a clean tube. • Store serum at 4°C (Use vaccine carriers with four ice packs) • Transport serum samples using appropriate packaging to prevent breaking or leaks during transportation	• The specimen should arrive at the laboratory within 3 days of being collected. • Results are usually available after 7 days. • If as few as 2 out of 5 suspected measles cases are laboratory confirmed, the outbreak is confirmed. • Transport the serum in a hand vaccine carrier at 4oC to 8oC to prevent bacterial overgrowth (up to 7 days). If not refrigerated, serum stored in a clean tube will be good for at least 3 days. • Measles diagnostics labs in NRL and Margibi • Measles negative samples should be tested for rubella
Meningitis REFERENCE: “Laboratory Methods for the Diagnosis of Meningitis Caused by Neisseria	Gram stain of CSF specimen and microscopic examination for Gram negative diplococcus	Cerebral spinal fluid (CSF) Note: CSF is the specimen of choice for culture and	Collect specimens from 5 to 10 cases once the alert or action threshold (see “Meningitis” in Section 8) has been reached.	• Prepare the patient and aseptically collect CSF into sterile bottles with tops. • Immediately collect 1 ml of CSF into a sterile plain and fluoride	• Isolation of Neisseria meningitidis, a fastidious organism, is expensive, and difficult. It requires excellent techniques for specimen collection and handling and expensive media and antisera.

meningitis, Streptococcus pneumoniae and Hemophilus influenzae". WHO document WHO/CDS/EDC/99.7 WHO, Geneva	(Neisseria meningitis); Gram negative coccobacillary (H Influenza); OR Gram positive coccus (S. Pneumoniae) Culture and isolation of bacteria from CSF	microscopic exam. If CSF not available, collect blood (10 ml adults, 1-5 ml for children) for culture.		bottles and transport to the lab immediately	• Initial specimens in an outbreak or for singly occurring isolates of N. meningitis should be serotyped and antibiotic sensitivity performed to ensure appropriate treatment.
Neonatal Tetanus	Laboratory confirmation is not required				
Viral hemorrhagic fevers (EVD, Marburg) REFERENCES: Infection Control for Viral Hemorrhagic Fevers in the African Health Care Setting WHO/EMC/ESR/98.2 Viral Infections of Humans; Epidemiology and Control. 1989. Evans, A.S. (ed). Plenum Medical Book Company, New York	Presence of IgM antibodies against Ebola, Marburg, CCHF, Lassa or Dengue fever – OR – Presence of Ebola in post-mortem skin necropsy	For ELISA: Whole blood, serum or plasma For PCR: Whole blood or blood clot, serum/plasma or tissue For immunohistochemistry: Skin or tissue specimens from fatal cases	Collect specimen from all suspected cases.	• Handle and transport specimen from suspected VHF patients with extreme caution. Wear protective clothing and use barrier precautions. • For ELISA or PCR: Refrigerate serum or clot • Freeze (-20C or colder) tissue specimens for virus isolation • For Immunohistochemistry: Fix skin snip specimen in formalin. Specimen can be stored up to 6 weeks. The specimen is not infectious once it is in formalin. • Store at room temperature • Formalin-fixed specimens may be shipped at room temperature.	• EVD testing is carried out at • National Reference Laboratory, Margibi, librlab@gmail.com • Phebe Hospital Bong County • Jackson F Doe Hospital Nimba • ELWA III Laboratory, Montserrado • Redemption Hospital, Montserrado
Yellow Fever REFERENCES: District guidelines for Yellow Fever Surveillance, WHO/GPVI/EPI/98.09 Yellow Fever. 1998. WHO/EPI/Gen/98.11	ELISA for the presence of yellow fever IgM antibodies	Serum	Collect specimen from the first suspected case of yellow fever. If more than 1 suspected case, collect until specimens have been collected from 5 to 10 suspected cases.	• Collect 10 ml of venous blood from adults, 1-5 ml from children. In a standard glass test tube, capillary tube or microtainer. • Separate blood cells from serum: • Let clot retract for 30 to 60 minutes at room temperature. Centrifuge at 2000 rpm for 10-20 minutes and pour off serum into a clean glass tube.	• The specimen should arrive at the laboratory within 3 days of being collected. • Send specimens to the National Reference Lab (NRL) for initial testing • For confirmation shipment to the external referral lab in Senegal

				• If no centrifuge, put sample in refrigerator overnight (4 to 6 hours) until clot retracts. Pour off serum the next morning. OR, • If no centrifuge and no refrigerator, let blood sit at an angle for at least 60 minutes (without shaking or being driven in a vehicle. Pour off serum into a clean tube. • Store serum at 4°C. • Ship serum samples using appropriate packaging to prevent breaking or leaks during shipment	

Annex 5G: WHO epidemiological weekly calendar

Week Number	2021	2022
01	04-01-21 to 10-01-21	03-01-22 to 09-01-22
02	11-01-21 to 17-01-21	10-01-22 to 16-01-22
03	18-01-21 to 24-01-21	17-01-22 to 23-01-22
04	25-01-21 to 31-01-21	24-01-22 to 30-01-22
05	01-02-21 to 07-02-21	31-01-22 to 06-02-22
06	08-02-21 to 14-02-21	07-02-22 to 13-02-22
07	15-02-21 to 21-02-21	14-02-22 to 20-02-22
08	22-02-21 to 28-02-21	21-02-22 to 27-02-22
09	01-03-21 to 07-03-21	28-02-22 to 06-03-22
10	08-03-21 to 14-03-21	07-03-22 to 13-03-22
11	15-03-21 to 21-03-21	14-03-22 to 20-03-22
12	22-03-21 to 28-03-21	21-03-21 to 27-03-22
13	29-03-21 to 04-04-21	28-03-22 to 03-04-22
14	05-04-21 to 11-04-21	04-04-22 to 10-04-22
15	12-04-21 to 18-04-21	11-04-22 to 17-04-22
16	19-04-21 to 25-04-21	18-04-22 to 24-04-22
17	26-04-21 to 02-05-21	25-04-22 to 01-05-22
18	03-05-21 to 09-05-21	02-05-22 to 08-05-22
19	10-05-21 to 16-05-21	09-05-22 to 15-05-22
20	17-05-21 to 23-05-21	16-05-22 to 22-05-22
21	24-05-21 to 30-05-21	23-05-22 to 29-05-22
22	31-05-21 to 06-06-21	30-05-22 to 05-06-22
23	07-06-21 to 13-06-21	06-06-22 to 12-06-22
24	14-06-21 to 20-06-21	13-06-22 to 19-06-22
25	21-06-21 to 27-06-21	20-06-22 to 26-06-22
26	28-06-21 to 04-07-21	27-06-22 to 03-07-22
27	05-07-21 to 11-07-21	04-07-22 to 10-07-22
28	12-07-21 to 18-07-21	11-07-22 to 17-07-22
29	19-07-21 to 25-07-21	18-02-22 to 24-07-22
30	26-07-21 to 01-08-21	25-07-22 to 31-07-22
31	02-08-21 to 08-08-21	01-08-22 to 07-08-22
32	09-08-21 to 15-08-21	08-08-22 to 14-08-22
33	16-08-21 to 22-08-21	15-08-22 to 21-08-22
34	23-08-21 to 29-08-21	22-08-22 to 28-08-22
35	30-08-21 to 05-09-21	29-08-22 to 04-09-22
36	06-09-21 to 12-09-21	05-09-22 to 11-09-22
37	13-09-21 to 19-09-21	12-09-22 to 18-09-22

Week Number	2021	2022
38	20-09-21 to 26-09-21	19-09-22 to 25-09-22
39	27-09-21 to 03-10-21	26-09-22 to 02-10-22
40	04-10-21 to 10-10-21	03-10-22 to 09-10-22
41	11-10-21 to 17-10-21	10-10-22 to 16-10-22
42	18-10-21 to 24-10-21	17-10-22 to 23-10-22
43	25-10-21 t 31-10-21	24-10-22 to 30-10-22
44	01-11-21 to 07-11-21	31-10-22 to 06-11-22
45	08-11-21 to 14-11-21	07-11-22 to 13-11-22
46	15-11-21 to 21-11-21	14-11-22 to 20-11-22
47	22-11-21 to 28-11-21	21-11-22 to 27-11-22
48	29-11-21 to 05-12-21	28-11-22 to 04-12-22
49	06-12-21 to 12-12-21	05-12-22 to 11-12-22
50	13-12-21 to 19-12-21	12-12-22 to 18-12-22
51	20-12-21 to 26-12-21	19-12-22 to 25-12-22
52	27-12-21 to 02-01-22	26-12-22 to 01-01-23

Annex 5H: Border health surveillance

The purpose of the International Health Regulations (IHR 2005) is to prevent, protect against, control and provide public health response to the international spread of diseases in ways that are relevant and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade. It calls for strengthening of national capacity for surveillance and control, including sites such as points of entry (POE) (i.e., ports, airports and ground crossings); prevention, alert and response to international public health emergencies; global partnerships and international collaboration. In addition to the IHR, it is essential that border health activities be sustainable and align with other surveillance activities under IDSR. A system to detect, report, and appropriately respond to ill travelers is appropriate. The long-term strategy is to work towards full compliance with IHR at official POEs, including strengthening Port Health and further leveraging the presence of the Bureau of Immigration and Naturalization (BIN) at official POEs to augment the public health role. The Border Health Surveillance Annex will be amended over time, in accordance with the IHR and national preparedness guidelines.

Key Partners: Liberian Maritime Authority (LiMA); Liberian Civil Aviation Authority; National Port Authority of Liberia; Roberts International Airport; James Spriggs Payne Airport; Bureau of Immigration and Naturalization (BIN); WHO; International Organization for Migration (IOM); Centers for Disease Control and Prevention (CDC); County Health Teams.

Detection of and Response to Ill Travelers at Points of Entry:
Routine measures should be in place at points of entry for the detection of ill travelers; reporting to health authorities; rapid public health assessment; and access to healthcare for severely ill travelers or those whose symptoms suggest a risk to public health, including safe transportation from the point of entry to a healthcare facility.

Detection of ill travelers should include, at a minimum, the following:

- Reporting of ill travelers or deaths onboard international aircraft arriving at Liberian airports to Port Health as required by International Civil Aviation Authority regulations
- Reporting of ill travelers or deaths onboard ships arriving at official ports to Port Health or the Port Authority as required by the International Ship and Port Facility Security Code (ISPS Code) of the International Maritime Organization
- BIN officers who are present at every official point of entry and who interact with all travelers making formal entry into Liberia should be trained to visually observe travelers for signs of illness and notify Port Health or the County Health Officers of ill travelers meeting certain syndrome definitions. (Refer to Annex 1B for CEBS Triggers)

- Port Health officers who are present at select points of entry should be trained to recognize ill travelers they encounter during their routine assessments as well as to conduct an initial assessment of whether the illness poses a potential public health risk, including access to supervisory support from County Health Team in conducting such assessments.

The initial response to an ill traveler detected at a point of entry should include, at a minimum, the following:

- The ability to rapidly isolate the ill traveler from others to avoid potential spread of disease. Isolation may occur in a private room, a vehicle, or outdoors in a location that is protected from the elements, as available.
- County Health Teams should be available, either in person or remotely by telephone, to conduct a rapid assessment of ill travelers detected at points of entry to determine if a communicable disease of public health concern is suspected.
- A healthcare facility located close to the point of entry should be designated to provide medical care as needed to severely ill travelers or those with a suspected communicable disease of public health concern. The designated facility should have adequate infection prevention and control capacity to prevent spread of disease to staff or other patients and diagnostic capacity including access to laboratory diagnostics. For ground crossings, depending on the location of the point of entry, consideration may be given to use of a healthcare facility on the other side of the border if closer or with greater capacity to provide care with coordination of relevant authorities in the other country.
- Ambulance service or other safe transportation should be available to facilitate transport of ill travelers from the point of entry to the designated healthcare facility.

As needed, during a declared public health emergency affecting international travelers or with the potential for international spread of disease, there should also be capacity to implement at short notice, traveler screening or other border health measures as recommended by the WHO. [Refer to the SOPs for Ports of Entry]

Role of Competent Authorities:

Authorities at every port of entry shall:

- Be responsible for monitoring baggage, cargo, containers, conveyances, goods, postal parcels and human remains departing and arriving from affected areas, so that they are maintained in such a condition that they are free of sources of infection or contamination, including vectors and reservoirs;
- Ensure, as far as practicable, that facilities used by travelers at Points of Entry are

maintained in a sanitary condition and are kept free of sources of infection or contamination, including vectors and reservoirs;

- Be responsible for the supervision of any de-ratting, disinfection, disinfection or decontamination of baggage, cargo, containers, conveyances, goods, postal parcels and human remains or sanitary measures for persons, as appropriate under these Regulations;
- Advise conveyance operators, as far in advance as possible, of their intent to apply control measures to a conveyance, and shall provide, where available, written information concerning the methods to be employed.

Reporting Structure

Reports from POEs to the communities on alerts/events/triggers/cases/conditions should be channeled through the nearest healthcare facility.

Detecting Communicable Diseases in Recent Travelers in Communities

The IHR (2005) include the control of borders (airports, seaports, ground crossings) and containment at source of public health events. Because infected travelers may not be symptomatic at the time of travel, not recognized at the time of entry, or enter the country at a location other than an official point of entry, there is a need to rely on communities – especially those close to borders or other international points of entry – to be vigilant about detecting and reporting illnesses or deaths in recent travelers if a communicable disease is suspected. Community event-based surveillance (CEBS) is an important part of IDSR to facilitate timely detection and verification of suspected public health emergencies. Event-based surveillance should additionally address investigation of rumors or reports of "unexplained illness or clusters" as an event category for reporting from lower levels to the national level. Trainings on CEBS should promote the ability of border communities to detect and report travel- related illnesses or deaths. Refer to the CEBS Information in Annex 2C.

Cross-border surveillance protects against:

- international spread of serious risks to public health and
- unnecessary or excessive use of restrictions in traffic or trade for public health purposes

Routine surveillance at land POE

If a traveler is identified with signs and symptoms at the primary screening point the following actions are to occur:

- Upon being detected as a suspected case at initial screening, the traveler should be immediately isolated for secondary screening by staff in PPE.
- The traveler/suspect case should be kept separate from others including family members.
- The suspected case should be transferred to the nearest holding room where Alert Notification Form is completed by the senior screener at the POE.

- All persons travelling with the suspected case should be listed on the Alert Notification.
- The suspected case should remain in this area until they are escorted to the HCF by a Healthcare Worker.
- The suspected case may be able to attend the HCF in an ambulance or with a POE staff member if they are available.

Providing data

Data is collected from POE's based on whether they are designated as a CEBS level or Healthcare facility level. These designations are determined by the National Level Government. Refer to Section 2 of IDSR guidelines for reporting lines and Annex 11 for specific reporting forms.

Data Management

- Ensure that all competed forms are stored in a proper way (for example by week in a locked cupboard).
- Report suspected cases to the HCF as soon as possible to organize transport.
- The Alert Notification form should be sent with the patient to the HCF for processing. A record of this form should be kept at the POE.

During an emergency or outbreak response, cross-border coordination should include:

- Partners meeting as soon as the epidemic or event is recognized
- Assessing the need for, and request support from, the regional or national Emergency Preparedness and Response Committee or Rapid Response Teams when necessary
- Meeting regularly to assess the status of the outbreak or epidemic as indicated
- Regularly sharing surveillance data addressing case counts (including zero cases if applicable) and status of contact tracing (if indicated)
- Sharing information on travel history of cases and identified contacts to facilitate coordinated response on both sides of the border
- Regularly reviewing the epidemic response and taking action to improve epidemic control actions as indicated
- Documenting and communicate epidemic response actions escalating notifications as needed

Emergency Response

National and county health authorities and key partners have begun the development of all-hazards communicable disease surveillance and response capability for both outbreak and steady operations at points of entry and in border communities. These Emergency Preparedness

and Response Plans, at national and county levels, are available from the MOH and are in keeping with the IHR. The EPR plans include procedures to prevent the travel of infected or exposed persons who could pose a potential public health threat if they were allowed to travel and to lift these restrictions for individual travelers as soon as they are no longer a risk.

Public health emergencies involving travelers or with the potential for international spread of disease will result in immediate notification of the national level (National Focal Point, NFP). The national authority will then rapidly convene a committee of experts to conduct an assessment of whether the case or event constitutes a potential public health emergency of international concern (using the decision instrument provided in Annex 2A of the IHR 2005). If the criteria are met, the NFP has the authority to notify WHO immediately.

As described in the surveillance matrix, the NFP should additionally notify national counterparts in other countries if an event is identified that impacts the residents of that country.

Annex 6: Make a plan for routine analysis of surveillance information

A minimum plan for routine analysis of surveillance information should include the following information which could be presented as tables, graphs and maps.

a) Calculate completeness and timeliness of reporting. Monitoring whether surveillance reports are received on time and if all reporting sites have reported is an essential first step in the routine analysis of the surveillance system. This assists the district (or other level) surveillance team in identifying silent areas (areas where health events may be occurring, but which are not being reported) or reporting sites that need assistance in transmitting their reports. It also depicts how representative the data is for the specific level.

b) Calculate district (or other level) totals by week (or by month). Update the total number of reported cases and deaths for the whole year. This is summary information that helps to describe what has happened in the particular reporting period.

c) Prepare cumulative totals of cases, deaths and case-fatality rates since the beginning of the reporting period.

d) Use geographical variables (such as hospitals, residence, reporting site, neighborhoods, village and so on) to analyze the distribution of cases by place. This is information that will help to identify high-risk areas.

e) Analyze disease trends for at least the diseases of highest priority in your district. Monitor the trends for cases, deaths, and case fatality rates to identify any unusual increases or disease patterns.

f) Data validation and quality analysis. Establish a data validation team at all levels. Meetings should be held periodically to review reports. All reports submitted must be checked for consistency with various sources.

An example of a product from an analysis plan for routine surveillance information is on the next page.

Example of data analyzed for cholera in Country A, 2017				
Distribution by Time				
Onset Week	Total	Outcome		Case-fatality rate
		Alive	Deaths	
26	23	16	7	30
27	97	92	5	5
28	88	87	1	1
29	21	19	2	10
32	11	11	0	0
33	11	9	2	18
Total	251	234	17	7
Distribution by Place				
District	Total	Outcome		Case-fatality rate
		Alive	Deaths	
District 1	1	1	0	0
District 2	92	86	6	7
District 3	158	147	11	7
Total	251	234	17	7
District		Population	Cases	Attack rate per 100 000
District 1		179 888	92	51
District 2		78 524	158	201
Distribution by Person				
Age Group	Total	Outcome		Case-fatality rate
		Alive	Deaths	
0-4	37	35	2	5
5-9	55	50	5	9
10-14	30	28	2	7
15-19	23	23	0	0
20-24	28	27	1	4
25-29	26	24	2	8
30-34	12	11	1	8
35-39	8	6	2	25
40+	32	30	2	6
Total	251	234	17	7
Sex	Total	Outcome		Case-fatality rate
		Alive	Deaths	
Female	122	114	8	7
Male	129	120	9	7
Total	251	234	17	7

Annex 6A: How to manually make a line graph

How to make a line graph	
1.	Decide what information you want to show on the graph.
2.	Write a title that describes what the graph will contain (for example, *monthly totals for inpatient cases and deaths due to malaria with severe anemia*).
3.	Decide on the range of numbers to show on the vertical axis. • Start with 0 as the lowest number
4.	Label the vertical axis, explaining what the numbers represent.
5.	Label the horizontal axis and mark the time units on it. The horizontal axis is divided into equal units of time. Usually you will begin with the beginning of an outbreak, or the beginning of a calendar period, such as a week, month or year.
6.	Make each bar on the graph the same width.
7.	Mark the number of cases on the graph or histogram. For each unit of time on the horizontal axis, find the number of cases on the vertical axis. Fill in one square for each case, or for some number of cases in the column for the day on which the patient was seen. Show deaths by using a different pattern of lines, or a different colour. If you are making a line graph, instead of making a bar or filled-in squares, draw a cross or make a point where the horizontal and vertical lines cross. Connect the points on the graph to show the trend going up or down over time.

Annex 6B: Types of Analysis, Objectives, Tools and Methods

This section gives more detail on how to receive surveillance data and analyze it by time, place and person. The analysis may be done electronically or manually. Methods for carrying out the analysis and steps for interpreting and summarizing the findings are also included. Information in this section can be applied to health facility and district levels. For further details on analysis of investigation findings and during outbreaks see Section 4 ("Analyze data about the outbreak").

Analyze data by time, place and person

Findings from data analysis may initiate investigations and subsequent response to an outbreak, condition, or public health event. Data should be analyzed by time, place and person (see Table below).

TYPES OF ANALYSIS, OBJECTIVES, TOOLS AND METHODS

Type of analysis	Objective	Method	Data Display Tools
Time	Detect abrupt or long- term changes in disease or unusual event occurrence, how many occurred, the seasonality and the period of time from exposure to onset of symptoms.	Compare the number of case reports received for the current period with the number received in a previous period (days, weeks, months, quarters, seasons or years).	Record summary totals in a table or on a line graph or histogram or sequential maps.
Place	Identify where cases are occurring (for example, to identify high-risk area or locations of populations at risk for the disease).	Plot cases on a map and look for clusters or relationships between the location of the cases and the health event being investigated. (for example, cases near a river, cases near a market)	Plot cases on a spot map of the district or area affected during an outbreak. Dot density analysis can also be used to depict the number of cases by geographical location. NB: The information can also be presented in a table or a bar chart, but plotting cases in a map will assist in quick assessment and allow prompt

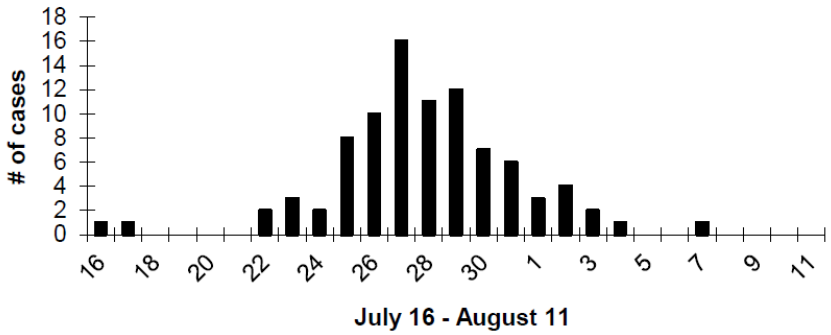
Person	Describe reasons for changes in disease occurrence, how it occurred, who is at greatest risk for the disease, and potential risk factors.	Depending on the disease, characterize cases according to the data reported for case-based surveillance such as age, sex, place of work, immunization status, school attendance, and other known risk factors for the diseases.	Extract specific data about the population affected and summarize in a table or a bar chart or a pie chart

Analyze data by time

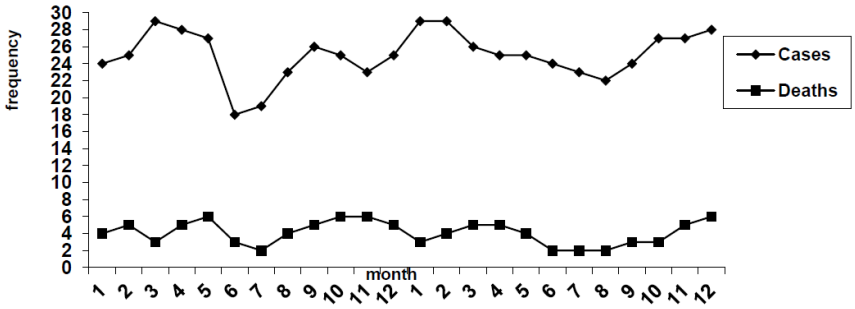
Analyzing data to detect changes in the numbers of cases and deaths over time is the purpose of "time" analysis. Observing disease trends over time helps to show when regular changes occur and can be predicted. Other disease rates make unpredictable changes. By examining events that occur before a disease rate increases or decreases, it may be possible to identify causes and appropriate public health actions for controlling or preventing further occurrence of the disease.

Data about time is usually shown on a graph. The number or rate of cases or deaths is placed on the vertical or y-axis. The time period being evaluated is placed along the horizontal or x-axis. Events that occurred that might affect the particular disease being analyzed can also be noted on the graph. For example, the graph may indicate the date that refresher training was conducted for health workers in IMCI case management for childhood diseases. Graphs can show how many cases and deaths have occurred in a given time. It is easier to see changes in the number of cases and deaths by using a graph, especially for large numbers of cases or showing cases over a period of time. Graphs are made with bars (a bar graph) or lines (a line graph) to measure the number of cases over time. Below are examples of a bar graph and a line graph.

Number of cases by day of onset of symptoms



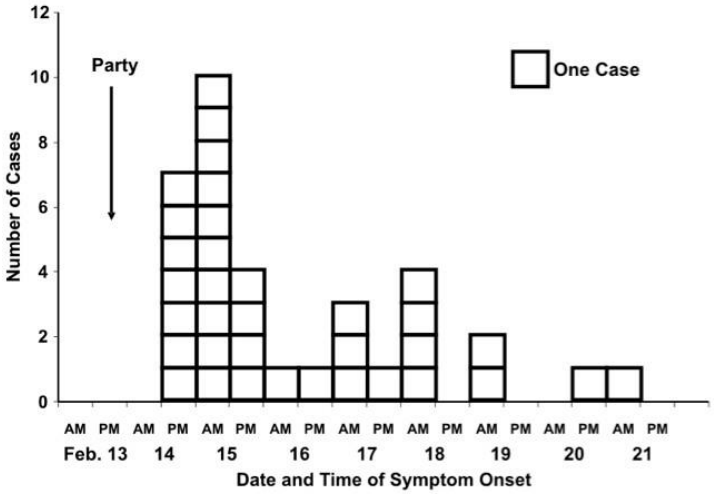
Number of cases of diarrhea with blood by month



Using a histogram

A histogram is like a line graph except that it uses a symbol or a point (in the above example, squares and diamond shapes) to represent cases rather than a line to connect plotted points. Use histograms to analyze outbreak data and to show an epidemic curve (an "Epi" curve). For acute outbreak diseases, time may be shown in 1-day, 2-day, 3-day or 1-week or longer intervals. In a histogram, the cases are stacked on the graph in adjoining columns so that the number of cases and deaths can be observed during the period under observation. Below is an example of a histogram.

Number of Cases of Salmonella Enteriditis Among Party Attendees by Date and Time of Onset



To make a graph:

- Decide what information you want to show on the graph
- Write a title that describes what the graph will contain (for example, "Monthly totals for inpatient cases and deaths due to malaria with severe anemia)
- Start with 0 as the lowest number for the vertical axis
- Write numbers going up until you reach a number higher than the cases

- Chose an interval for the numbers you will show on the vertical axis if the numbers are too large
- Label the vertical axis explaining what the numbers represent
- Label the horizontal axis and mark the time units on it
- The horizontal axis is divided into equal units of time
- Usually, it will begin at the beginning of an outbreak or the beginning of a calendar period, such as a month or year
- Mark each bar on the graph the same width
- Mark the number of cases on the graph or histogram
- For each unit of time on the horizontal axis, find the number of cases on the vertical axis
- Fill in one square for each case or for some number of cases in the column for the day on which the patient was seen
- Show deaths by using a different symbol or pattern or colored line
- If making a line graph instead of a bar, draw a point where the horizontal and vertical lines cross
- Connect the points on the graph to show the trend going up or down (or staying the same) over time

Analyze the data by place

Analyzing data according to place gives information about where a disease is occurring. Establishing and regularly updating a spot map of cases for selected diseases can give ideas as to where, how, and why the disease is spreading. An analysis of place provides information that is used to:

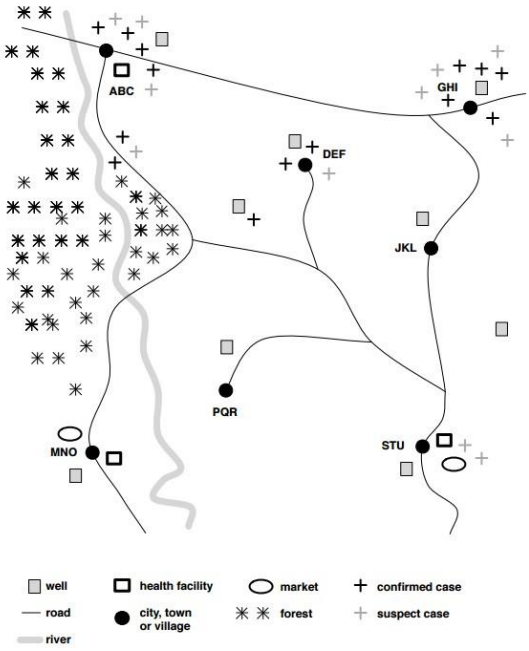
- Identify the physical features of the land
- Understand the population distribution and density of the area
- Describe the variety of populations in an area (for example, is it a farming area, a high-density urban area, a refugee settlement, etc.)
- Describe environmental factors (i.e., major water sources in a community, such as rivers, lakes, pumps, etc.)
- Identify clinics, meeting houses, schools, community buildings, and large shelters that can be used during emergency situations
- Show distances between health units and villages (by travel time or distance in kilometers)
- Plan routes for supervisory or case investigation activities
- Spot locations of disease cases and identify populations at highest risk for transmission of specific diseases.

Create a map to use as part of routine surveillance of disease

- Obtain a local map from the local government office or land department. Trace the main features needed for health work onto transparent paper and then to a large card that can be hung on a wall for easy use. If no official map is available, sketch the whole county area.
- Prepare a code of signs to use on the map, to represent each of the following features that will be shown on the map:
- Location of health facilities in the county and the areas each serves
- Geographic areas such as forests, savannah areas, villages, roads, and cities
- Socio-economic areas of relevance to priority diseases

- Significant occupation sites such as mines or construction sites
- Location of suspected and confirmed cases of priority diseases
- Location of previous confirmed outbreaks

SPOT MAP EXAMPLE



Analyze data by person

Analysis by person is recommended for describing the population at risk for epidemic-prone diseases, for Liberia this includes the priority conditions, and diseases targeted for eradication or elimination. These are diseases that are reported with case-based surveillance so data about personal characteristics is likely to be available. Analysis by person is not routinely recommended for summary data.

A simple count of cases does not provide all of the information needed to understand the impact of a disease on the community, health facility or county. Simple percentages and rates are useful for comparing information reported to the county.

The first step in analyzing person data is to identify the numerator and denominator for calculating percentages and rates.

- The numerator is the number of specific events being measured (such as the actual number of cases or deaths of a given disease, for example the number of cases of measles cases that occurred during the year in children less than 5 years of age)
- The denominator is the number of all events being measured (such as the size of the population in which the cases or deaths of a given disease occurred, or the population at risk)

Simple percentages can be calculated to compare information from populations of different sizes. For example:

Health facility	Number of measles cases this year in children < 5 years of age
A	42
B	30

By looking only at the number of reported cases, it appears that a higher occurrence of measles cases occurred in health facility A. But when the number of reported cases at each health facility is compared to the total number of school-aged children living in each catchment area, then the situation becomes clearer.

Health facility	Number of school-aged children living in the catchment area
A	1150
B	600

By calculating the percentage of the number of cases of measles during the last 12 months in school-aged children, the county officer can compare the impact of the illness on each facility. The numerator is the number of cases that occurred over one year. The denominator is the number of school aged children at risk in each catchment area. In this example, the incidence rate is higher in health facility B than in health facility A.

Health facility	Percentage of cases of Guinea worm in school-aged
A	(42/1150)*100 = 3.7%
B	(30/600)*100 = 5.0%

Make a table for person analysis

For each priority disease or condition under surveillance, use a table to analyze characteristics of the patients who are becoming ill. A table is a set of data set in columns and rows. The purpose of a table is to present the data in a simple way. For surveillance and monitoring, use a table to show the number of cases and deaths from a given disease that occurred in a given time.

To make a table:

- Decide what information you want to show in the table

- For example, consider analysis on measles cases and deaths by age group
- Decide how many columns and rows will be needed
- Add an extra row at the bottom and an extra column at the right to show totals as needed.
- In the below, for example, a row will be needed for each age group and a column for each variable, such as age group, cases, and deaths.
- Label all the rows and columns, including measurements of time
- In the below example, the analysis is done yearly.
- Analysis of person is recommended for analysis of outbreak data.
- Record the total number of cases and deaths as indicated in each row
- Check to be sure the correct numbers are in the correct row or column.

Age group	Number ofreported cases	Number of deaths
0-4 years	40	4
5-14 years	9	1
15 years and older	1	0
Age unknown	28	0
Total	78	5

Calculate the percentage of cases occurring within a given age group

When the summary totals for each age group are entered, one analysis that can be done is to find out what percent of the cases occurred in any given age group. Use the information in the table to:

- Identify the total number of cases reported within each age group from the summary data for which time or person characteristics are known
- For example, there are 40 cases in children 0 up through 4 years of age
- Calculate the total number of cases for the time or characteristic being measured
- In this example, there are 50 cases whose age is known
- Divide the total number of cases within each age group by the total number of reported cases whose age is known
- For example, for children age 0 and up through 4 years, divide 40 by 50; the answer is 0.8
- Multiply the answer times 100 to calculate the percent
- 0.8 X 100. The answer is 80%

Age group	Number of reported cases	% of reported cases in each age group
0-4 years	40	80%
5-14 years	9	18%

15 years and older	1	2%
Age unknown	28	-
Total	78	-

Calculate a case fatality rate

A case fatality rate helps to:

- Indicate whether a case is identified promptly
- Indicate any problems with case-management once the disease has been diagnosed
- Identify a more virulent, new or drug-resistant pathogen
- Indicate poor quality of care or no medical care
- Compare the quality of case management between different catchment areas, cities, and counties

Public health programs can impact the case fatality ratio by ensuring that cases are promptly detected and good quality case management takes place. Some disease control recommendations for specific diseases include reducing the case fatality rate as a target for measuring whether the outbreak response has been effective.

To calculate a case fatality rate:

- Calculate the total number of deaths
- In the below example of measles data, there are 5 deaths.
- Divide the total number of deaths into the total number of reported cases
- For example, the total number of reported cases is 78 and the number of deaths is 5; divide 5 by 78 to get 0.06.
- Multiple the answer times 100
- 0.06 multiplied by 100 is 6%

Age group	Number of reported cases	Number of deaths	Case fatality rate
0-4 years	40	4	10%
5-14 years	9	1	11%
15 years and older	1	0	0%
Age unknown	28	0	0%
Total	78	5	6%

Annex 6C: Checklist of laboratory supplies for use in an outbreak investigation

For using standard safety precautions when collecting and handling all specimens:

_____ Pieces of bar soap for hand-washing
_____ Bleach for decontamination
_____ Supply of PPEs (gloves, mask, gowns, etc)
_____ Triple package and refrigerant for sample transportation,
_____ Safety boxes for collecting and disposing of contaminated supplies
_____ Equipment (Biosafety cabinet)

For collecting laboratory specimens :

Blood

_____ Sterile needles, different sizes
_____ Sterile syringes
_____ Vacutainers
_____ Test tube for serum
_____ Antiseptic skin disinfectant
_____ Tourniquets
_____ Transport tubes with screw-on tops
_____ Transport media (Cary-Blair, Trans-Isolate, VTM)

Blood films (malaria)

- Sterile or disposable lancet
- Glass slides and cover slips
- Slide box

Respiratory specimens

_____ Swabs
_____ Viral transport medium

Cerebrospinal fluid (CSF)

_____ Local anaesthetic
_____ Needle and syringe for anaesthetic
_____ Antiseptic skin disinfectant
_____ Sterile screw-top tubes and tube rack
_____ Microscope slides in a box
_____ Trans-Isolate transport medium
_____ Latex kit
_____ Gram stain
_____ May Grunwald Giemsa Kit

Stool

_____ Stool containers
_____ Rectal swabs
_____ Cary-Blair transport medium

Plague

_____ Gram stain kit
_____ Rapid diagnostic test (dipstix AgF1) _____ Cary-Blair transport

If health facility has a centrifuge:

_____ Sterile pipette and bulb
_____ Sterile glass or plastic tube, or bottle with a screw-on top

For packaging and transporting samples:

_____ Cold box with frozen ice packs or vacuum flask
_____ Cotton wool for cushioning sample to avoid breakage
_____ Labels for addressing items to lab
_____ Labels for marking “store in a refrigerator” on outside of the shipping box
_____ Case forms and line lists to act as specimen transmittal form
_____ marking pen to mark tubes with patient’s name and ID number (if assigned by the district)

Reagents and supplies for testing

_____ Reagents
_____ Media (MacConkey, Blood agar,
____ others

Appropriate personal protection (PPE) (for all EPR diseases such as VHF, suspected avian influenza, etc.)

In some events which present with fever, it might be worthy carrying malaria rapid diagnostic kits (mRDT) if found not available in a nearby health facility

Annex 6D: Recommended list of Personal Protective Equipment (PPE)

The following equipment should be available for the personal protection of all staff investigating a suspected case with highly infectious disease e.g. viral hemorrhagic fever, avian influenza etc. (See reference for the guidelines to use and select PPE at the end of the section).The equipment should be held at Provincial/Regional level, if the PPE kits are inadequate, preposition of the PPE should be done in high risk provinces/region which are likely to report these specific or which have been identified to be at risk through risk assessment. See Annex 7A for other stocks that may be needed to respond to a suspected outbreak.

Composition of one set of PPE	**WHO Deployment Kit**
1 surgical gown	100 surgical gowns
1 coverall	100 coveralls
1 head cover	100 head cover
2 pairs of goggles	50 pair of goggles
1 pair of rubber gloves	100 pairs
1 mask N95	200 pieces
1 boot cover*	0
1 box 50 pairs of examination gloves	800 pairs of examination gloves
1 plastic apron re-usable	20 pieces
1 pair of gum boots	20 Gum boots
1 hand sprayer	2 of 1.5 litres each
1 Back sprayer	1 back sprayer of 10-12 litres
Specimen containers	
Scotch of tapes	3 rolls
Anti fog for goggles	3 bottles
Chlorine	
N.B:: chlorine and gum boots can be purchased locally; biohazard bags for PPE/Waste management must be purchased * Not essential	

Annex 6E: How to conduct a register review

1. Background

The purpose of a register review is to collect information on cases admitted to the health facility during a specific period. Explain that the information will be used to determine what caused the outbreak or increase in number of cases. The register should be used for:

- Any inpatient facility with more than 10 hospital beds. Give priority to government health facilities.
- Large reference or teaching hospitals with pediatric wards because they receive referrals from other health facilities.
- Small hospitals or health facilities that serve remote areas and high-risk populations. For example, nomadic groups, refugees, or areas without regularly scheduled health services.

2. Meet with the health facility staff and explain the purpose of the review.

Explain to the health facility's senior staff the purpose of the review. The information will assist the district and health facility in determining the most appropriate action for limiting the outbreak and preventing future cases from occurring. Emphasize that the activity is an information-gathering exercise, and is not a review of health worker performance.

3. Arrange to conduct the review.

Arrange a time to conduct the review when staff who will assist with the review are present and available to help or to answer questions.

4. Identify sources of information.

During the visit, depending on the priority disease or condition or events being investigated, check inpatient registers for the pediatric and infectious disease wards. The inpatient register for the pediatric ward is a good source because it lists all children admitted to the ward. Annual summary reports are not always accurate, and outpatient registers often include only a provisional diagnosis.

Review the system and procedures health workers use to record information in the registers about diagnoses. Make sure that the information needed for investigating any suspected case is available. At a minimum, the register should include:

- the patient's name and location
- the signs and symptoms
- date of onset of symptoms and outcome (for example, date of death, if relevant)
- immunization status, if appropriate to this disease.

If the health facility does not keep at least the minimum information, talk with senior staff about how to strengthen the record keeping so that the minimum information is collected.

5. Conduct the record review at the scheduled date and time.

Go to the selected wards as scheduled. During the visit, look in the health facility registers for cases and deaths that may be suspected cases of a priority disease. These should be cases or deaths that meet the standard case definition for suspected cases. Find out whether the suspected case was investigated and reported according to the national guidelines.

6. Line-list the suspected cases that are found.

Record information about the suspected cases. This information will be used during case investigation activities.

7. Provide feedback to the health facility staff.

Meet with the health facility supervisor and discuss the findings of the activity. Use the opportunity to review any features of case management for the illness that may help health workers in the facility. Reinforce the importance of immediate reporting and case investigation as tools for prevention of priority diseases and conditions. Use opportunity to emphasize on the need for IPC and minimum PPE

8. Report any suspected cases to the next level.

Report the suspected cases according to local procedures. Investigate the case further to determine the factors that placed the patient at risk for the disease or condition. Develop an appropriate case response.

Annex 6F: Sample line list

No.	Name of patient	District or county	Ward	Locality	Age	Sex (M-Male or F-Female)	Occupation	Date of onset	Date seen at HF	Diarrhea (Yes/ No)	Vomiting (Yes/No)	Severe dehydration (Yes/ No)	Specimen	Results	Hospitalized (Yes/ No)	Place of admission	Treatment given	Outcome	Date of discharge or death	Comments
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				

Annex 6G: Contacts recording sheet

Contacts[1] Recording Sheet filled in by _____

Case name _____ Case number (if assigned) _____

Case's Village/neighbourhood _____ Chief or Community leader _____

District/Town _____ Province/Region _____

Date of symptom onset _____ Hospitalized/Found in the community _____

If hospitalized, Hospital _____ Date of Admission: _____

Surname	Other Name	Relationship with the case	Health worker (Y/N), if yes which facility?	Age (yrs)	Sex (M/F)	Phone number	Head of Household	Village/ neighborhood	Chief or Community leader	District/Town	Type of Contact (1, 2 or 3, list all)	Date of last contact	Last date for follow-up	1st Visit	Outcome

Contacts are defined as:

1 - sleeping in the same household with a suspected

2 - direct physical contacts with the case (dead or alive)

3 - has touched his / her linens or body fluids

4 – has eaten or touched a sick or dead animal

Annex 6H: Contact tracing form (follow-up)

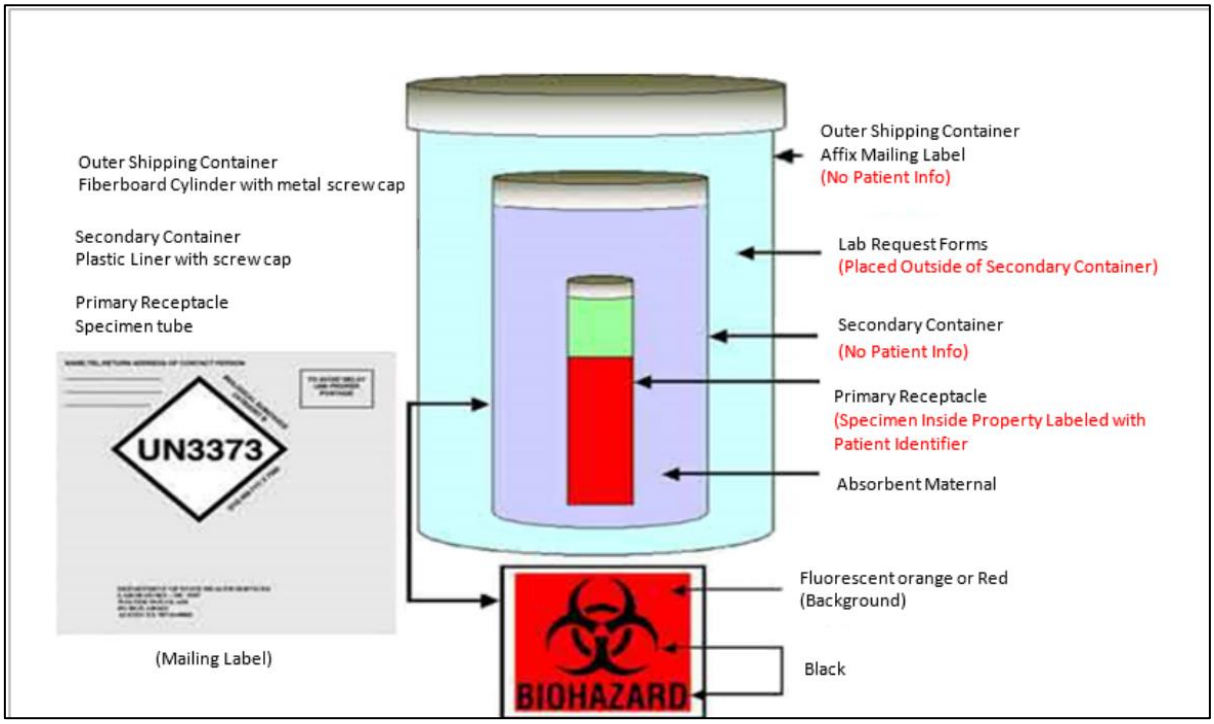
Contact Tracing Form – by Village Team _____ Volunteer's name _____
Village _____ Chief or Community leader _____
District/Town _____ Province/Region _____

CN	Family Name	First Name	Age	Sex	Date of last contact	Day of Follow-up																		
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Record "O" if the contact has not developed fever or bleeding

Record "X" if the contact has died or developed fever and/or bleeding (complete Case Investigation Form and, if alive, refer to the hospital)

Annex 6I: Types of Triple Packaging of samples during an Outbreak



Source: https://medicine-science-and-more.com

Annex 6J: Example of an analytical study to test hypothesis

Case control study to determine potential exposures to cholera in Central African Republic. The unadjusted matched analysis indicates that persons who ate cold cassava leaves (one of the step foods in the region. Odds ratio (OR) = 3.07; 95% Confidence Interval (C.I) = [1.155; 8.163]; P = 0.020) were at greater odds of having cholera. The association was statistically significant at $P < 0.05$.

Risk factors	Odds ratio	95% Confidence interval	P values
Drinking water from the Oubangui river	1.16	[0.415 ; 3.239]	0.983
Drinking water sold on the streets	0.25	[0.027 ; 2.421]	0.422
Eating cold cassava leaves	3.07	[1.155 ; 8.163]	0.020
Eating hot cassava leaves	0.57	[0.090 ; 3.669]	0.900
Attending funerals from September 2011	0.56	[0.192 ; 1.643]	0.627
Washing hands after using the toilet	0.85	[0.295 ; 1.713]	0.395
Eating outside	0.66	[0.259 ; 1.713]	0.206
Eating dried meats	0.45	[0.184 ; 1.208]	0.062
Eating fresh meats	0.41	[0.143 ; 1.228]	0.060
Eating hot smoked fish	0.83	[0.328 ; 2.111]	0.354
Eating cold smoked fish	0.89	[0.360 ; 2.235]	0.410
Washing hands before eating	1.05	[0.318 ; 3.512]	0.466

Excerpt obtained from
https://www.cdcfoundation.org/sites/default/files/upload/pdf/2011CholeraOutbreakReport.pdf

Annex 7: County epidemic preparedness and response committee

County-level Epidemic Preparedness and Response (EPR) Committees are coordinating committees composed of technical and non-technical members from health and other sectors. The role of the EPR Committee is to develop and oversee the regular evaluation and implementation of epidemic preparedness strategies, action plans, and procedures. Each HERC will need to go through a series of developmental steps, some common across counties and some that will need to differ based on county-specific contexts. Coordination with the national level and district level is essential to the successful operation of a county-level EPRC during the planning phase. Refer to each County Epidemic Preparedness and Response Plan for specific details, including members.

In Liberia the County EPR Committee shall do the following:

- Developed a County epidemic preparedness and response plan, in alignment with national guidelines that accounts for potential emergencies including disease outbreaks and other emergent public health events or hazards. These plans are under review by the National IMS with feedback provided.
- Ensure coordination and integration between community, health facility, district, county, and national level components of IDSR strategy
- Establish effective community risk communications plans for sharing information with communities before, during, and after public health emergency, including the public, media, and partners
- Develop an epidemic communication plan for developing strategies for working with health facilities, district, county and national level. The plan should include how communication will be coordinated, message development, communication channels, consistence of messaging, and sharing information
- Mobilize resources for epidemic prevention and control including procurement of response and communication supplies, including stockpiling supplies for the county Emergency Operations Centers (EOCs)
- Ensure all reporting sites are aware of the use of thresholds for reporting acute outbreaks or events
- Work with county and national level EOCs, coordinate training of community, health facility, district and county personnel in emergency preparedness and response
- Work with county and national level EOCs, coordinate the ongoing pre-emergency preparedness assessments
- Work with county and national level EOCs, coordinate post-emergency evaluation and plan to disseminate findings with relevant stakeholders, including the affected communities

Committee Members

The committee should include a mix of representatives from the public, non-governmental organizations (NGO) and private sectors. Participants may include:

County police commander
County Inspector
County Immigration commander
County Health Officer
Laboratory technician
Medical Director, County Hospital
County Education Officer
County red cross County IPC focal point
Representatives of Business community
Representative from EOCs
District Commissioner
District Health officer
Community Health Development Director
County surveillance officer
County superintendent
District environmental health Technician
County Agricultural coordinator

The County EPR Committee performs its functions through Technical Sub-committees. Technical sub-committees are composed of experts in that particular area of intervention. Sub-committees are therefore responsible for the technical aspect of the control measures such as developing and designing strategies, planning, implementation, monitoring and supervision of activities. Examples of the composition and tasks of County EPR sub-committees are given below.

Meeting Frequency

When there is no epidemic, the EPR Committee should:

- Meet to review county disease trends and updates on preparedness steps adopted by the district
- Review the level of preparedness on a regular basis
- Share conclusions and recommendations of these meetings with the national level
- Coordinate preparedness evaluations

During an emergency or outbreak response, the county EPR Committee should:

- Meet as soon as the epidemic or event is recognized
- Assess the need for, and request support from, the national EPR Committee and/or Rapid Response Teams when necessary
- Meet daily at the beginning of an outbreak or epidemic and weekly as the epidemic response continues or when indicated
- Regularly review the epidemic response and take action to improve epidemic control actions as indicated
- Document and communicate epidemic response actions to next higher level

After an outbreak the EPR Committee should review and update the EPR Plan accordingly.

The EPR Committee may appoint sub committees to manage specific tasks and report back. These may include those listed in the Table below:

IDSR MEMBERSHIP OF THE COUNTY EPR COMMITTEES

Sub committee	Members (Experts, Organizations)	Description of tasks
Coordination	Overall Chair of County EPR committee (CHO) Members: • County police commander • County immigration commander • County inspector • County chairperson • District commissioner (RDC) • County health officer • Medical director, county hospital • Community health development director • Laboratory technician • County surveillance officer • District environmental health technician • County superintendent • County education officer • County agricultural coordinator • County red cross chapter • Representatives of business community • Others, as needed	Coordinate all aspects of the response including: • Selecting participating organizations and assigning responsibilities • Designing, implementing and evaluating control interventions • Co-ordination of technical EPR sub-committees and overall liaison with partners • Daily communication through situation report about the evolution of the outbreak • Managing information for public and news media
Case management and infection prevention & control	Chair: Physician or physician assistant from the district or county referral hospital Members: • Medical and clinical officers • IPC Officer • Nurse • Technical assistance from MOH • Partners supporting case management (e.g. MSF) • Funeral home staff	• Strengthen isolation facilities and reinforce barrier nursing procedures and standard and risk-based precautions • Provide appropriate medical care to patients • Provide ambulance services – collection of suspected cases from the community using the defined referral system • Collection and provision of data from isolation facility (if available) to the surveillance sub-committee • Disinfection of homes with suspected/ probable/ confirmed cases/ deaths of an infectious disease • Training and refreshers training of health workers in the isolation facility and other health facilities in the affected district

Epidemiology/ Laboratory	Chair: County Surveillance Officer Co-chair: County Laboratory Focal Person Members: • Surveillance officers from and health facilities • Technical Assistants from the Ministry of Health • Veterinary/animal health workers • Wildlife warders • Partners supporting surveillance & laboratory e.g. CDC, WHO • Others, as needed	• Conduct active case finding, contact tracing and follow-up • Verification of suspected cases/alerts/ rumors in the community • Verification of dead bodies in the community • Ensure filling of case investigation, contact tracing and follow-up forms • Collection and testing of specimens from suspect/probable cases/deaths • Data management – regular epidemiological analysis & reports • Training of health personnel in disease surveillance • Close linkage with burial, infection control and social mobilization groups. • Conduct safe burial of dead bodies from isolation facilities and community deaths
Social mobilization/ Public information	Chair: County Health Educator or Health Promotion staff Members: • Health Educators from the county • Politicians • Technical Assistants from the Ministry of Health • Partners supporting communication e.g. UNICEF, URCS	• Conduct rapid assessment to establish community knowledge, attitudes, practices & behavior on prevailing public health risks/events • Review and/or develop materials for social mobilization • Organize sensitization and mobilization of the communities • Serve as focal point for information to be released to the press/public • Liaise with the different sub-committees, local leadership and NGOs involved in activities on mobilizing communities
Psychosocial support	Chair: Psychosocial Coordinator Members: • Counselors • Mental Health clinicians • Clinical Psychologists • Social workers • Technical assistance from the Ministry of Health • Partners supporting psychosocial services	• Provide psychological and social support to suspected/ probable/confirmed cases; affected families and communities • Provide wellness care and psychological support to the response team • Prepare bereaved families/communities for burials • Prepare communities for reintegration of convalescent cases/ patients who have recovered

Logistics	Chair: County Pharmacist/ Logistics Officer Members: • Supplies/ Stores assistants • Pharmacists or dispensers • Technical assistance from the Ministry of Health • Partners supporting logistics management	• Provide budgetary support/ funding for epidemic preparedness & response • Procurement of equipment and supplies • Maintain adequate stocks of supplies and equipment • Arrange for transport and communication systems • Liaison with other agencies for logistic support • Provide accountability for all the resources used during epidemic preparedness & response
Water, Sanitation and Hygiene (WASH)	Chair: County Health Inspector Members: • Environmental Health technician or WASH Officer • Ministry of Public Work • Health Inspectors • Technical assistance from the Ministry of Health • Partners supporting WASH e.g. UNICEF	• Conduct environmental health risk assessment for the outbreak • Ensure provision of clean water • Improved water management at household and community level. • Plan for sanitation improvement campaign • Plan for improved hygiene practices including hand-washing, food hygiene and sanitation
Vaccination campaign	Chair: Child survival, EPI focal point, or County Cold Chain Technician Members: • MCH supervisor • County hospital medical doctor • Physician assistant • Certified midwives • Partners supporting vaccination e.g. WHO, UNICEF • Technical assistance from the Ministry of Health	• Identify high risk groups during the outbreak that should be targeted for vaccination • Compute the targeted population for the vaccination campaign • Conduct micro-planning for all vaccination logistics including cold-chain facilities, vaccine delivery and distribution, human resource needs, waste handling, social mob. • Conduct the vaccination campaign and post vaccination campaign validation exercise

Annex 7A: List of supplies for responding to outbreaks

Personal Protection Equipment			
Goggles		Rubber Boots (One Small, Large)	
N95 mask		Gloves-disposable	
Surgical mask		Alcohol hand rubs	
Grown-disposable		Disinfecting solution	
Apron disposable			
Waste management			
Biohazard bag		Plaster container –for needles, etc.	
Blood collection			
Syringes +needles (5cc)		Tissue	
Blood collection tubes (5-10 ml)		Viral Transport media	
Serum tubes		Bacteria transport media	
Vacutainer		Alcohol 70 + cotton	
Sterile disposal transfer pipette			
Respiratory tract specimens			
Swab stick		Tongue depressor	
Viral transportation medium		Scissor	
Bacterial transportation medium		Small plastic container with lid (sputum)	
Stool specimen			
Transport media		Cotton swab	
Stool container		Carey-Blair Medium	
Other samples:			
Sterilized plastic container &lid		Sterile containers for food or water	
Transport and storage materials			
Rack for tubes		Case alert and Laboratory forms	
Plastic bags with zip lock		Biohazard container	
Marker		Ice packs	
Others (If available)			
Questionnaires/forms/OIR manual		Paracetamol	
List of important contacts		Antibiotics	
Radio / mobile phones		ORS, soap	
Rain coats		Camera (especially if acute rash syndrome)	
Life jackets		Food (if required)	
Bed nets, mosquito repellents		Education materials e.g. hand washing	

Annex 7B: IDSR matrix: Core functions and activities by health system level

Level	Identify	Report	Analyze and Interpret	Investigate and confirm
Community and Points of entry	• Use alert triggers to identify priority diseases, events, conditions or other hazards in the community. • Support community in case finding and promote use of alert triggers	• Report essential information on alert triggers to HCF and appropriate authorities	• Involve local leaders in observing, describing, and interpreting disease patterns, events, and trends in community. • Map community catchment area.	• Support investigation activities. • Follow up on rumors or unusual events reported by community leaders or members. • act as liaisons for feedback to community on follow up actions
Healthcare facility	• Use standard case definitions to detect, confirm and record priority diseases or conditions • Collect and transport specimens for laboratory confirmation. • Verify alert triggers from community • Ensure appropriate storage of surveillance materials	• Report case-based information for immediately reportable diseases • Report weekly summary data to next level • Feedback weekly summary data to community level • Report laboratory results to CEBS worker	• Prepare and periodically update graphs, tables, and charts to describe time, person and place for reported diseases and conditions • From the analysis, report immediately any disease or condition that: • Exceeds an action threshold • Occurs in locations where it was previously absent • Presents unusual trends or patterns	• Take part in investigation of reported outbreaks • Collect, package, store and transport specimens for laboratory confirmation during investigation

District	• Support HCF to verify alerts from the community • Collect surveillance data from health care facilities and the community and review the quality • Ensure reliable supply of data collection and reporting tools are available at reporting sites • Ensure all healthcare facilities have materials for laboratory collection and transport	• Make sure healthcare facilities and CEBS workers know and use standard case definitions for reporting priority diseases and conditions • Maintain list of reporting sites • Provide instructions and supervision for surveillance and reporting priority diseases and conditions for healthcare facilities and communities. • Report data on time to the County Surveillance Officer (CSO)	• Aggregate data from HCF • Use and refine denominators for rates • Analyze data by time, place and person • Assist HCF to update graphs, tables, and charts to describe reported diseases, events and conditions weekly • Compare data and make conclusions about trends and thresholds	• Arrange and lead investigation of verified cases or outbreaks • Maintain an updated line list of suspected cases • Assist healthcare facility in safe collection, packaging, storage and transport of laboratory specimens for confirmatory testing • Receive laboratory results from County and give to HCF • Report finding of initial investigation to County
County	• Ensure coordination between Community Health Department Director to oversee and support community services and CEBS with District • Ensure reliable supply of data collection and reporting tools are available at reporting sites • Ensure laboratory specimen collection and transport material is available • Track specimens for laboratory confirmation	• Make sure Districts know and use standard case definitions for reporting and verifying priority diseases and conditions • Provide instructions and supervision for surveillance and reporting priority diseases and conditions for healthcare facilities and communities. • Receive surveillance data from the District Surveillance Officer (DSO) and review the quality • Harmonize monthly IDSR and HMIS data • Report data on time to the National MOH	• Ensure accuracy of denominators for County • Aggregate data from DSO reports • Analyze data by time, place and person • Weekly update graphs, tables, and charts to describe reported diseases, events and conditions • Calculate rates and thresholds and compare current data with previous periods to make conclusions • Describe risk factors for priority diseases or conditions	• Arrange and support investigation of reported diseases or events • Receive and interpret laboratory results • Compile District levels line lists of suspected cases • Report the confirmed outbreak to National level • Ensure specimen collection kits for investigation activities are available

National	• Define and update national policy and guidelines and ensure compliance • Set policies and procedures for the reference laboratory networks including quality assurance systems • Use reference laboratories for confirmatory and specialized testing if necessary • Collect and transport specimens for additional analysis at WHO Collaborating Centers as necessary	• Train, inform and support lower levels on surveillance and response • Aggregate County reports of immediately reportable diseases and events • Report other priority diseases and events on time to relevant programs and stakeholders • Include all relevant laboratories in the reporting network • Use IHR Decision Instrument (Annex 2A) to determine risks for priority diseases, events, conditions or hazards • Inform WHO as indicated by IHR (2005)	• Set policies and procedures for analyzing and interpreting data • Define denominators and insure accuracy • Analyze and interpret data from a national perspective • Calculate national rates and compare current data with previous periods • Describe risk factors for priority diseases or conditions • Regularly convene a meeting of the technical coordinating committee to review the analyzed and interpreted data before wider dissemination • Carry out special analyses to forecast magnitude and trends of priority events	• Ensure guidelines and standard operating procedures for outbreak investigations are available at all sites • Coordinate and collaborate with international authorities as needed during investigations • Coordinate response with county and district health teams as needed during investigations • Alert and support laboratory participation • Provide surveillance and response logistic support • Share information with county and international networks about confirmed outbreak • Process specimens from investigation and send timely results
WHO Country Office, WHO AFRO Regional Office	• Develop and disseminate generic guidelines for surveillance • Document & share IDSR best practices • Provide technical support to national level for detection and confirmation of priority diseases, conditions and events • Inform countries about problems that may cross borders • Coordinate international reference laboratory network support including	• Collect and compile reports of outbreaks and international notifiable diseases and events • Produce annual county profiles or situation reports by priority diseases, conditions and events	• Develop and disseminate best practices for analysis of data for each priority disease • Provide technical support to national level to improve capacity for analysis	• Provide support to countries to conduct assessments or investigations of priority diseases and events upon request • Provide support for the coordination of laboratory participation during investigations • Provide support for risk assessment using IHR decision instrument

Annex 7C: Interventions that may be implemented during an outbreak response

Implementing a response means carrying out the operational steps to take planned action. Select the appropriate public health intervention by reviewing the investigation results and the reports from those in the field to contain the confirmed outbreak or public health problem. Refer to Annex 9 for specific guidelines on surveillance and response activities organized by priority condition or event. For conditions or events in which the cause is not determined use care and make clear what assumptions guide the response and further investigation. Detailed national level epidemic preparedness and response activities to support an escalated response are detailed in the National Epidemic Preparedness and Response Plan (January 2016).

The selected interventions that are common when responding to outbreaks or public health events include:

- Strengthening infection control measures and case management.
- Providing training and refresher training to update health staff skills
- Enhancing surveillance during the response
- Informing and educating the community and continuously work with key informants, CHV/CHA's to assure a dialogue about events, fears, and actions associated with the outbreak
- Conducting a mass or targeted vaccination campaign
- Assuring access to safe water
- Ensuring safe disposal of infectious waste
- Reducing exposures to environmental hazards
- Ensuring safe and dignified burial and handling of dead bodies
- Ensuring appropriate and adequate logistics and supplies
- Ensuring information sharing and coordination among stakeholders
- Updating and giving feedback to the health staff and rapid response team

1. Strengthen case management and infection control measures

Take steps to support improved clinical practices in the district. Review the recommendations in Annex 7P for treating cases during an outbreak. Prepare health workers to conduct these responses.

- Update and provide standard operating procedures that include infection control guidelines (See National EPR Plan)
- Review with each health facility whether the clinical staff know and use recommended protocols for case management of outbreak diseases.
- Make sure that clinicians receive results of laboratory confirmation where necessary.
- Have the medical officer at each health facility to identify an area that can be used to accommodate a large number of patients.
- Implement infection control and risk mitigation measures, for example depending on the type of event:
- Activate or establish an isolation ward or center for highly infectious diseases (Ebola,

Cholera, etc.). This helps break the chain of transmission.

- Ensure health staff access to safety and personal protective measures for any infectious diseases (especially for Ebola and SARS).
- Mark areas of the hospital with tape to delineate a three-meter distance for patient screening between beds as well as the flow of people throughout the health facility.
- Begin primary screening of patients (determining if patient meets suspect case definition or should be immediately separately). Screening should be done by staff with clinical training.
- Review the referral system and the ongoing access to it.

2. Update health staff skills with case management and public health

Provide opportunities for health staff to receive information and updates on the outbreak or event case definition, case management procedures, reporting process and required data elements. It is essential that members of the response teams are aware of and have access to any indicated personal protection equipment and infection control practices indicated by the disease involved in the response. If there are immunization requirements for responding to the particular disease or condition, ensure that rapid responders are up-to-date with indicated immunizations.

To update the health staff and rapid response team:

- Give clear and concise directions to health workers taking part in the response.
- Select topics for orientation or training and simulations. Emphasize case management according to disease specific recommendations. Select other training topics depending on the risk of exposure to the specific public health hazard for example:
- Enhancing standard precautions (use of clean water, hand-washing and safe sharps disposal)
- Barrier nursing and use of protective clothing
- Isolation precautions
- Treatment protocols such as delivering oral rehydration salts (ORS) and using intravenous fluids
- Disinfecting surfaces, clothing and equipment
- Disposing of bodies safely.
- Conduct training and supervise skills via observation and simulations.
- Orient or reorient the district epidemic management committee, rapid response team and other health and non-health personnel on epidemic management based on the current epidemic.
- In an urgent situation, there often is not time for formal training. Provide on-the-job training as needed. Make sure there is an opportunity for the training physician or nursing staff to observe the trainees using the updated or new skill.
- Monitor participant performance and review skills as needed

3. Enhance surveillance during the response

During a response to an outbreak, encourage health staff at all health facilities to be vigilant in surveillance of the disease or condition. For example, members of the response teams and health staff in affected facilities should:

- Search for additional persons who have the specific disease and refer them to the health facility or treatment centers, or if necessary quarantine the household and manage the patient.
- Ensure timely exchange of laboratory information with the team
- Update the line list and analyze data by time (epi-curve), person (age and sex) and place (mapping cases).
- Monitor the effectiveness of the outbreak or response activity.
- Report daily at the beginning of the epidemic. Once the epidemic matures, the committee can decide on a different frequency of reporting.
- Actively trace and follow up contacts as indicated

4. Inform and educate the community

Effective risk communication is an essential element of managing public health events. When the public is at risk of a real or potential health threat, treatment options may be limited, direct interventions may take time to organize, and resources may be few. Communicating advice and guidance, therefore, may be the most important public health tool in managing a risk.

Keep the public informed to calm their fears and encourage cooperation with the outbreak response. Develop community education messages with information about recognizing the illness, how to prevent transmission and when to seek treatment. Begin communication activities with the community as soon as an epidemic or public health problem is identified. Identify outreach teams that can help gather information and amplify the messages.

Keep an active process of qualitative information coming in to establish what rumors are circulating so that they can be addressed (see Section 7 of this guide about Fact sheets). Select testing promotional and educational materials from similar settings when available until tested materials for current setting are available.

- Signs and symptoms of the disease
- How to treat the disease at home, if home treatment is recommended, including preparing disinfectant solutions.
- Prevention of behaviors that are feasible and that have a high likelihood of preventing disease transmission
- When to come to the health facility for evaluation and treatment
- Immunization recommendations, if any.

Prepare uniform health communication messages. Make sure that the messages:

- Use local terminology
- Are culturally sensitive and acceptable
- Are clear and concise
- Work with local traditions
- Address beliefs about the disease

Select appropriate communication methods that are present in your district. Prepare uniform health education messages to trusted and respected community leaders and ask them to transmit them to the community. For example,

- Mass media, (radio, television, newspapers)
- Meetings (health personnel, community, religious, opinion and political leaders)
- Educational and communication materials (posters, fliers)
- Multi-media presentations (for example, films, video or narrated slide presentations) at the markets, health centers, schools, women's and other community groups, service organizations, religious centers.

Select and use a community liaison officer, focal point, or health workers to serve as spokesperson to the media. As soon as the outbreak has been recognized:

- Tell the media the name of the spokesperson, and that all information about the outbreak will be provided by the spokesperson
- Release information to the media only through the spokesperson to make sure that the community receives clear and consistent information.

On a regular basis, meet with the community spokesperson to give:

- Frequent, up-to-date information on the outbreak and response
- Clear and simple health messages that the media should use without editing
- Clear instructions to communicate to the media only the information and health education messages from by the Epidemic Response Committee.

5. Conduct a mass or targeted vaccination campaign

Collaborate with the national EPI and disease control program manager to conduct a mass vaccination campaign, if indicated. Begin planning the vaccination campaign as soon as possible. Speed is essential in an emergency vaccination because time is needed to obtain and distribute vaccine. Determine the target population for the activity based on the case and outbreak investigation results (refer the EPI program guidelines for specific recommendations about delivery of the indicated vaccines). See Annex 7E for more information.

6. Assure access to safe water

Containers that hold drinking water can be the vehicle for disease outbreaks including cholera, typhoid, Shigella and hepatitis A and E. Make sure the community has an adequate supply of safe water for drinking and other uses. The daily water needs per person during non-outbreak situations are shown below. Water needs are much higher during an outbreak situation, especially outbreaks of diarrheal diseases.

Daily water needs per person*		
	Non-outbreak	During outbreak of diarrheal disease
Home use	20 liters per day	50 liters
Health care setting	40 to 60 liters per day	50 liters in wards 100 liters in surgery 10 litres in kitchen

*Refugee Health: an Approach to Emergency Situations, *Medecins sans Frontieres*, 1997

Safe sources of drinking water include:

- Piped chlorinated water
- Chlorination at point-of-use to ensure safe drinking water
- Protected water sources (for example, closed wells with a cover, rain water collected in a clean container)
- Boiled water from any source.

If no local safe water sources are available during an emergency, water supply may need to be brought from outside. To make sure that families have safe drinking water at home (even if the source is safe) provide:

- Community education on how to keep home drinking water safe. Ensure community messages and references to specific prevention guidelines for preparing safe water at home are developed.
- Containers that prevent contamination of water. For example, provide containers with narrow mouths so that people cannot contaminate the water by putting their hands into the container.
- Sites for waste disposal including feces should at least be 30 meters or more away from sources of water.

7. Ensure safe disposal of infectious waste

To make sure that human excreta are disposed safely to avoid secondary infections due to contact with contaminated substances:

- Assign teams to inspect local areas for human waste disposal. Safe practices include disposing of feces in a latrine or burying them in the ground more than 10 meters from water supply.
- If unsafe practices are found, provide information to the community about safe disposal of the waste. Construct latrines appropriate for local conditions with the cooperation of the community
- Conduct effective community education on sanitation practices.
- Assess and assure WASH standards for health facilities and community.
- Provide oversight about disposal of PPE and other contaminated supplies.

8. Improve food-handling practices

Make sure that people in the home, in restaurants, at food vending settings, and in factories handle food safely. Refer to the nationally established standards and controls for the handling and processing of food. To ensure food hygiene:

- Conduct community education on food hygiene practices for the general public and those in the food industry.
- Visit restaurants, food vendors, food packaging factories, and so on to inspect food-handling practices. Look for safe practices such as proper hand-washing, cleanliness and adherence to national standards.
- Close restaurants, vending areas or factories if inspection results show unsafe food handling practices.
- Strengthen national controls as necessary

9. Reduce exposures to environmental hazards

As indicated by the outbreak or event, take action to reduce exposure to hazards or factors contributing to the outbreak or event. This may involve chemical, physical or biological agents. Community education and behavior change interventions can be supportive in engaging the community to affect changes that will limit exposure to dangerous levels of chemicals and other hazards.

For vector-borne diseases, engage the service of experts such as an entomologist in designing appropriate interventions that will reduce exposure to the offending vectors (for example, for mosquito borne-illness) work with the malaria control program in your district to:

- Implement an insecticide treated nets (ITNs) program.
- Conduct community education on the proper use of bed nets and how to avoid dusk-to- dawn mosquito bites.
- Promote the use of locally available ITNs and other insecticide treated materials (blankets, clothes, sheets, curtains, etc.)

Encourage prevention of diseases carried by rodents by helping people in your district reduce their exposure to these animals. For example, rodents can transmit the virus that causes Lassa fever or they may be infested with fleas that carry plague. Work with the vector control officer in your district to encourage the community to:

- Avoid contact with the rodents, urines, droppings and other secretions
- Keep food and water in the home covered to prevent contamination by rodents
- Keep the home and cooking area clean and tidy to reduce possibilities of rodents nesting in the room.
- Use chemicals (insecticides, rodenticides, larvicides etc.) and traps as appropriate based on environmental and entomological assessment.

10. Ensure safe and dignified burial and handling of dead bodies

Dead body management forms a critical role in combating the spread of infectious diseases both as a part of case detection and surveillance as well as managing potentially infectious material. VHF, Cholera and Unexplained deaths in suspicious circumstances are situations that require careful handling of bodies. It is also essential to dispose of bodies in a safe and dignified manner by trained personnel due to the infectiousness of an epidemic prone disease. The disinfection or decontamination of homes and hospital wards where corpses

of persons who died of an infectious disease should be implemented. National guidance will be given in this event.

Dead body management guidelines currently distinguish between high and low priority/risk bodies, utilizing Environmental Health Technicians (EHTs) that have received training. Deaths that are considered high risk may be treated as a form of surveillance and case detection for EVD or possibly other conditions when relevant testing capabilities are available.

Currently the national cemetery is located at Disco Hill and is under the management of the Ministry of Health. The site provides a location to conduct safe and dignified burials outside of the communities and it has been instrumental in meeting the DBM needs that presented themselves during the EVD outbreak, particularly for Montserrado and Margibi counties. Safe burials can be conducted in the community at approved burial sites at the discretion of the families. In rural remote counties, the county health teams, their EHTs, and DBM partners will activate the safe and dignified burial contingency plan when an infectious disease outbreak occurs. Such plan will be reviewed periodically to address the evolution of the epidemic.

11. Ensure appropriate and adequate logistics and supplies

Throughout the outbreak, monitor the effectiveness of the logistics system and delivery of essential supplies and materials. Carry out logistical planning to make sure transport is used in the most efficient ways. Monitor the reliability of communication between teams during the outbreak and if additional equipment is needed (for example, additional minutes for mobile phones), take action to provide teams what they need to carry out the response actions.

Annex 7D: Preparing disinfectant solutions from ordinary household products

During a response to an outbreak of any disease transmitted through direct contact with infectious body fluids (blood, urine, stool, semen, and sputum for example), an inexpensive system can be set up using ordinary household bleach.

The following table describes how to make 1:10 and 1:100 chlorine solutions from household bleach and other chlorine products.

Use the chlorine product below	To make a 1:10 solution for disinfecting: • excreta • cadavers • spills of infectious body fluids	To make a 1:100 solution for disinfecting: • gloved hands • bare hands and skin • floors • clothing • equipment • bedding
Household bleach 5% active chlorine	1 liter bleach per 10 liters of water	100 ml per 10 liters of water or 1 liter of 1:10 bleach solution per 9 liters of water
Calcium hypochlorite powder or granules 70% (HTH)	7 grams or ½ tablespoon per 1 liter of water	7 grams or ½ tablespoon per 10 liters of water
Household bleach 30% active chlorine	16 grams or 1 tablespoon per 1 liter of water	16 grams or 1 tablespoon per 10 liters of water

To disinfect clothing:

- Promptly and thoroughly disinfect patient's personal articles and immediate environment using one of the following disinfectants:
- Chlorinated lime powder
- 1% chlorine solution
- 1% to 2% phenol solution
- Promptly and thoroughly disinfect patient's clothing:
- Wash clothes with soap and water
- Boil or soak in disinfectant solution
- Sun dry
- Wash utensils with boiling water or disinfectant solution
- Do not wash contaminated articles in rivers or ponds that might be sources of drinking water, or near wells.

Annex 7E: Key considerations for planning and implementing outbreak vaccination responses

Once the decision to intervene with a vaccination response is made, it is critical to act as quickly as possible to minimize the number of severe cases, deaths and limit further disease spread. Key considerations for outbreak vaccination response include to:

1. Specify the target population for the immunization activity based on epidemiology of outbreak, risk assessment and disease.

2. Estimate the necessary amounts of vaccine, diluent, and immunization supplies such as sterile syringes and sterile needles, safety boxes, vaccine carriers and cold boxes.
   a. Coordinate with national EPI program, WHO country office and UNICEF offices to arrange for provision of necessary vaccine and supplies .
   b. A list of pre-qualified WHO vaccines is available at: http://www.who.int/immunization_standards/vaccine_quality/PQ_vaccine_list_en/ en/

3. Conduct rapid but comprehensive microplanning for the campaign. A microplan is the operational plan for a campaign at the county or lower level. An adequate microplan includes at least:
   a. Estimate of the number of vaccination teams required and their composition, as well as number of supervisors and monitors
   b. List of supervisors and their contact numbers
   c. Targeted plans for hard-to-reach or difficult to access groups
   d. Travel plan for teams and supervisors including transportation requirements
   e. Coordination typically required with other groups in area (governmental, NGOs, faith-based and civic organizations etc.) to provide for adequate transport
   f. Maps of the targeted area
   g. Cold chain requirements and maintenance h.
   h. Plan for distribution of logistics
   i. Plans for disposal of waste from campaign
   j. Social mobilization plan with community leaders mapped and engaged
   k. Training schedule
   l. Budgetary estimates for the various campaign components including training and planning prior to implementation and waste disposal following implementation

4. Choose the immunization sites and communicate with the community
   a. Coordinate with local EPI program and community leaders
   b. Determine geographically or culturally hard-to-reach areas; identify mobile immunization teams to reach these areas and local guides/facilitators

c. Make sure there is sufficient capacity to store extra amounts of vaccine during transportation to the immunization site

5. Select sufficient number of immunization teams for the outbreak response; the number of teams required will vary depending on target population, geographic scope and ease of travel. Teams typically consist of:
   a. One to two vaccinators to administer the vaccines
   b. A reporter to document receipt of vaccine
   c. Community health volunteers to verify age, assist with community acceptance, perform crowd control and guide teams.

6. Conduct refresher training for vaccination teams on recommended immunization practices.
   a. Training materials for vaccinators, supervisors and monitors for a rapid SIA are accessible among other places at:
   http://www.polioeradication.org/Resourcelibrary/Resourcesforpolioeradicators/Technicalguidelines.aspx

7. Mobilize the community. Inform the public about the emergency immunization activity using all applicable communication techniques, however person-to-person contact from locally trusted individuals is typically most effective
   a. Ensure that there is a clear communication plan that includes easy to understand information about:
   b. the need for the campaign;
   c. who is targeted for the campaign;
   d. the dates of the campaign
   e. The communication plan should include procedures for rapidly identifying and addressing rumors that may arise during the campaign
   f. This should be done by a single point of contact well versed in risk communications and the local culture

8. Maintain close contact between vaccination teams and first-level supervisors
   a. During the first several days of the campaign when issues are mostly likely to be encountered and quick adjustments made, this is an imperative
   b. Teams may need to be quickly moved from initial sites to other locations based on workload/ equitable geographic coverage in the district/county
   c. First-level supervisors are the key to solving issues that arise in the field and ensuring teams are able to keep vaccinating. National level supervisors need to ensure that these first-level supervisors have the capacity to resolve issues in the field and provide on-site retraining of vaccinating teams wherever necessary
   d. Early in a campaign focus should be on ensuring good immunization technique, proper vaccine storage and handling and accurate recording. Missed houses/individuals are

especially important to document for follow up on subsequent days

e. Later, campaign focus should be on ensuring good stock management and checking vaccine vial monitors (VVMs) to ensure vaccine potency
f. A rapid guide to common SIA problems and potential quick fixes is available at: http://www.polioeradication.org/Portals/0/Document/Resources/PolioEradicators/1c.QuickFixesforSIA20100914.pdf

9. Monitor the number of doses of vaccine given and supplies used daily
   a. Daily summary sheets should be collected from teams
   b. Amount of remaining stocks and supplies necessary for the next day should be calculated at the end of the day
   c. Estimated number of individuals vaccinated should be followed daily and tracked against target population
   d. Follow up visit plans should be made for missed individuals based on tally/summary sheet information

10. Conduct brief feedback sessions at the end of each day with vaccination teams and make necessary mid-course corrections

Annex 7F: Estimating vaccine supplies for immunization activities

Outbreak: _____

Date confirmed: _____

Target population:
_____children age 0 up to 5 years
_____children age 9 months up to 14 years
_____children and adults age 0 up to 30 years
_____women of childbearing age - 15 years up to 45 years
_____all adults and children in the general population

1. Calculate the size of the target population. If the activity only targets a proportion of the general population, estimate the size of the target population. Multiply the general population times the percentage of children or adults in the target population. If you do not know the exact age distribution rates in your area, use recommended estimates such as the following:

children age 0 up to 5 years	17%
children age 9 months up to 14 years	45%
children and adults age 1 up to 30 years	70%
women of childbearing age 15-45 years	20%

2. Find out how many doses each person should receive. During a response this would be one dose. Record the number below as "number of doses recommended."

3. Allow for wastage. Use a wastage factor of 20%. Multiply the size of the target population (see step 1) times the number of doses times 1.20.

_____	x	_____	x	1.20	=	_____
Size of target population		Number of recommended doses		Wastage		Number of doses to order included wastage

4. Allow for a reserve stock. Use a reserve factor of 25%. Multiply the estimated number of doses including wastage times 1.25 to obtain the total estimated number of doses.

_____	x	1.25	=	_____
Number of doses including wastage		Reserve factor		Total number of estimate doses

5. To obtain the total number of vials of vaccine to order, divide the total number of estimated doses by the number of doses that are contained in the vial. (This is usually printed on the label and may be one dose, two doses, five doses, ten doses or twenty doses).

Total number of estimated doses	÷	Doses per vial	=	Total number of vials required

6. If the vaccine requires a diluent, multiply the number of milliliters of diluent per vial times the total number of vials required. (note: normally diluent bundled with vaccine).

Diluent required per vial	+	Total number of vials	=	Total diluent to order

7. Estimate the number of sterile needles and syringes that will be needed to carry out the activity. If single-use needle and syringes are used, order the same amount as for the estimated number of doses in Step 4.

8. In addition, estimate the number of dilution syringes necessary for preparing the vaccine. Note EPI
policy is to use 1 dilution syringe per vial, as calculated in Step 5.

Sources: Field Guide for Supplementary Activities Aimed At Achieving Polio Eradication, World Health
Organization, Geneva 1997

District guidelines for yellow fever surveillance, Division of Emerging and other communicable disease surveillance and control, World Health Organization, Geneva 1998.

Annex 7G: Actions that may be implemented in response to CEBS alert triggers

The table below shows possible response to CEBS alert triggers for suspected AFP, cholera and *Shigellosis* for immediate and longer-term action. These are some interventions, or actions, that can be applied at the community level.

CEBS Community Alert Trigger	Suspected illness	Response
Any person with weakness in the legs and arms or not able to walk	Acute Flaccid Paralysis (Poliomyelitis)	**Immediate**: Encourage person to seek care at local health facility. **Long-Term**: Urge the community to get immunized with the polio vaccine.
Running stomach. Any person passing three (3) or more water pu-pu within one day.	Cholera (severe Acute watery diarrhea)	**Immediate**: Provide extra fluids to patients as soon as possible and encourage continued breastfeeding; Encourage patient to seek care at health facility immediately if diarrhea is present so they can begin ORS. **Long-Term**: Promote use of safe and clean water; Encourage use of proper hand-hygiene techniques with soap and water (or bleach water combination) especially before food preparation and after going to the bathroom (ALWAYS after pu-pu).
Diarrhea with blood (pu-pu with blood) Any person passing bloody pu-pu or slimy (slippery) pu-pu with stomach pain	Acute bloody diarrhea (*Shigellosis*)	**Immediate:** Provide extra fluids to patients as soon as possible and encourage continued breastfeeding; Encourage patient to seek care at health facility immediately if diarrhea is present so they can begin ORS. **Long-Term**: Encourage use of safe and clean water. Promote use proper hand-hygiene techniques with soap and water (or bleach water combination) especially before food preparation and after going to the bathroom (ALWAYS after pu-pu).
Dog or other animal bite	Human Rabies	Immediate: wash wound immediately and thoroughly for a minimum of 15 minutes with soap and water. Cleaning well can reduce the likelihood that rabies virus will be transmitted. Send to healthcare facility for post-exposure prophylaxis (rabies shot). Call livestock or wildlife officer to catch or isolate animal. Long-term: advocate and support animal vaccination.

Annex 7H: Developing a fact sheet

During the response one of the ways to increase knowledge of the general public about the cause and management of the outbreak is by providing simple fact sheets that will inform and guide. Fact sheets are brief summaries of 1 to 2 pages. They are usually prepared by National or County Public health workers for adaptation by the health promotion team to ensure it is understandable (simplified and locally appropriate language) prior to distribution to the general public. They deal with a single topic or message related to the response. A library of field-tested fact sheets for Liberia is important to have on hand when situations arise.

For example, a fact sheet on a Shigella outbreak in a district may contain the following information for the community: the cause of Shigella, how it is transmitted, steps for prevention and updates on the number of cases and deaths. Fact sheets may be posted on a bulletin board or distributed to community groups that are planning health education campaigns or through the various community structures such as the places of worship, women groups, schools and Community Health Teams.

When developing fact sheets it is important to know your audience (for example, the reading level and important cultural beliefs). The following points should be considered when developing fact sheets:

- One or-two pages (but NO more than 2 pages)
- Readable font (at least 12-point sized font)
- Brief text
- The most important information should be in the first paragraph:
- What the issue is, what action is needed, and the main message(s) should follow
- List how to get more information
- The fact sheet must be self-contained. That is, it should NOT refer to previous documents or assume information will be remembered.
- Use bullets and graphics and simple layout
- Leave lots of white space
- Make it very clear what actions you want the reader (or audience) to take in the outbreak (for example, wash hands before eating or if feeling ill with symptoms to go to the HCF)

SAMPLE FACTSHEET: CHOLERA

What is cholera?

Cholera is an infection of the small intestine.

What causes cholera?

It is caused by the bacterium *Vibrio cholerae*

How it is spread

Transmission occurs primarily by drinking or eating water or food that has been contaminated by the diarrhea of an infected person or the feces of an infected but asymptomatic person. This bacterium can, however, live naturally in any environment. In the developed world, seafood is the usual cause, while in the developing world it is more often water.

Who is at risk?

Children are also more susceptible with two to four year olds having the highest rates of infection. Persons with lower immunity such as persons with AIDS or children who are malnourished are more likely to experience a severe case if they become infected. However, it should be noted that any particular person, even a healthy adult in middle age, can experience a severe case.

What are the signs and symptoms of cholera?

The main symptoms are profuse painless watery diarrhea and vomiting of clear fluid. These symptoms usually start suddenly, one to five days after ingestion of the bacteria. The diarrhea is frequently described as "rice water" in nature and may have a fishy odor. An untreated person with cholera may produce 10–20 litres of diarrhea a day with fatal results. If the severe diarrhea and vomiting are not aggressively treated it can, within hours, result in life-threatening dehydration. The typical symptoms of dehydration include, low blood pressure, poor skin turgor (wrinkled hands), sunken eyes, and a rapid pulse.

How it can be prevented

Although cholera may be life-threatening, prevention of the disease is normally straightforward if proper sanitation practices are followed like:

- Proper disposal of fecal waste material.
- Sterilization of all contaminated materials (e.g. clothing, bedding, etc.) is essential. All materials that come in contact with cholera patients should be sterilized by washing in hot water, using chlorine bleach if possible. Hands that touch cholera patients or their clothing, bedding, etc., should be thoroughly cleaned and disinfected with chlorinated water or other effective antimicrobial agents.
- Warnings about possible cholera contamination should be posted around contaminated water sources with directions on how to decontaminate the water (boiling, chlorination etc.) for possible use.
- Water purification, all water used for drinking, washing, or cooking should be

sterilized by either boiling, chlorination, ozone water treatment, ultraviolet light sterilization (e.g. by solar water disinfection), or antimicrobial filtration in any area where cholera may be present. Chlorination and boiling are often the least expensive and most effective means of halting transmission.

- Public health education and adherence to appropriate sanitation practices are of primary importance to help prevent and control transmission of cholera and other diseases.

Primary treatment

The primary treatment is with oral rehydration solution (ORS) to replace lost water and if this is not tolerated or doesn't provide quick enough treatment, intravenous fluids can also be used. Antibiotics are beneficial in those with severe disease to shorten the duration and severity.

Roles of different stakeholders

Stakeholder	Role
CHVs and CHAs	Mobilizing communities for sanitation
Clinicians	Initiate treatment and inform next county health officer higher level.
CHO	Provide supplies and human resource and inform central level authorities.
MOH/SW (Central)	Monitor trends Provide supplies and technical support
Development partners	Technical support, resources, etc.

Annex 7I: Sample public health bulletin

Liberia IDSR Epidemiology Bulletin

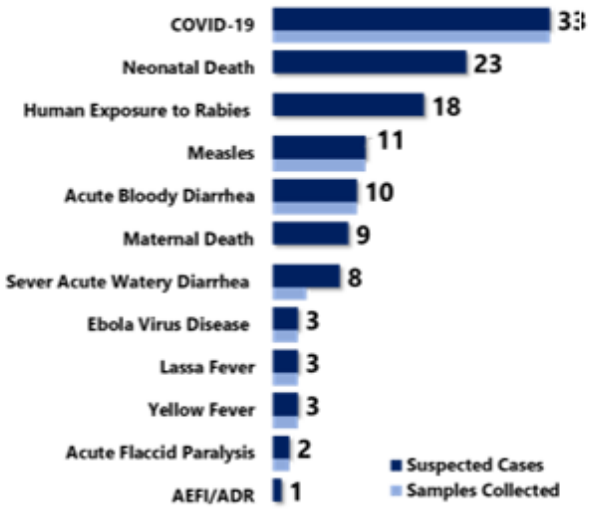
World Health Organization

2021 Epi-week 22 (May 24 – 30, 2021)

Country Population: 4,999,425 | Volume 16 Issue 22 | May 24 – 30, 2021 | Data Source: CSOs from 15 Counties and Lab

Highlights

Figure 1: Public Health Events Reported during this week



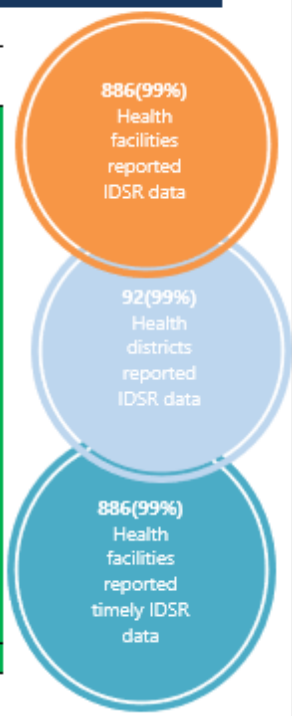
Keynotes and Events of Public Health Significance

- A total of **124** events of public health importance including **32** deaths were reported
- Completeness and timeliness of health facility reports were both **99% respectively**
- **Adverse Events Following Immunization** surveillance heightened at all level
- **Ongoing Lassa fever** outbreak in two counties
- **Thirty-three** new confirmed COVID-19 cases recorded from two counties
- **Ongoing EVD preparedness** initiated at all level

Reporting Coverage

Table 1: Health Facility Weekly DSR Reporting Coverage, Liberia, Epi week 22, 2021

County	Expected Report	Reports Received	Received on Time	Completeness (%)	Timeliness (%)
Bomi	26	26	26	100	100
Bong	57	57	57	100	100
Gbarpolu	15	15	15	100	100
Grand Bassa	36	36	36	100	100
Grand Cape Mount	34	34	34	100	100
Grand Gedeh	24	24	24	100	100
Grand Kru	22	22	22	100	100
Lofa	61	61	61	100	100
Margibi	55	55	55	100	100
Maryland	27	27	27	100	100
Montserrado	367	367	367	100	100
Nimba	91	87	87	96	96
Rivercess	20	20	20	100	100
River Gee	20	20	20	100	100
Sinoe	37	37	37	100	100
Liberia	**892**	**886**	**886**	**99**	**99**



- *The national target for weekly IDSR reporting is 80%. Health facility timeliness is monitored at health district level*
- *All counties submitted weekly IDSR reports to national on time*

Legend: ≥80 | <80

Annex 7J: Outbreak investigation report

Purpose

With your familiarity with local disease surveillance data and with your County or district's population, you will likely be among the first to notice a suspected outbreak. Based on the procedures of your county and district, you may be called upon to assist with the investigation of an outbreak. As part of your participation, you might assist in the development of the outbreak investigation report. If this opportunity presents itself, the report can be one of your field products.

Your county or district might or might not keep a logbook of all rumors and suspected outbreaks in your jurisdiction already. This can be used for suspected outbreaks or proven outbreaks. Whether your county or district already has one or not, another way to fulfill this field product requirement is to keep such a rumor logbook.

This section includes a suggested template for an outbreak investigation report. It also includes a sample report.

Guidelines for Preparing Outbreak Investigation Reports

- Participate in the outbreak investigation
- Complete an outbreak investigation report.
- A logbook may also be kept of all suspected outbreaks and rumors.

Template for Investigation Report

Notice of Investigation

Date:

From: To:

Location: Subject:

Introduction

Methods

Results

Discussion

Maximum two pages

Instructions

Use the following checklist for drafting your notification of investigation.

Notification of Investigation Report Checklist

Category	Criteria	Included?
Introduction	Briefly (1-2 sentences) describes the background of the disease	
	Describes the problem clearly	
	Clearly provides the objective of the investigation	
Methods	Describes clearly how the investigation was conducted	
	Provides a case definition	
Results	Presents a descriptive analysis of time, place and person in a clear and organized way	
	Provides rates, proportions and other measures of association as appropriate	
Discussion and conclusions	Emphasizes the most important findings	
	Gives detailed and specific conclusions	
	Provides clear recommendations for action derived from the findings	
Structure of report	Title precisely reflects the outbreak	
	Use of format IMRD	
	Results reflect the methods used	
	Neither analysis nor methods appear in the results section	
	Results are not repeated in the discussion nor the conclusions	
	Recommendations are related to the findings	
	Includes supporting documentation	

Outbreak investigation Report Example

Notice of Investigation

Date: November 23 2015

From:
A. Goodbody, District Medical Officer, Alpha District
B. Patience, Chief Laboratorian, Alpha District

To:
C. Woodly, Provincial Health Director, Gamma Province

Location: Mount Pleasant, Alpha District

Subject: Confirmed cholera outbreak

Introduction: Cholera is a serious diarrheal disease. The case fatality rate can reach 50% if left untreated. The last major cholera epidemic in X county occurred between 1991 and 1994 when more than 10,000 people died. Between January 13 and January 18, 2015, 12 cases of severe diarrhea presented to Central Hospital in Mt. Pleasant. Seven patients were male and five were female, and they ranged in age from 3 months to 59 years. This study was conducted in order to determine the cause of the outbreak.

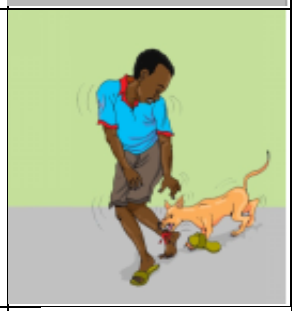
Methods: Confirmed cases were identified as those individuals presenting with diarrhea and/or vomiting and a positive laboratory test for *Vibrio cholerae* 01. Four of the 12 cases were confirmed. The investigation team conducted a case control study comprised of the 12 confirmed and suspected cases and 24 healthy adults randomly selected from the community.

Results: The index case presented at Central Hospital in Mount Pleasant on 13 January. Results indicated that cases had 6 times the odds of eating food from a street vendor compared with controls. Cases had slightly higher odds (1.2) of drinking water from the public water supply compared with controls. Subsequent laboratory tests of the water supply were negative for *Vibrio cholerae*.

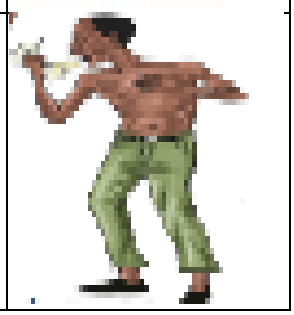
Discussion: From these results we concluded that the source of the outbreak in Alpha district was food and drinks served by one or more street vendors. Based on this, we took several steps to control this outbreak. 1) We publicized the information on the source of the outbreak and encouraged consumers that purchase food from street vendors to reheat foods and to wash fresh fruits and vegetables. 2) We visited street vendors in the implicated area and advised them on proper food safety and hygiene. 3) We advised the general public to seek medical care if symptoms appeared and we sent out a bulletin to clinicians and medical/health facilities regarding the recognition and treatment of cholera. Although our instinct was to make recommendations regarding drinking of the public water, laboratory testing showed that the water supply was not implicated, and therefore no changes in water usage were recommended. In order to prevent future outbreaks of cholera, as well as other diseases spread through contaminated food or water, we recommend establishing a food safety and hygiene program for street vendors. It may also be advisable to conduct a public health campaign for the general public regarding the importance of proper hand-washing as a general protective measure against the spread of many diseases.

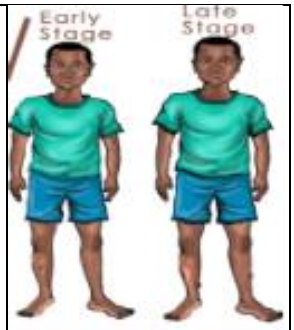
Annex 7K: Simplified suspect case definitions3w

Name of IDSR Event or disease **CEBS Community Trigger**

S/N	Targeted Diseases	Community Case Definition	Job Aid for CHAs/CHVs
1	Acute Flaccid Paralysis (Poliomyelitis)	Any person with weakness in the legs and arms or not able to walk	
2	Acute Watery Diarrhea (Running Stomach)	Any person passing three (3) or more water pu-pu within one day.	
3	Acute Bloody Diarrhea (Pu-pu with blood)	Any person passing bloody pu-pu or slimy (slippery) pu-pu with stomach pain	
4	Exposure to Human Rabies (Dog/animal bite)	Any person who is bitten by a dog or any other animal.	
5	Measles	Any person with hot skin (fever), spot-spot (rash) and/or red eyes.	
6	Viral Hemorrhagic Fevers (Yello	Any person who has fever and two or more other symptoms	

7		w Fever Lass a fever	(headaches, vomiting, yellow eyes, runny stomach, weak in the body) or who died after serious sickness with fever and bleeding	
8		Ebola		
9	Meningitis (stiff neck)		Any person with hot skin (fever) and stiff neck	
10	Maternal Deaths (Big Belly Death)		Woman who dies with big belly or within 42 days (six weeks) after the baby is born or when the belly move	
11	Neonatal Tetanus (Jerking sickness)		Baby who is normal at birth, then after two days is not able to suck starts jerking	

12	**Neonatal Deaths (Young baby death)**	**Baby who dies at birth or within 28 days (four weeks) after birth**	
13	**Unknown health problems grouped together**	**Any health problem that you don't know about that is happening to many many people or animals in the same community.**	
14	**Unknown death grouped together**	**Any death in human or group of animals that you don't know why it happened**	
15	**Dengue Fever**	**Any person with hot skin (fever) for 2-7 days, with 2 or more, Strong pain behind the eyes, Muscle pain or joint pain**	
16	**Monkey pox**	**Any person with fever for 1-3 days with bump-bump on the face and spread to other parts of the body, under the feet and palms of hand with headache and body pain.**	
17	**TB**	• **Any person who has cough for 2 weeks or more, with fever, night sweat, weight loss and weakness**	

18	**Yaws**	**Any person who has one or more knots that can burst into sore on any part of the body.**	
19	**Buruli Ulcer**	**Any knot, swelling, or sore on any part of the body that is not hurting from the starting and later turn to big sore.**	
20	**Coronavirus Disease (COVID-19)**	**Any person with hot skin, cough, not breathing well and/or who has travelled from outbreak area or who has taken care of a sick person**	
21	**Adverse Events Following Immunization (AEFI)**	**Any person who gets sick after taking any vaccine**	

Annex 7L: Targets and indicators

Indicators are used to monitor performance, and identify and address gaps in the surveillance system. The indicators below are examples of important statistics used in the monitoring and evaluation of IDSR inputs, process, and outputs. A subset of these indicators are tracked routinely at the national level as part of the National Core Indicators, however the indicators should be used by counties, districts, and health facilities as needed to monitor implementation of IDSR within their jurisdiction. The below indicators are subject to change based on the update of the IDSR monitoring and evaluation framework.

Indicator	Purpose	Reporting levels	Disaggregation levels	Numerator	Denominator	Source of information	Target	Frequency of data collection
Priority Indicators								
Attack rate for each outbreak of a priority disease	Helps to identify the population at risk and efficacy of interventions; Core Indicator 10	National	Administrative levels (National, County, District, etc.), Disease type, Period / outbreak	Number of new cases of an epidemic-prone disease that occurred during an outbreak	Number of population at risk during the outbreak	Numerator: Outbreak investigation report with line lists or case- based forms. Denominator: Demographic data about the county using population data	Will vary, depends on disease	Quarterly, or more frequently depending on the situation
Case fatality rate for each disease reported	Measures quality of case management; Core Indicator 9	National	Administrative levels (National, County, District), Disease type, Period / outbreak	Number of deaths from each of the epidemic-prone diseases	Number of cases from the same immediately reportable diseases	Routine reports and outbreak investigation reports	Depends on disease	Quarterly

Other Programmatic and Process Indicators Epidemic Preparedness and Response Indicators								
Percentage of new / re- emerging health events responded to within 48 hours as per IHR requirements	Measures the timeliness and quality of response to outbreak; Core Indicator 8	County, National	Type of health event; administrative levels (National, County, District, etc.)	Number of new / re-emerging health events responded to within 48 hours as per IHR requirements	Total number of cases of new / re- emerging health events notified/reported	Outbreak investigation reports; Supervisory reports	Will vary depending on the events	Quarterly
Percentage of counties with funded outbreak preparedness and response plans	Measures capacity of counties to prepare for outbreaks; Investment Plan Indicator	County		Number of counties with funded outbreak preparedness and response plans	Total number of counties	Budgetary information	100%	Quarterly
Reporting Indicators								
Proportion of cases of each priority disease with information on community referral	Measures the proportion of cases detected through CEBS activities	District		Proportion of cases of each priority disease with information on community referral	Total number of cases of each priority disease	Line lists	80%	Quarterly
Proportion of specimens of notifiable diseases that have lab results available	Measures capacity of laboratory to confirm diagnosis and involvement of laboratory in	District; County; National		Number of specimens of notifiable diseases that have lab	Total number of investigated outbreaks that occurred	Log of CEBS forms; Health facility assessment form; Case	85%	Monthly

within 24 hours of sample collection	surveillance activities; Core Indicator 7			results available within 24 hours of sample collection		Investigation forms; Laboratory reporting forms; Outbreak investigation report		
Proportion of priority diseases or events of epidemic potential that are notified to the next level within 24 hours of surpassing the epidemic threshold	Measures use of data and thresholds for early detection of outbreaks and timely reporting; Core Indicator 4	Community; District; County; National	Disaggregated by disease type, age group, outcome	Number of outbreaks of priority diseases and events notified to the next level within 24 hours	Number of outbreaks of priority diseases at each level	Quarterly supervision checklist; Log of suspected outbreaks and rumors; County and district analysis books or other routine analysis tools	80%	Quarterly
Proportion of reports of priority diseases or public health events (e.g. maternal or newborn death) that were submitted to the next highest level on time (by noon Mondays)	Measures practice of timely submission of surveillance data; Core Indicators 1 & 2	Health Facility; District; County; National	Type of priority disease or event (e.g. maternal or newborn death); non-polio acute flaccid paralysis rate in children <15 years;	Number submitting at each level	Total number at each level	Summary reporting forms; Weekly bulletins	85%	Weekly or Monthly
Detection and Data Collection Indicators								

Proportion specimens arrived at lab within 72 hours of collection	Measures capacity of districts to collect and send specimens to the lab for timely and enhanced surveillance and response; Core Indicator 12	District	% cases of blood specimen collected for measles; % suspected yellow fever cases with blood specimen taken; 2 stools collected 24-48 hours apart & <14 days of paralysis onset	Number of suspected cases of disease with specimens collected and sent from the district to the designated lab within 24 hours of case alert	Total number of suspected cases of disease	Health facility log books; Lab log books	85%	Monthly
Proportion of epidemics detected by a higher level that were missed by each lower level	Checks the capacity of the entire health system to detect epidemics; Core Indicator 11	District; County; National;		Number of epidemics detected by a higher level that were missed by the lower level	Total number of epidemics at each level	Summary reporting forms; Analysis books; Supervisory reports; Standard surveillance reports	Zero	Annual
Data Analysis and Use Indicators								
Proportion of reports of notifiable disease or event for which case-based forms, line-list forms, and trend analyses are available for verification	Measures use and reporting of surveillance data with detailed information to use for further analysis; Core Indicators 3 & 5	District; County; National	Disease type; Case- based forms; Line- list forms; Trend analyses	Number of notifiable diseases that are appropriately reported quarterly with case-based forms, line-	Total number of notifiable diseases selected for case- based surveillance that occurred at each level	Supervision reports; Routine summary reports and case-based or line listing reports for diseases	85%	Quarterly

				lists, and trend analyses		targeted for elimination and eradication and for any diseases selected for case-based surveillance		
Proportion of outbreaks for which there is daily situation report (SitRep) coverage	Measures availability of additional variables for further analysis; Core Indicator 6	District; County;	Reports that include epidemic curve	Number of outbreaks for which there is daily situation report coverage	Total number of outbreaks	Investigation reports	85%	Quarterly
Proportion of lab results received at county within 24 hours of receipt of results at national level	Measures capacity of laboratories to analyze/utilize lab data; Core Indicators 12 & 14	District; County; National		Number of laboratories analyzing and reporting data	Total number of laboratories	Lab reports; Weekly bulletins	80%	Weekly
Proportion of sampled entities that received at least one supervisory visit that included written feedback on improving the surveillance system	Measures availability of supervision and feedback for the surveillance system; Core Indicator 13	Laboratories; Health Facility; District; County; National	Administrative Units (Laboratories; Health Facility; District; County; National)	Number of entities that received at least one supervisory visit that included written feedback	Total number of entities at given level	Supervisory reports	100%	Annual

Annex 7M: Supervisory checklists, visits and reporting

Each health facility or surveillance team has unique problems and priorities that require specific problem solving and corrections. To motivate the staff in order to make improvements, the items listed in the graduated checklists (based on columns of surveillance matrix) are selected based on what has been achieved so far at the health facility or District or County office. For example, when the health care facility has achieved one objective, work with health workers to include the next indicator or item for monitoring performance and revise the supervisory checklist accordingly. Use it during future visits to help health workers monitor their activities and progress towards an improved system.

During the supervisory visit, use a checklist (see samples in following Annexes) to monitor how well staff are carrying out the recommended surveillance functions. For example, a district surveillance focal person visiting a health facility for a supervisory visit should verify the following:

Identify and register cases	• Check for availability and use of standard case definitions booklets/charts • Check the register to see if all the columns in the registry are filled out correctly
Confirm cases	• Compare the laboratory records for priority diseases with the number of cases seen in the clinic for the same period of time
Reporting	• Ask to see copies of the most recent reports for the most recent reporting period and compare the number of cases of priority diseases that were reported with the number recorded in the register • Check the date on which the case report was sent against the date recommended for sending the report • Check the reports to make sure they are complete and accurate
Review and analyze data	• Verify that trend lines are prepared and kept up-to-date for priority diseases and ask to see the Health Facility HMIS database, and check if it is being used
Preparedness	• Look at the stocks of emergency medicines, supplies and protective clothing to be sure there is adequate supply

Note: A sample supervisory checklist is in Annexes 8C -F. The questions to be answered during the supervisory visit can be adapted or modified to meet the specific concerns and extent of progress towards an integrated surveillance system within the health facility.

Conduct quarterly supervisory visits at all levels

Begin regularly scheduled supervision by the DSO/CSO to ensure that:

- Appropriate supplies and required standard case definitions/ guidelines are available.
- Health workers know how to identify and use standard case definitions to record suspected cases of priority diseases seen in their health facility.
- Priority diseases are recorded in the case register according to the case definition.
- Some data is analyzed in the health facility to identify thresholds to take action both for routinely reported priority diseases and case-based diseases.
- Reported cases of diseases for which a single case is a suspected outbreak are investigated promptly.
- Response takes place when outbreaks are confirmed, or when problems are identified

in routine reporting
- Response actions are monitored and action is taken by the health facility to improve surveillance actions and readiness for outbreak response.

During the visits provide appropriate feedback, training, and assistance

Write a report of the supervisory visit

Report achievements and challenges that were recognized during the visit. Also state the actions that were planned with the health workers and any requests for additional resources, funds or special problems.

- Provide feedback to the health workers or staff being supervised:
- Let the health workers or surveillance staff know what is working well and what is not working
- Give feedback on how the data reported previously was used to detect outbreaks and take action to reduce illness, mortality and disability in the county
- If improvements are needed, discuss solutions with the health workers
- Provide on-the-job training as needed if a problem is identified. For example, during a review of the Health Facility HMIS Database, the supervisor noted that case fatality rates were not calculated correctly; the supervisor met with the health workers who do the calculation and reviewed the steps for calculating the rate with the health workers.
- Follow up on any request for assistance such as for emergency response equipment or supplies
- If a solution to a pre-existing problem was identified in a previous visit, check to see how well the solution has been implemented and find out if problems are still occurring and modify the solution if necessary

Use supervisory visits to improve surveillance activities in the County

Visits of surveillance supervisors from MoH are good opportunities to discuss and improve disease control in your County.

Annex 7N: Checklist for supervising surveillance and response activities at the community level

Below is an example of a Supervisory checklist at the community level. These checklists are updated routinely to reflect changes in IDSR or address specific gaps or challenges within the area.

Ministry of Health

Monthly Checklist for IDSR at the Community

COUNTY:			COMMUNITY NAME	
DISTRICT:			MOBILE NUMBER:	
CHA/CHV Respondent:			EMAIL	
POSITION:			START	
DATE:			END TIME:	
SN	Category	Query	Response	Comments
1	Case Detection, Investigation, and Reporting	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
1.1		Do you carry out surveillance activities in your communities?		
1.2		Do you have alert notification forms/trigger forms for tracking reportable diseases in registers/box files/ledgers?		
1.3		Availability of Job aids with simplified case definitions?		
1.4		Availability of defined population to CHAs/CHVs, number of persons a CHA/CHV will serve		
1.5		Do you record information about immediately notifiable disease on alert notification form?		
1.6		Are you able to identify reportable diseases, conditions or events using the community triggers and report to the next level? If no, why?		
1.7		Do you have all necessary forms/tools to work with?		
1.8		Had you reliable supply of recommended forms at all times over the last 3 months?		
1.9		For the cases of priority diseases that need to be reported to the next level within 24 hours, how many have you reported in the last 3 months?		
1.10		Are community members receiving the impacts of CHA/CHVs surveillance activities in their communities? Verify with community members		
2.0	Data Analysis and Use	Check for the availability of the following forms and select "Yes" or "No" from the dropdown menu. Please note if supply of forms is not adequate or will run out soon in the comments box		
2.1		Have gCHVs been trained in CEBS? By whom and how many times?		
2.2		Of all alerts reported by you in the past 3 months how many were verified by your supervisor to be true alerts?		
2.3		Do you take part in response activities in case of outbreak? If yes, what's your role?		
2.4		How often do you support Health Facility to conduct community sensitization meeting on CEBS Triggers?		
3.0	Supervision and Feedback	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
3.1		Do health facilities provide feedback to you?		
3.2		How many gCHVs in the community that received training for CEBS during the last 6 months?		
3.3		How many times have you received visits from your supervisors in the past 3 months?		
Signature of person completing				

Annex 7O: Checklist for supervising surveillance and response activities at the health facility level

Below is an example of a Supervisory checklist at the health facility level. These checklists are updated routinely to reflect changes in IDSR or address specific gaps or challenges within the area.

Ministry of Health

Monthly Checklist for IDSR at the Health Facility Level

COUNTY:			Health Facility (Name and Priority)	
DISTRICT:			MOBILE NUMBER:	
CHA/CHV Respondent:			EMAIL	
POSITION:			START	
DATE:			END TIME:	
SN	Category	Query	Response	Comments
1	Administration	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
1.1		IDSR guidelines		
1.2		Community case definitions pinned on wall		
1.3		Standard case definitions pinned on wall		
1.4		Alert and epidemic threshold charts		
1.5		Means of adequate/functioning transport, including fuel, for surveillance activities		
1.6		Surveillance Focal Person, if yes please describe their qualifications/additional training in the comment box		
1.7		Is there a patient register?		
1.8		Were there any missed reported priority conditions?		
1.9		Laboratory registers [if applicable]		
1.10		Health workers trained in IDSR? If yes, please specify number and when the workers were trained.		
1.11		Means of communication, if yes please specify type used?		
1.12		Is there a dedicated area to store records/data?		
1.13		Are the records kept safe and secure?		
2.0	Data Collection Tools	Check for the availability of the following forms and select "Yes" or "No" from the dropdown menu. Please note if supply of forms is not adequate or will run out soon in the comments box		
2.1		IDSR weekly ledger		
2.2		IDSR monthly reporting forms (HMIS)		
2.3		IDSR case alert and lab referral form		
2.4		Case investigation forms for priority diseases AFP		
2.5		Case investigation forms for NNT		
2.6		Case investigations forms for EVD		
2.7		Case investigation forms for maternal and neonatal death		

2.8		Case investigation forms for VHF		
3.0	Analysis and Reporting	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
3.1		Were all weekly reports submitted in the last month? If no, indicate the reasons.		
3.2		Were all weekly reports submitted on time in the last month? If not all, what is the reason for late reporting?		
3.3		Is the table of priority diseases data displayed on notice board?		
3.4		Does the facility keep copies or its own records of reports/investigation forms submitted?		
3.5		Is there a trend analysis/line graph of priority disease(s) displayed for any recent outbreak?		
3.6		Does the health facility have an updated map of catchment area?		
3.7		Can the SFP state the case definition for two priority diseases (of the interviewer's choosing)?		
4.0	Investigation and Confirmation of Cases	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
4.1		Is there a line list of alerts and rumors?		
4.2		Have all alerts from the community been investigated?		
4.3		Have all alerts from the community been investigated within 48 hours? If no, what proportion have been investigated within 48 hours of notification		
4.4		Were there any suspected priority diseases reported within the last month?		
4.5		Is there completed case investigation forms for epidemic prone diseases reported in last month?		
4.6		Were all suspected outbreaks of epidemic prone diseases in the last month notified to the next level within 24 hours of surpassing alert threshold?		
4.7		Are there any challenges in specimen pickup? If yes, please describe.		
4.8		Are there lab results for any specimen sent for suspected cases?		
4.9		Are there lab SOPS for specimen collection, packaging, and storage for priority diseases?		
5.0	Epidemic Preparedness and	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
5.1		IPD Protocols (are these easily located and identified?)		
6.0	Supervision and Feedback	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
6.1		Internal health facility supervision plan		
6.2		Supervision feedback report from district/ county		
6.3.		Does the health facility conduct supervisory visits to the communities? If yes, please report the number of communities visited within the past month.		
6.4		Feedback mechanism to the community (CHV meetings at health facility with support from OIC).		
7.0	Safe and Dignified Burial	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
7.1		SOPS for dead body management		
7.2		Does the facility have a staff trained to collect oral swab?		
7.3		Are there oral swab collection materials?		
8.0	Community Event Based Surveillance	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
8.1		Is CEBS reporting mechanism in place? If yes (please provide a brief overview/identify gaps in comments box)		
8.2		Does the facility keep record of gCHVs/CHVs/CHAs trained?		
8.3		Are there gCHVs/CHVs/CHAs trained in CEBS in your catchment area? If yes, please specify number in the comments section.		
8.4		Is there a list of the CHSS, including contact information? [if applicable]		
Signature of person completing				

Annex 7P: Checklist for supervising surveillance and response activities at the district level

Below is an example of a Supervisory checklist at the district level. These checklists are updated routinely to reflect changes in IDSR or address specific gaps or challenges within the area.

Ministry of Health

Monthly Checklist for IDSR at the District Level

COUNTY:				
DISTRICT:			MOBILE NUMBER:	
NAME:			EMAIL	
POSITION:			START	
DATE:			END TIME:	
SN	Category	Query	Response	Comments
1	Administration	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
1.1		Office space for surveillance activities		
1.2		Data storage facilities including functioning computer		
1.3		Is there an archive of the filled case based forms? If yes, describe how they are stored.		
1.4		Is the DSO trained in FETP? If not, please include in the comments what training has been received.		
1.5		Is the DSO trained in IDSR since 2015? If not, please include in the comments what training has been received.		
1.6		Means of communication. If yes, please specify type used. If not, please specify reason for absence.		
1.7		Means of adequate/functioning transport for surveillance activities		
1.8		Office space for surveillance activities		
2.0	Data Collection Tools	Check for the availability of the following forms and select "Yes" or "No" from the dropdown menu. Please note if supply of forms is not adequate or will run out soon in the comments box		
2.1		Updated IDSR guidelines		
2.2		IDSR monthly reporting forms		
2.3		IDSR case alert and lab referral forms		
2.4		Community Event Based surveillance reporting forms		
2.5		Case specific reporting forms for NNT		
2.6		Case specific reporting forms for EVD		
2.7		Case specific reporting forms for maternal and neonatal death		
2.8		Case specific reporting forms for VHF		
2.9		Case specific reporting forms for AFP		
3.0	Analysis and Reporting	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
3.1		Were all district weekly reports submitted for the last month? If no, indicate the reasons.		
3.2		Were all district weekly reports submitted on time? If no, what is the reason for late reporting?		
3.3		Is the table of priority diseases data displayed on notice board or surveillance office?		

3.4		Does the surveillance office keep its own copies or records of weekly reports submitted?		
3.5		Is there a trend analysis/line graph for priority diseases displayed?		
3.6		Calculations for district-level IDSR indicators displayed on the wall of the surveillance office		
3.7		Map of district showing health facilities and catchment population displayed?		
4.0	**Investigation and Confirmation of Cases**	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
4.1		Are there updated line lists for outbreaks in the district?		
4.2		What proportion of alerts have been investigated in the community within 48 hours of notification?		
4.3		Do all notified diseases have completed case investigation forms?		
4.4		Are there updated line lists for outbreaks in the district?		
4.5		What proportion of alerts have been investigated in the community within 48 hours of notification?		
4.6		Do all notified diseases have completed case investigation forms?		
4.7		Are there updated line lists for outbreaks in the district?		
4.8		What proportion of alerts have been investigated in the community within 48 hours of notification?		
5.0	**Epidemic Preparedness and Response**	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
5.1		Availability of district response teams-verify evidence of meeting with minutes		
5.2		Guidelines for management of EVD, cholera, and measles. Specify in the comments which guidelines are not available.		
5.3		Linkage of district rapid response team to county rapid response team. Describe the level of coordination and reporting structure in the comments.		
5.4		Availability of standard IPC protocols for priority diseases		
5.5		Availability of communication messages for epidemic prone diseases		
5.6		Availability of district response plan-written with risk mapping done		
6.0	**Supervision and Feedback**	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
6.1		Has any IDSR supervision been conducted by the County Health Team in the last quarter?		
6.2		Supervision feedback report from county		
6.3.		District integrated supportive supervision plan		
6.4		Number of supervisory visits the health facilities performed - availability of report		
6.5		Feedback mechanism to the health workers in health facilities		
7.0	**Safe and Dignified Burial**	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
7.1		Are there health workers in the district trained on safe and dignified burial? If yes, include how many in the comments.		
7.2		SOPS for dead body management, including oral swab collection		
7.3		Does the district have a line list for community deaths?		
8.0	**Community Event Based Surveillance**	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
8.1		Does the district maintain a list of gCHVs/CHVs/CHAs, including contact information and locations?		
8.2		Have all gCHVS/CHVs/CHAs been trained in CEBS? Please specify the number trained in the comments section.		
8.3		Is there a list of CHSS, including contact information?		
8.4		Is there a CEBS reporting mechanism in place? If yes, please provide a brief overview/identify gaps in the comments.		
Signature of person completing				

Annex 7Q: Checklist for supervising surveillance and response activities at the county level

Below is an example of a Supervisory checklist at the county level. These checklists are updated routinely to reflect changes in IDSR or address specific gaps or challenges within the area.

Ministry of Health

Monthly Checklist for IDSR at the County Level

COUNTY:				
Name respondent(s)			MOBILE NUMBER:	
Position respondent(s)			EMAIL	
Date of supervision			START	
			END TIME:	
SN	Category	Query	Response	Comments
1	Administration	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
1.1		Office space for surveillance activities		
1.2		Data storage facilities including functioning computer		
1.3		Is there an archive of the filled case-based forms? If yes, describe how they are stored.		
1.4		Is the CSO trained in FETP? If not, please include in the comments what training has been received.		
1.5		Is the CSO trained in IDSR since 2015? If not, please include in the comments what training has been received.		
1.6		Means of communication, if yes please specify type used?		
1.7		Means of adequate/functioning transport for surveillance activities		
1.8		Surveillance review meetings held quarterly (Availability of minutes)		
1.9		Availability and functionality of EOC (e.g. internet, power supply)		
2.0	Data Collection Tools	Check for the availability of the following forms and select "Yes" or "No" from the dropdown menu. Please note if supply of forms is not adequate or will run out soon in the comments box		
2.1		Updated IDSR guidelines		
2.2		IDSR monthly summary reporting forms buffer stock		
2.3		IDSR case alert and lab referral form buffer stock		
2.4		Community Event Based surveillance reporting forms buffer stock		
2.5		Case specific reporting forms for NNT		
2.6		Case specific reporting forms for EVD		
2.7		Case specific reporting forms for maternal and neonatal death		
2.8		Case specific reporting forms for VHF		
3.0	Analysis and Reporting	Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
3.1		County weekly epi-summary report submitted to MoH/DPC on time		
3.2		Calculations for county level IDSR indicators displayed on the wall of the surveillance office		
3.3		Is the table of priority diseases data displayed on notice board or surveillance office?		
3.4		Does the surveillance office keep its own copies or records of the weekly reports submitted?		
3.5		Is there a trend analysis/line graph for priority diseases displayed for county?		
3.6		Map of county showing health facilities		

4.0		Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
4.1	Investigation and Confirmation of Cases	Is there an updated line list for each outbreak in the county?		
4.2		Were all alerts within the past month investigated in the district/health facility or community within 24-48 hours of notification? If not, what proportion?		
4.3		Is there completed case investigation forms for epidemic prone diseases reported in last month?		
4.4		Were all suspected outbreaks of epidemic prone diseases notified to the county within 48 hours of surpassing epidemic threshold within last month? – If not, how many?		
4.5		Is there lab results/confirmation for suspected cases? Specify number of suspected cased with lab results		
4.6		Does the CSO have copies of SOPS for specimen collection, packaging, and storage for priority diseases?		
5.0		Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
5.1	Epidemic Preparedness and Response	Availability of County epidemic response committee (get copy of minutes of last meeting)		
5.2		Availability of epidemic response plan including mapping of high risk communities		
5.3		Guidelines for management of epidemic prone diseases		
5.4		Linkage of district epidemic response team to county response team		
5.5		Availability of standard IPC protocols for priority diseases		
5.6		Availability of communication messages for epidemic prone diseases		
6.0		Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
6.1	Supervision and Feedback	IDSR supervision and mentorship conducted monthly by MoH and/or partners		
6.2		Supervision feedback report from MoH/DPC (copies of weekly epi bulletins)		
6.3.		Availability of county IDSR supervision plan		
6.4		Feedback mechanism to the districts		
7.0		Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
7.1	Safe and Dignified Burial	Are there health workers in the county trained on safe and dignified burial		
7.2		SOPS for dead body management including oral swab collection		
7.3		Does the county have a line list of community deaths?		
7.4		Do all districts in the county have dead body management teams?		
8.0		Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
8.1	Cross border surveillance	List of PoEs with key focal points for communication with IHR focal point [if relevant]		
8.2		PoE supervised in the previous month [if relevant]		
8.3		Cross border meeting held on either side (review minutes) [if relevant]		
9.0		Check for the availability of the following and select "Yes" or "No" from the dropdown menu. Indicate quantities or concerns in the comments box where appropriate		
9.1	Community Event Based Surveillance	Does the county maintain a list of gCHVs/CHVs/CHAs, including contact information and locations?		
9.2		Have the gCHVs/CHVs/CHAs been trained in case fatality-based surveillance?		
9.3		Is there a list of the CHSS, including contact information?		
9.4		Is CEBS reporting mechanism in place? If yes, please provide a brief overview/identify gaps in the comments.		
Signature of person completing				

Annex 7R: Surveillance Officer job aid

County surveillance officer job aid

The county surveillance officer (CSO) is responsible for coordinating all disease surveillance and response including public health event activities in the county and reports to the County Health Officer (CHO).

Identify

- Ensure coordination between Community Health Department Director to oversee and support community services and CEBS with District
- Ensure reliable supply of data collection and reporting tools are available for reporting sites
- Ensure laboratory specimen collection and transport material is available
- Ensure a log of specimens sent for laboratory confirmation is maintained

Report

- Ensure DSOs know and use standard case definitions for reporting priority diseases and conditions
- Provide instructions and supervision for surveillance and reporting priority diseases and conditions
  Receive weekly surveillance data on Monday mornings from the District Surveillance Officer (DSO) and review the quality
- Report weekly and monthly surveillance data on time to the National Level DPC
- Harmonize monthly IDSR and HMIS data

Analyze and Interpret

- Ensure accuracy of denominators for use within County
- Aggregate data from DSO reports and maintain an up to date archive of all surveillance data
- Analyze data by time, place and person
- Weekly update graphs, tables, and charts to describe reported diseases, events and conditions
- Calculate rates and thresholds and compare current data with previous periods to make conclusions
- Describe risk factors for priority diseases or conditions

Investigate and Confirm

- Arrange and support investigation of reported diseases or events
- Receive and interpret laboratory results
- Report laboratory results to DSO
- Compile District levels line lists of suspected cases
- Report any confirmed outbreak to DPC
- Ensure specimen collection kits for investigation activities are available

Prepare

- Convene emergency preparedness and management committees
- Develop and manage contingency plans
- Conduct training and simulation exercises for staff
- Periodically conduct risk assessment for risk factors and potential hazards
- Organize and support Rapid Response Team

Respond

- Select and implement appropriate public health response
- Activate epidemic preparedness and response committee and plan response
- Conduct training for emergency activities
- Plan timely community information and education activities
- Document response activities
- In case of epidemics, sends daily district sit-reps to the MOH

Communicate (Feedback)

- Alert nearby areas and districts about the outbreak including cross border areas
- Give feedback to districts on surveillance and data quality findings
- Give districts regular, periodic feedback about routine control and prevention activities
- Conduct County level surveillance review meetings to include key community members and partners
- Produce a monthly county surveillance bulletin

Monitor, Evaluate and Improve

- Monitor, evaluate and take action to improve program targets and indicators for measuring quality of the surveillance system for district and health care facilities
- Conduct regular supervisory visits with DSOs
- Monitor and evaluate timelines of response to outbreaks
- Provide regular assessment of staffing needs for IDSR implementation and inform the next level
- Assess acceptability of response to community and refine as needed
- Ensure involvement of partners in surveillance and response activities

District surveillance officer job aid

The District Surveillance Officer (DSO) is responsible to implement and coordinate IDSR activities at the district level. They detect, report and respond to priority diseases and public health events in the district. They report to the county surveillance officer but also to the district health officer as the immediate supervisor.

Identify

- Support HCF to verify alerts from the community
- Collect surveillance data from health care facilities and the community and review the quality
- Ensure reliable supply of data collection and reporting tools are available at reporting sites
- Ensure all healthcare facilities have materials for laboratory collection and transport

- Ensure reliable supply of data collection and reporting tools are available at reporting sites
- Participate in and support CEBS training with community members

Report

- Maintain a list of all reporting sites in the district
- Make sure healthcare facilities know and use standard case definitions for reporting priority diseases, conditions and events
- Ensure CEBS workers (CHVs, CHAs etc.) have community-based case definitions for reporting priority diseases, conditions and events
- Provide instructions and supervision for surveillance and reporting priority diseases and conditions for healthcare facilities and communities.
- Report data on time to the County Surveillance Officer (CSO)

Analyze and Interpret

- Use and refine the denominators e.g. catchment populations
- Aggregate data from healthcare facility reports and maintain an up to date archive of all data
- Analyze data by time, place and person and maintain an updated district analysis summary tables, graphs and charts for reported priority diseases, conditions and events
- Assist healthcare facilities to update graphs, tables, and charts to describe reported diseases, events and conditions
- Compare data and make conclusions about trends and thresholds

Investigate and Confirm

- Arrange and lead investigation of reported diseases, conditions or events
- Maintain an updated line list for cases of suspected priority diseases, conditions and events reported in the district
- Assist healthcare facility in safe collection, packaging, storage and transport of laboratory specimens for confirmatory testing
- Maintain an updated samples collected and results log at the district.
- Receive laboratory results from CSO, give feedback to healthcare facility
- Report findings of outbreak investigation to the CSO and DHO

Prepare

- Participate in emergency preparedness and response committees
- Participate in risk mapping of potential hazards
- Organize and support District Outbreak and Rapid Response Teams
- Participate in and support training and simulation exercises for preparedness of health facilities and district staff

Respond

- Together with CSO, select and implement appropriate public health response
- Plan timely community information and education activities for HCF and communities
- Document response activities based on IDSR outbreak reporting format (for Liberia)
- In case of epidemics, sends daily district sit-reps to the CSO

Communicate (Feedback)

- Alert nearby areas and districts about outbreaks or events
- Give healthcare facilities regular feedback on surveillance activities, priority events and about routine control and prevention activities
- Give feedback on surveillance and data quality findings to DHO and CSO
- Support healthcare facilities to engage communities on surveillance activities
- Conduct regular district level surveillance review meetings to include key community members and partners

Monitor, Evaluate and Improve

- Conduct regular supervisory visits to healthcare facilities
- Monitor and evaluate program timeliness and completeness of reporting from healthcare facilities in the district
- Monitor and evaluate timeliness of response to outbreaks
- Gather information from affected communities on needs and impact of response

Health facility surveillance focal person job aid

The Surveillance Focal Person (SFP) is a clinician who has been identified as the focal person for reporting IDSR Case Alerts to the District Surveillance Officer (DSO). It is often the Officer in Charge. The SFP plays a role in verifying and reporting the Community Event-Base Surveillance (CEBS) alerts received by the community. Their responsibilities are:

Identify

- Use standard case definitions to detect, confirm and record priority diseases or conditions
- Ensure specimen are collected safely, in correct packaging and storage
- Ensure transport of laboratory specimens for confirmatory testing
- Verify alert triggers from the community
- Co-organize and lead training of Community Health Assistants (CHAs)/Community Health Volunteers (CHVs) with the Community Health Surveillance Supervisor (CHSS)
- Ensure appropriate storage of surveillance materials

Report

- Complete the weekly IDSR ledger and report it to DSO
- Report case-based information for immediately reportable diseases
- Feedback summary data to community level
- Pass all CEBS forms to the DSO

Analyze and Interpret

- Prepare and update graphs, tables, and charts on healthcare facility walls to describe reported diseases, events and conditions
- From the analysis, report to the DSO any disease or condition that
- Exceeds an action threshold
- Occurs in locations where it was previously absent
- Presents unusual trends or patterns

Investigate and Confirm

- Together with DSO undertake detailed case investigation of any persons with suspected priority diseases
- Report laboratory results when received to the CEBS worker

Prepare and Respond

- Participate in emergency preparedness and response committees as required
- Participate in response training and simulation exercises
- Ensure healthcare facility has all essential supplies required

Respond

- Manage cases and contacts according to standard case management guidelines
- Take relevant additional control measures
- Participate as part of rapid response team

Communicate (Feedback)

- Communicate with community members about outcome of prevention and response activities
- Conduct regular meetings with CEBS workers about surveillance and response activities integrated with other health programs (e.g. EPI)

Monitor, Evaluate and Improve

- Assess community participation
- Conduct self-assessment on the surveillance and response activities
- Monitor and evaluate prevention activities and modify them as needed

Annex 7S: Log of suspected outbreaks and rumors

Record verbal or written information from health facilities or communities or social media about suspected outbreaks, rumours, or reports of unexplained events. Record the steps taken and any response activities carried out.

Condition or disease or event (1)	Source of suspected outbreak or rumor (newspaper, telephone, etc.) (2)	Number of cases initially reporter (3)	Number of deaths initially reporter (4)	Location on Health Center (5)	Date district was notified (6)	Date suspected outbreak was investigated by the district (7)	Result of district investigation (confirmed, ruled out, or unknown) (8)	Date outbreak began (9)	Date onset index case (10)	Date crossed threshold or first cluster (11)	Date a case was first seen at a health facility (12)	Date specific intervention began (13)	Type of concrete intervention that was begun (14)	Date district notificated national level of the outbreak (15)	Date district received national response (16)	Comment (include if sample taken and result) (17)	Name and signature

Annex 8: Instructions on unique IDs

IDSR ID

There are a number of different unique identification numbers in use in IDSR. The primary identification number used in Liberia is called the "IDSR ID". The IDSR ID is intended to uniquely identify cases in outbreaks, and will be used to tie together individuals across alerts, lab samples, and outbreak investigations. The IDSR ID is constructed by:

[County Code] – [Facility Code] – [Case ID]

County Code – The county code is a three-letter abbreviation of the county name.

Facility Code – The facility code is an identification number given uniquely to each facility, and should be posted on the facility wall. Community workers will use the code of the facility to which they are tied. Some district level workers may be given their own unique facility code. Contact the district health team or county health team if you not know your facility code.

Case ID – Your facility may have an "ID Book" to reference and assign Case IDs. You can reference the ID Book for the number to assign to the case. Do not re-use any of the numbers in the book, cross them out after use. If your facility does not have an ID Book, assign the case numbers in order, starting at "1". For every additional case, increase the count. This count never restarts at 1. Reference previous IDSR Alert forms to reference the last Case ID assigned.

Patient Record ID

The patient record ID refers to the identification number used within the facility to refer to the patient data. The patient record ID is also sometimes called, "Health Facility ID", "Medical Register Number", "Patient Registration ID", or simply "Patient ID".

Annex 9: Forms

Annex 9A: Community alert reporting form

Instructions: This form is completed by the CBS focal person and submitted immediately to nearest health facility/sub-district surveillance focal person when he or she identifies disease (s) or public health event as per the community case definition. It is also completed for unusual health events/alerts that are not captured by the given case definition.

Community alert reporting form

[Send this form immediately to your supervisor or nearby health facility]

1. Name of CBS focal person reporting:_____

2. Telephone number:_____Community_____District_____

3. Date reporting (day, month, year)____/_____/__ _____

4. Type of illness/Condition/Event/Alert (please describe): _____

5. When did this happen (Date: Day/Month/Year); Time ____/___/_____

6. Date/time this was detected (Date: Day/Month/Year); Time: ____/___/_____

7. Where did this happen?
(Location: community, ward/sub-district, district)

8. How many people have been affected?

9. Has anyone died? If yes, how many

10. Are there sick or dead animals involved?

11. Is the event ongoing as at the time of this report?

12. What action has been taken?

NB: Countries should adopt this form such that it is used to capture and notify/report the country's priority diseases (Indicator-based surveillance) and events/alerts (event-based surveillance) occurring at the community level. This can be carbonated in the form of a CBS Register or note book with a copy sent to the nearest health facility and copy kept at community with the CBS focal person. Sections of the register should include pictures or images of the community case definitions and the predetermined events/alerts to assist in detection at the community level.

Annex 9B Community-Based Surveillance (CBS) suspected diseases and public health events monthly log sheet

Instructions: This form is a line listing of all the diseases/events/alerts identified during the month. It is completed by the CBS focal person and submitted monthly to nearest health facility/sub-district surveillance focal person every month.

NB: Countries should adopt this form such that it is used to capture and notify/report the country's priority diseases (Indicator-based surveillance) and events/alerts (event-based surveillance) occurring at the community level. This can be carbonated in the form of a note book with a copy sent to the nearest health facility and copy kept at community with the CBS focal person

Community-Based Surveillance Suspected Diseases and Public Health Events Monthly Log Sheet

District_____ Ward/Subdistrict_____

Community:_____ Month_____ Year_____

Serial Number	Type of illness/ Condition/Event/ Alert	When did this happen? (DD/MM/YYY)	Where did this happen? (Community, District)	How many have been affected?	How many died?	What action was taken?

Annex 9C: IDSR immediate case-based reporting form

	IDSR Immediate Case-Based Reporting Form Variables/Questions	Answers – Case n
X	Record's unique identifier (YYYY-WEEK-CCC-PPP-DDD-Case nnn)	
1	Reporting Country	
2	Reporting Province/Region	
3	Reporting District	
4	Reporting Site (Health Facility, Camp, Village...)	
5	Disease/Event (diagnosis): *	
6	Inpatient or Outpatient?	
7	Date seen at health facility (day/month/year)	________\
8	Patient Name(s)	
9	Date of Birth (day/month/year)	________\
10	Age (...Years/...Months/...Days).	
11	Sex: M=Male F=Female	
12	Patient's residence: Name of Community/ Neighborhood	
13	Name of Town/City	
14	Name of District of residence	
15	Urban/Rural? (U=Urban R=Rural)	
16	Address, (cell)phone number ... If applicable, name of mother and father if neonate or child	
17	Occupation	
18	Date of onset (day/month/year) of first symptoms	________\
19	Travel history (Y or N), if Yes, state destination	
20	Number of vaccine doses received in the past against the disease being reported**	
21	Date of last vaccination	________\
22	Date specimen collected	
23	Date specimen sent to lab	
24	Laboratory results	
25	Outcome: (Alive, Dead, transferred out, Lost to follow-up or unknown)	
26	Final Classification: Confirmed, Probable, Compatible, Discarded	
27	Date health facility notified District (day/month/year)	_ _ _ _ _ _ _ _ _ \
28	Date form sent to district (day/month/year)	________\
29	Person completing form: name, function, signature	

* Disease/Event (Diagnosis):
AFP, Anthrax, Cholera, Bloody Diarrhea, Dracunculiasis (Guinea Worm Disease), Neonatal Tetanus, Non-neonatal Tetanus, Measles, Dengue, Chikungunya, Meningitis, Monkey Pox, Yellow Fever, SARS, SARI, Maternal death, Neonatal death, Viral Hemorrhagic Fever, Plague, Typhoid fever, Rabies (Human), Smallpox, death, Influenza due to new subtypes, Adverse Effects following immunization (AEFI), Any event or disease of public health importance (Specify)

** Measles, Neonatal Tetanus (TT in mother), Yellow Fever, and Meningitis, etc.
For cases of Measles, NT (TT in mother), Yellow Fever, and Meningitis; 9=unknown

Annex 9D: IDSR case-based laboratory reporting form

IDSR case-based Laboratory Reporting Form

Part I: Referring health worker to complete this form and a copy sent to the laboratory with the specimen

	Variables	Answers
1	Date of specimen collection (day/month/year)	
2	Suspected Disease or Condition	
3	Specimen type *	
4	Specimen unique identifier **	
5	Patient Name (s)	
6	Sex (M= Male F= Female)	
7	Age (….. Years/ ……Months/… Days).	
8	Date Specimen sent to laboratory (day/month/year)	________\
9	Phone and email address of clinician	

Part II. Laboratory to complete this section and return the form to district and clinician

	Variables	Answers
1	Laboratory Name and location	
2	Date laboratory received specimen (dd/mm/yyyy)	________\
3	Specimen condition: (Adequate/Not adequate)	
4	Type of test(s) performed	
5	Final Laboratory Result(s)	
6	Date (dd/mm/yyyy) laboratory sent results to district	________\
7	Date Results sent to the clinician (dd/mm/yyyy)	________\
8	Date district received laboratory results (dd/mm/yyyy)	________\

* Blood, Plasma, Serum, Aspirate, CSF, Pus, Saliva, Biopsy, Stool, Urethral/Vaginal discharge, Urine, Sputum, food/water samples

** Same as the patient's identifier in the IDSR immediate case-based reporting form

Annex 9E: IDSR weekly/monthly summary reporting form

IDSR weekly/monthly summary reporting form

Year: Week: Month:

Country: Province/Region: District: Population:

District ISO code: Reporting Site Name: Report Unique Identifier:

Officially Expected Reports: Number of reports received: Reports received on time:

	Notifiable Diseases and Events	Cases	Deaths	Lab confirmed cases observations
1	Acute Flaccid Paralysis			
2	Acute hemorrhagic fever syndrome			
3	Acute viral hepatitis			
4	Adverse Effects following immunization (AEFI)			
5	Anthrax			
6	Buruli ulcer			
7	Bacterial meningitis			
8	Chikungunya			
9	Cholera			
10	Chronic viral hepatitis B (New cases)			
11	Chronic viral hepatitis C (New cases)			
12	Dengue fever			
13	Diabetes mellitus (New cases)			
14	Diarrhea with blood			
15	Diarrhea with severe dehydration <5			
16	Dracunculiasis (Guinea worm disease)			
17	HIV/AIDS (New cases)			
18	Hypertension (New cases)			
19	Influenza-like illness			
20	Leprosy			
21	Listeriosis			
22	Malaria			

IDSR weekly/monthly summary reporting form

Year: Week: Month:
Country: Province/Region: District: Population:
District ISO code: Reporting Site Name: Report Unique Identifier:
Officially Expected Reports: Number of reports received: Reports received on time:

	Notifiable Diseases and Events	Cases	Deaths	Lab confirmed cases	Observations
23	Malnutrition < 5 years				
24	Maternal deaths				
25	Measles				
26	Mental health (Epilepsy)				
27	Middle East respiratory syndrome (MERS)				
28	Monkey Pox				
29	Neonatal tetanus				
30	Non-neonatal tetanus				
31	Newborn with low birthweight (less than 2500 g)				
32	Noma				
33	Onchocerciasis				
34	Perinatal deaths				
35	Plague				
36	Poliomyelitis (AFP)				
37	Public health events of international or national concern				
38	Rabies (Human)				
39	SARS				
40	Severe Acute Respiratory Infections (SARIs)				
41	Severe pneumonia <5				
42	Sexually Transmitted Infections				
43	Smallpox				
44	Trachoma				
45	Trypanosomiasis				

IDSR weekly/monthly summary reporting form

Year: Week: Month:

Country: Province/Region: District: Population:

District ISO code: Reporting Site Name: Report Unique Identifier:

Officially Expected Reports: Number of reports received: Reports received on time:

	Notifiable Diseases and Events	Cases	Deaths	Lab confirmed cases	Observations
46	Typhoid fever				
47	Viral hemorrhagic fever				
48	Yellow Fever				
49	Zika virus disease				

Analysis, Interpretation, Decision, Action and Recommendations

Epidemiological comments	
Decisions and action(s) taken	
Recommendations	
Report date: __________ (dd/mm/yyyy)	Responsible Officer:

Annex 9F: IDSR reports and data sharing logbook

IDSR Reports and Data Sharing Log book

Country:

Province /Region:

District:

Surveillance site name:

Reception Date of the Report or Data set	Report description: pick one from the list below*	Reporting site name	Reported period **	Report form well filled? (Y/N)	Report received Timely or Late?	Feedback sent to the reporting site?	Comments

* Weekly AFP polio; Weekly Epidemic Prone Diseases; Weekly Influenza sentinel sites and labs findings; Monthly IDSR Aggregated data including malaria and Guinea worm disease; Monthly Pediatric bacterial Meningitis surveillance data; Monthly; Measles and yellow fever laboratory data; Monthly Measles, yellow fever and NNT case-based data; Monthly Bacteriology laboratory data; Monthly Rotavirus surveillance data; Quarterly Tuberculosis Report; Quarterly MDR and XDR Tuberculosis Report; Quarterly Leprosy Report; Quarterly Trypanosomiasis Report; Annual HIV Surveillance data, Etc.

**(Use epidemiological notation to record the reporting period, for example: W-2010-18 for weekly data, M-2010-12 for monthly data, Q- 2010-02 for quarterly data)

Note: Instructions for completing forms can be printed on the reverse side if a paper form is used or in electronic format if reports are compiled and transmitted by computer

Annex 9G: IDSR data quality checklist

IDSR Data Quality Audit Checklist				
Name of Reporting Officer: _____				
Contact Phone Number: _____				
E-mail: _____				
Health Facility: _____				
District: _____				
Region/Province: _____				
Date _ _/ _ _/ _____				
Persons Met and Title				
CORE ACTIVITY	THINGS TO LOOK FOR IN THE FACILITY General			NOTES
1. DATA COLLECTION TO IDENTIFY SUSPECTED CASES WITHIN HEALTH FACILITY	1. Is there an information flow for reporting to the district level (diagram or description)?			
	2. How frequently do you review and collect data (for example, daily, weekly, monthly)?			
	3. Is there a list of the country's notifiable diseases?			
	4. Is there a list of priority reportable diseases/conditions/events?			
	5. For each priority reportable disease, condition or event, does this facility have case definitions for suspected and confirmed cases?			
	6. Priority Reportable Diseases/conditions/events with case definitions			
	Disease (examples only. Please modify list for your setting.)	Yes	No	Notes
	AFP (Suspected Polio)			
	Tuberculosis			
	Viral Hemorrhagic Fever, for example, Ebola			
	Yellow Fever			
	Monkey Pox			
	Others: specify			
	Case-Based Reporting or Line List Form, IDSR weekly/monthly summary forms			
	1) Is the cased-based form or line listing form or IDSR weekly/summary form paper-based or electronic?			
	2) If paper-based, do you have adequate supply of case-based reporting or line listing forms?			
	3) Is your facility using them?			
	4) Do you get feedback about the final diagnosis?			

Thoughts on possible problems in data collection process Examples: • Unsystematic data collection and reporting procedures due to HCW not knowing	List possible causes of omissions or problems.	
	List recommended solutions, including target date and person responsible.	
2. RECORDING OF CASES	1. For suspected cases, what material is reviewed to determine suspected cases (for example, patient chart/folder/card, facility record, case-based form, line list)?	
	2. For suspected cases, how was diagnosis assessed (for example, laboratory confirmatory tests, patient signs and/or symptoms, patient history, or consultation)?	
	3. Are priority reportable diseases recorded in the health facility register or facility line list according to the country	
	4. Select randomly 3 priority diseases; verify how they are diagnosed and recorded	
Thoughts on possible problems in recording of cases, for example: Lack of documentation/recording Data or files are lost Poorly completed forms (missing values, forms not filled, presence of blanks, etc.).	List possible causes of omissions or problems	
	List recommended solutions, including target date and person responsible	
3. REPORTING	1. Who is responsible for reporting priority reportable diseases (health-care provider, laboratory, institution)?	
	2. When was the last time a supervisor made a site visit to your facility?	
	3. How often do you report information to the next level?	
	4. Is there a standard method for reporting each immediate reportable disease?	
	5. Is there a standard method for summary reporting each priority disease?	
	6. Is there a standard method of reporting an outbreak?	
	7. Is the report case-based or aggregate format?	
	8. Is the reporting protocol process mapped out or summarized in narrative format and readily visible in the facility (for example, on the wall)?	
	9. For priority diseases, are "0" cases recorded and reported?	
	10. Are the number of cases of notifiable diseases seen at the facility within a specified reporting period same as that reported to the district level? (Randomly select 3 notifiable diseases and verify)	
	11. Are each of the immediately reportable diseases consistently reported in a timely manner?	
	Immediately Reportable Diseases	
	Disease / Yes / No	

List findings seen For example: Under-reporting or Over-reporting of cases. Duplicate reporting Untruthful reporting, (for example, reporting zero, while there is an ongoing outbreak of epidemic- prone diseases) Inconsistent reporting formats (forms). Late submission/reporting. Inconsistent reporting periods,	
	List possible causes of omissions or problems List recommended solutions, including target date and person responsible

Annex 9H: Maternal death-reporting form and perinatal death reporting forms

Maternal Death Reporting Form	
The form must be completed for all deaths, including abortions and ectopic gestation related deaths, in pregnant women or within 42 days after termination of pregnancy irrespective of duration or site of pregnancy	
Questions/Variables	**Answers**
1 Country	
2 District	
3 Reporting Site	
4 How many of such maternal death occurred cumulatively this year at this site?	
5 Date this maternal death occurred (day/month/year)	
6 Maternal death locality (Village or Town)	
7 Record's unique identifier (year-Country code-District-site-maternal death rank)	
8 Maternal death place (Community, health facility, district hospital, referral hospital or private hospital, on the way to health facility or	
9 Age (in years) of the deceased	
10 Gravida: how many times was the deceased pregnant?	
11 Parity: how many times did the deceased deliver a baby of 22 weeks/500g or more?	
12 Time of death (specify "During pregnancy, At delivery, during delivery, during the immediate post-partum period, or long after	
13 If abortion: was it spontaneous or induced?	
Maternal death history and risk factors	
14 Was the deceased receiving any antenatal care? (Yes/No) Did she have Malaria? (Yes or No)	
15 Did she have Hypertension? (Yes or No)	
16 Did she have Anaemia? (Yes or No)	
17 Did she have Abnormal Lie? (Yes or No)	
18 Did she undergo any Previous Caesarean Section? (Yes or No)	
19 What was her HIV Status? (choose "HIV+; HIV-; or Unknown HIV status")	
Delivery, puerperium and neonatal information	
20 How long (hours) was the duration of labour	
21 What type of delivery was it? (choose one from "1=Vaginal non-assisted delivery, 2= vaginal-assisted delivery (Vacuum/forceps), or 3=Caesarean section"	21
22 What was the baby status at birth? (Alive or Stillborn)	

Maternal Death Reporting Form	
The form must be completed for all deaths, including abortions and ectopic gestation related deaths, in pregnant women or within 42 days after termination of pregnancy irrespective of duration or site of pregnancy	
Questions/Variables	**Answers**
23 In case the baby was born alive, is he/she still alive or died within 28 days after his/her birth? (choose 1=Still alive, 2=neonatal death, 3=died beyond 28 days of age)	
24 Was the deceased referred to any health facility or hospital? (Yes/No/Don't know)	
25 If yes, how long did it take to get there? (hours)	
26 Did the deceased receive any medical care or obstetrical/ surgical interventions for what led to her death?	
27 If yes, specify where and the treatment received*	
28 Primary cause of the Maternal Death	
29 Secondary cause of the Maternal Death	
30 Analysis and Interpretation of the information collected so far (investigator's opinion on this death)	
31 Remarks	
32 Maternal death notification date (day/month/year)	
33 Investigator (Title, name and function)	
*Treatment received	
I.V. Fluids; Plasma; Blood Transfusion; Antibiotics; Oxytocin; Anti-seizure drugs; Oxygen; Anti-malarial; Other medical treatment; Surgery; Manual removal of placenta; Manual intra uterine aspiration; Curettage, laparotomy, hysterectomy, instrumental delivery (Forceps; Vacuum), Caesarean section, anesthesia (general, spinal, epidural, local)	
Definitions	
Gravida: The number of times the woman was pregnant- Parity: Number of times the woman delivered a baby of 22 weeks/500g or more, whether alive or dead	

Perinatal death – reporting form		
The form must be completed for selected perinatal deaths, comprising stillbirths and early neonatal deaths		
	Questions / Variables	**Answers**
	Identification	
1	Country	
2	District	
3	Reporting site/facility	
4	Perinatal death locality (village or town)	
5	Place of death (community, health facility, district hospital, referral hospital or private hospital, on the way to health facility or hospital)	
6	Date this perinatal death occurred (day/month/year)	
7	Record's unique identifier (year-country code-district-site) for the mother	
8	Record's unique identifier (year-country code-district-site) for the baby (deceased).	
	Pregnancy progress and care (Perinatal death history and risk factors)	
9	Mother's age (in years)	
10	Type of pregnancy (singleton/twin/higher multiples)	
11	Did the mother of the deceased receive any antenatal care? (Yes/No/Unknown)	
12	If yes to 11, how many visits? _____	
13	Did the mother of the deceased have malaria? (Yes/No/Unknown)	
14	If yes to 13, did the mot her receive treatment? (Yes/No/Unknown)	
15	Did the mother of the deceased have pre-eclampsia disease? (Yes/No/Unknown)	
16	If yes to15, did the mother receive any treatment? (Yes/No/ Unknown)	
17	Did the mother of the deceased have severe anemia (HB,7g/dl)? (Yes/No/Unknown)	
18	If yes to 17, did the mother receive any treatment? (Yes/No/Unknown)	
19	Did the mother of the deceased have recommended maternal immunizations (for example, tetanus toxoid) (Yes/ No/Unknown)	
20	Did the mother of the deceased have Rhesus factor (Rh) or ABO incompatibility? (Yes/ No/Unknown)	
21	If Rhesus positive, did the mother of the deceased receive Anti-D injection during this baby's pregnancy? (Yes/ No/Unknown)	
22	Did the deceased present an abnormal lie (including breech presentation)? (Yes/ No/Unknown)	
23	What was the HIV status of the mother? (choose "HIV+; HIV-; or Unknown HIV status")	

Perinatal death – reporting form
24 What was the status of the syphilis test of mother? (Positive (+) or negative (-) If she was positive for syphilis, did she receive treatment
Labor, birth, puerperium
25 Date of birth (day/month/year)
26 Attendance at delivery (Nurse/midwife/doctor/other-specify).
27 Was fetal heart rate assessed on admission? (Yes, No)
What type of delivery was it? (choose one from "1=Vaginal non-assisted delivery, 2= vaginal-assisted delivery (Vacuum/forceps), or 3=Caesarean section
28 Sex of the baby (1=male; 2=female, 3=ambiguous)
29 Birth weight in grams (>=2500; 1500-2499 (LBW); 1000-1499g (VLBW) <1000 (ELBW))
30 Did the mother of the deceased have premature rupture of membranes (PROM)? (Yes/No/Unknown)
31 Did the mother of the deceased have foul smelling liquor?
32 Gestational age (in weeks) Method of estimation: Ultrasound /LMP (DD/MM/YY)
33 How long (hours) was the duration of labor?
Information on the death and actions taken before and after the death
30 If stillbirth – gestational age (in weeks) of the deceased
31 If neonatal death – age (in days) of the deceased
32 If the deceased baby was born alive what was the APGAR Score?
33 If the deceased baby was born alive, was resuscitation with bag and mask conducted?
34 If the deceased baby was born alive, was he/she referred to any healt facility or hospital? (Yes/No/Unknown)
35 If the deceased baby was born alive, did he/she receive any other medical care beyond resuscitation? (Yes/No/Unknown)
If yes, specify where and the treatment received: * I.V. Fluids; Blood/Plasma transfusion; Antibiotics; Oxygen; Other medical treatment
Primary cause of death:
Secondary cause of death:
Maternal condition (if applicable)
34 Timing of death (1-fresh stillbirth; 2-macerated stillbirth)
35 Any physical malformation noted on the deceased? (Yes/No)
If yes, type of birth defect (with full description):
Investigator's report
36 Analysis and interpretation of the information collected so far
37 Perinatal death notification date (day/month/year)
38 Investigator (Title, name and function)

Annex 9I: Stillbirths and neonatal deaths monthly summary reporting form

The form must be completed for stillbirths and neonatal deaths								
Questions/Variables								**Answers**
Identification								
1	Data for the month of							
2	Country							
3	District							
4	Reporting site/facility							
5	Births							
		Total Births	Stillbirths			Neonatal deaths		
			Antepartum	Intrapartum	Unknown	Early	Late	
	<1000 g (ELBW)							
	1000-1499 g (VLBW)							
	1500-1999 g (LBW)							
	2000-2499 g (MLBW)							
	2500 + g							
	Total							
Pregnancy Progress and care (Perinatal death history and risk factors)								
6	Multiple pregnancies							
7	Born before arrival							
8	Mode of delivery							
	Normal vaginal delivery		Vacuum	Forceps	Cesarean	Unknown		
9	Gestational age							
	Term	Post-term	Ext preterm (<1000g)	Very preterm (1000-1499)	Mod preterm (1500-2499)	Unknown		
10	HIV status							
	Negative		Positive		Unknown			
11	Syphilis serology							
	Negative		Positive		Unknown			
12	Maternal age							
	>34 y		20-34 y	18-19 y	<18 y	Unknown		

Annex 9J: Liberia IDSR alert and lab submission form

The IDSR Alert and Lab Submission Form is used to follow up your immediate alert with written information about individual cases from surveillance. Contact the district immediately upon detection of a suspected priority condition at the health facility. *The paper form should be sent to the district as a follow-up to the verbal report, and be sent with all lab samples for priority conditions.*

The IDSR Alert and Lab Submission Form has been created as this generic case reporting form and lab submission for immediate case-based reporting.

Variable Name	Explanation
S/N	Serial number for the reported case. The serial number is a count, starting at "1" and increasing for every additional case (2, 3, 4 …). This count is restarted at the beginning of each year.
Reporting Date	Date the IDSR Case Alert Form was filled out, or date the case information was first collected
IDSR ID	The unique identification for the case as explained in the beginning of Section 11. The IDSR-ID should be assigned as [Three letter county code]-[Health facility code]-[Case ID]
Epi Week	The epidemiology week number at time of disease onset as given by the IDSR Calendar. This will be automatically calculated and does not need to be entered.
Reporting Health Facility	The name of the reporting health facility. If the case was detected in the community, enter the name of the nearest health facility
Reporting District	Name of the district reporting the case
Reporting County	Name of county reporting the case
Disease	Name of the disease being reported
Patient First Name	First name of the patient
Patient Middle Name	Middle name or initial of the patient
Patient Last Name	Last name or surname of the patient
Patient Sex	Sex of the patient (male or female)
Age	Age of the patient. If the patient is less than 1 year old, write the age in months. If the patient is less than 1 month old, write the age in days.
Age Type	Specify if the age of the patient was written in years, months, or days
Date of Birth	Date of birth of the patient, if known
County of Residence	The county where the patient currently lives
District of Residence	The district where the patient currently lives
Village/Town	The name of the village or town where the patient currently lives
Was the Case Identified at Community	If the case was referred from the community, or detected first by a CHA, CHV, TTM, or other community level staff, select "YES". If the case was detected at the health facility first, select "NO"
Date of Onset	The date at which the symptoms started. In the case of maternal or neonatal death, write the date of death here
Date Seen at Health Facility	The date which the patient was seen by a clinician at the health facility
Outcome	Write whether the patient is currently alive or dead
Number of Vaccination Doses	When reporting a vaccine preventable condition, write the number of doses of vaccine the patient received for the disease of report
Date of Last Vaccination	When reporting a vaccine preventable condition, write the date of the last vaccination for the disease of report
Date Specimen Collected	Date when the specimen was collected from the patient
Specimen Type	Write the type of specimen (blood, stool, CSF, oral swab, throat swab, rectal swab)
Date Specimen Received at Lab	Date when the lab received the specimen
Specimen Condition	The specimen condition when it was received at the lab
Final Results	The final lab results (e.g.,: positive, negative, indeterminate)
Date Results Reported	Date the lab results were reported
Comments	Any other comments on the case
Final Classification	The final classification of the case (e.g., Confirmed, Epi-linked, Probable, Suspect, Discarded)

An electronic version of the IDSR Case Alert and Lab Submission form will be reported to DPC every week. For a copy of the digital reporting form, contact DPC or the CSO.

For the healthcare facility:

1. Record the current date as the reporting date.
2. Record the IDSR-ID. The IDSR-ID consists of the county code (3 letter abbreviation), the health facility code, and the Case ID. The Case ID starts at 001, and increases by 1 with every report. Some facilities may also reference an ID book to assign Case IDs.
3. Record the ID or code assigned to the patient at the health facility. This might be the medical record number, registration number, or another code used to track the patient's information in the health facility.
4. In the "Disease Reporting Box", record the name of the health facility, and the district and county where the health facility is located. Also mark which priority disease is being reported. If "other", specify the suspected condition or disease of concern.
5. In the "Patient Demographic Box", record the name, sex, age in years, date of birth, and residence information for the patient. For age, report months if the age is less than one year, or days if age is less than one month. For locating information, include any other information which will help to locate the residence of the patient.
6. In the "Clinical Information Box", record the date of onset based on the date at which symptoms or condition first occurred. Also record the date the patient was first seen at the health facility, whether the patient is inpatient or outpatient, whether the patient is alive or dead at time of report, and whether the classification is probable or suspected based on case definitions in Annex 4. Also record the name and contact of the reporting person and any comments about the case.
    a. Continuously update the line list and the county with changes in information, such as patient death.
       The county can change the status on the form.
7. In the "Clinical Information Box", record the vaccination information if appropriate for the disease of alert. In "Vaccination History" record if the patient has been vaccinated to the disease of alert, number of vaccinations for the disease, and the date of the last vaccination for the disease.
    a. Record the date of the last immunization dose for the reported illness in the "last date of vaccination". This information is important for interpretation of lab results.
    b. For measles, polio, and yellow fever include both routine and supplemental campaign doses (if known, try to verify with a card).
    c. For neonatal tetanus, record the number of doses mother received, including during recent pregnancy
8. Specimen collection: If a specimen is not collected, send a copy of this form to the DSO or CSO as appropriate. If a specimen is collected, in the Clinical Information box record the name and contact information of the person collecting the sample, date of collection, date specimen was sent to the lab, and specimen type.

Send a copy of this form with the sample to the laboratory.

For the county DSO or CSO (dependent on reporting structure in the county):

1. Check to ensure the IDSR-ID was written correctly. Record the IDSR-ID in the line list. Also record the health facility identification number (ID number).
2. When the report is received at the county, record the date it was received. If a verbal report was made, report the date of the verbal report.
3. Verify the accuracy of all patient and clinical fields in coordination with the health facility or community.
    a. If the patient's illness is reported, and the patient later dies, inform the county. The county can change the status on the form.

4. For vaccine preventable diseases, such as polio, neonatal tetanus, measles, meningitis and yellow fever, ensure immunization history is filled in accurately based on the immunization booklet, and knowledge of doses from supplemental campaigns.

For the county: send a complete case report form to the national level for data entry and analysis as well as the final laboratory results once those are complete

For the laboratories:

If using an electronic database in the lab

1. Assign a specimen number and write on the IDSR Case Alert and Lab Submission Form
2. Enter the IDSR Case Alert and Lab Submission Form into the electronic database. Archive the form in a secure area.
3. Send the final results to the National Ministry of Health, Disease Prevention and Control Unit

If using a paper form:

1. Record the name of the laboratory and location of the lab
2. Record the following information in the laboratory:
    a. The date the laboratory received the specimen
    b. The date the specimen was tested
    c. Specimen condition (adequate/non adequate)
        i. See Annex 5F for information about ensuring the quality of specimens
        ii. If the specimen arrives in poor condition, inform the health facility promptly to let them know a useful lab result will not be available/possible due to the specimen's condition
        iii. If possible, try to have an additional specimen sent for testing and provide guidance in assuring the specimen arrives in adequate condition
3. Type of test/s performed
4. Final lab results of the specimen
5. The date lab results were sent to the clinician, health facility and/or county. If it is national policy that results be given to the county, the county will inform the health facility

Record the name of the laboratory analyst and who reported the results in the lab, send the lab results to the designated recipients.

Liberia IDSR Case Alert and Lab Submission Form

NOTE: Send a copy of this form to the DSO. A copy of this form should also accompany every lab sample

Reporting Date: ___/___/___ (Day / Month / Year)

IDSR-ID: ___-___-___ (County Code / Facility Code / Case ID)

Patient Record ID:

DISEASE REPORTING

Reporting Health Facility:

Reporting District:

Reporting County:

Disease or condition of alert* (select one):

☐ Acute Bloody Diarrhea (Shigellosis)	☐ Ebola Virus Disease	☐ Monkeypox	☐ Unexplained Cluster of Death
☐ Buruli Ulcer	☐ Human Exposure to Rabies	☐ Tuberculosis	☐ Unexplained Cluster of Health Events
☐ Cholera (Severe AWD)	☐ Lassa fever	☐ Yellow fever	☐ Yaws
☐ Coronavirus (COVID-19)	☐ Measles	☐ Maternal Death	☐ Other:
☐ Dengue fever	☐ Meningitis	☐ Neonatal Death	*Specify:* _____

**Report Acute Flacid Paralysis (AFP), Adverse Events Following Immunization (AEFI) and Neonatal Tetanus on disease specific forms*

Crossed International Border in last 1 month: ☐ Yes ☐ No **Case detected at community level:** ☐ Yes ☐ No

PATIENT DEMOGRAPHICS

Patient First Name:

Patient Last Name:

Patient Sex: ☐ Male ☐ Female

Patient Age: ☐ Years ☐ Months ☐ Days

Date of Birth: ___/___/___ (Day / Month / Year)

County of Residence:

District of Residence:

Community of Residence:

Locating Information*:

**If applicable, include head of household, phone number, and name of mother if young*

CLINICAL INFORMATION

Date of onset*: ___/___/___ (Day / Month / Year)

Date seen: ___/___/___ (Day / Month / Year)

In/out-Patient: ☐ Inpatient ☐ Outpatient

Outcome: ☐ Alive ☐ Dead

Classification: ☐ Probable ☐ Suspected

Reporting Person Name:

Phone Number:

Comments*:

Only for disease of this alert:

Vaccination History: ☐ Yes, by verbatim ☐ Yes, by card ☐ No

 # Doses:

Date of Last Vaccination: ___/___/___ (Day / Month / Year)

Person Collecting Specimen Name:

Phone Number:

Date of Specimen Collection: ___/___/___ (Day / Month / Year)

Date Specimen sent to Lab: ___/___/___ (Day / Month / Year)

Specimen Type*:

**Throat swab, oral swab, rectal swab, serum, blood, stool, CSF*

**Note: date of onset is date of death for maternal/neonatal death. Include cause of death in comments*

FOR LAB ONLY: complete this section, enter into the database, and file.

Laboratory Name:

Date Specimen Received: ___/___/___ (Day / Month / Year)

Specimen Condition: ☐ Adequate ☐ Inadequate

Date Specimen Tested: ___/___/___ (Day / Month / Year)

Type of Tests Performed:

Specimen ID:

Final Lab Results:

Date Results reported: ___/___/___ (Day / Month / Year)

v5 (05/11)

Annex 9K: Community trigger and referral form

In the community and points of entry, cases matching the community triggers in Annex 1B, are referred to the nearest health facility.

The Community Event Based Surveillance Form is used to report and refer these cases to the health facility. If the patient is too sick for transport, the form should be filled and handed to the surveillance or clinical officer conducting the investigation. For communities using CHVs, this form is not mandatory, but can be used as a guide in reporting the necessary information though phone call

Community Trigger & Referral Form

v.0.4 7/16

Section A Referral [Community → Facility] *to be triaged immediately*

The CHA/CHV fills this out, and submit to the Health facility (CHSS, OIC, SFP)

Patient Name:	Community:
Sex: ◯ Male ◯ Female	Facility or POE:
Date (DD/MM/YYYY):	CHA/CHV Name:
Patient Age: ◯ Years ◯ Months	CHA/CHV Phone Number:
Crossed Int. Border in last 1 month (Y) (N)	IDSR-ID: (Filled by health facility)

Immediately Notifiable Triggers

1. Acute flaccid paralysis (Polio)
2. Acute watery diarrhea / Cholera (Runny stomach)
3. Bloody Diarrhea (pu-pu with blood)
4. Human Rabies (Dog/any other animal bite)
5. Measles
6. Viral Hemorrhagic Fever (Ebola, Lassa Fever, & Yellow Fever)
7. Meningitis (Stiff neck)
8. Maternal Death (Big belly death)
9. Neonatal Tetanus (Jerking sickness)
10. Neonatal Death (Young baby death)
11. Unknown health problems grouped together
12. Any death in human or group of animals that you don't know why it happened

◯ Other (write in):

Core Referral

◯ Family Planning	◯ Child Health	◯ Maternal & Infant Health
◯ Child Vaccination	◯ Tuberculosis	◯ Leprosy
◯ Mental Health	◯ HIV	◯ Other

Case description & any danger sign observed	Describe any investigation or treatment

Facility Health Worker - Tear Here

Section B Counter-Referral [Facility → Community]

For the Facility Health Worker: He/she should tear at the dotted line above and return to the CHSS to take to the CHA/CHV

Patient Name:	CHA/CHV Name:
Date (DD/MM/YYYY):	Community:
Facility Worker Name:	Health Facility:
Facility Worker Phone #:	Facility Worker Position:
Case Definition Met (Y) (N)	IDSR-ID:

Follow up plan & instructions to CHA/CHV:

Actions Taken (tick all that

- ◯ Treated and sent home
- ◯ Placed in isolation unit
- ◯ Admitted ◯ Referred
- ◯ Sample collected
- ◯ Other (write in):

Annex 9L: Weekly Report Forms

The weekly report form is used to report aggregate numbers of priority disease and condition alerts to higher levels.

NOTE: Zero reporting is important on weekly forms to ensure comprehensive reporting.

- The health facility should fill out the Weekly Report Form ongoing throughout the week as cases are referred or detected. At the end of the week (Sunday) the weekly summary should be calculated. The form should be sent to the DSO by 1500 on Monday every week.
- The district level should compile all reports from the facility level, and record the names of each health facility. The aggregate form should be sent to the CSO on Monday by 1700.
- The county level should compile all reports from the district level, and record the names of each district. The aggregate form should be sent to the MOH-DPC by 1700 on Monday.

MINISTRY OF HEALTH/ NATIONAL PUBLIC HEALTH INSTITUTE

INTEGRATED DISEASE SURVEILLANCE AND RESPONSE

Weekly County Data Collection and Reporting Ledger

Country:_____ County:_____ Dates: From ___/___/_____ to ___/___/_____ Epi Week:_____

HEALTH DISTRICT: (Please list health district names)																																					Weekly Summary				
Disease/Condition/Event	Live		Dead			Live		Dead			Live		Dead			Live		Dead			Live		Dead			Live		Dead			Live		Dead			Live		Dead		
	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*
Acute Flaccid Paralysis																																								
Cholera (Severe Acute Watery Diarrhea)																																								
Acute Bloody Diarrhea (Shigella)																																								
Human Exposure to Animal Bites (Human Rabies)																																								
Lassa Fever																																								
Measles																																								
Buruli Ulcer																																								
Coronavirus (COVID-19)																																								
Dengue Fever																																								
Monkeypox																																								
Tuberculosis																																								
Yaws																																								
Adverse Event Following Immunization (AEFI)																																								
Meningitis																																								
Neonatal Tetanus		X		X			X		X			X		X			X		X			X		X			X		X			X		X			X		X	
Viral Hemorrhagic Fever (inc Ebola)																																								
Yellow Fever																																								
Maternal Death	X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X		
Neonatal Death	X	X		X		X	X		X		X	X		X		X	X		X		X	X		X		X	X		X		X	X		X		X	X		X	
Unexplained cluster of health events																																								
Unexplained cluster of deaths	X	X				X	X				X	X				X	X				X	X				X	X				X	X				X	X			
Other (write in):																																								
Other (write in):																																								
TOTAL CONSULTATIONS																																								
DATE REPORT RECEIVED																																								
TIME REPORT RECEIVED																																								

*SC: Number of samples collected for disease

Reported by:_____ Position/title:_____ Signature:_____ Date:_____

Reporting Instructions: CSO summarizes all district reports; file a copy; emails copies to the Division of Infectious Disease & Epidemiology (DIDE) by Monday by 5:00PM

v1.6 (2/21)

MINISTRY OF HEALTH/ NATIONAL PUBLIC HEALTH INSTITUTE

INTEGRATED DISEASE SURVEILLANCE AND RESPONSE

Weekly District Data Collection and Reporting Ledger

County:_____ District:_____ Dates: From ___/___/_____ to ___/___/_____ Epi Week:_____

HEALTH FACILITY: (Please list health facility names)																																					Weekly Summary					
Disease/Condition/Event	Live		Dead			Live		Dead			Live		Dead			Live		Dead			Live		Dead			Live		Dead			Live		Dead			Live		Dead		
	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*
Acute Flaccid Paralysis																																								
Cholera (Severe Acute Watery Diarrhea)																																								
Acute Bloody Diarrhea (Shigella)																																								
Human Exposure to Animal Bites (Human Rabies)																																								
Lassa Fever																																								
Measles																																								
Buruli Ulcer																																								
Coronavirus (COVID-19)																																								
Dengue Fever																																								
Monkeypox																																								
Tuberculosis																																								
Yaws																																								
Adverse Event Following Immunization (AEFI)																																								
Meningitis																																								
Neonatal Tetanus	X		X			X		X			X		X			X		X			X		X			X		X			X		X			X		X		
Viral Hemorrhagic Fever (inc Ebola)																																								
Yellow Fever																																								
Maternal Death	X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X		
Neonatal Death	X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X		
Unexplained cluster of health events																																								
Unexplained cluster of deaths	X	X				X	X				X	X				X	X				X	X				X	X				X	X				X	X			
Other (write in):																																								
Other (write in):																																								
TOTAL CONSULTATIONS																																								
DATE REPORT RECEIVED																																								
TIME REPORT RECEIVED																																								

*SC: Number of samples collected for disease

Reported by:_____ Position/title:_____ Signature:_____ Date:_____

Reporting Instructions: DSO summarizes all health facility reports; file a copy; emails copies to the County Surveillance Officer (CSO) by Sunday by 5:00PM

MINISTRY OF HEALTH/ NATIONAL PUBLIC HEALTH INSTITUTE

INTEGRATED DISEASE SURVEILLANCE AND RESPONSE

Weekly Health Facility Data Collection and Reporting Ledger

County:_____ District:_____ Health Facility:_____ Dates: From ___/___/_____ to ___/___/_____ Epi Week:_____

Disease/Condition/Event	Monday					Tuesday					Wednesday					Thursday					Friday					Saturday					Sunday					Weekly Summary				
	Live		Dead			Live		Dead			Live		Dead			Live		Dead			Live		Dead			Live		Dead			Live		Dead			Live		Dead		
	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*	<5	≥5	<5	≥5	SC*
Acute Flaccid Paralysis																																							
Cholera (Severe Acute Watery Diarrhea)																																							
Acute Bloody Diarrhea (Shigella)																																							
Human Exposure to Animal Bites (Human Rabies)																																							
Lassa Fever																																							
Measles																																							
Buruli Ulcer																																							
Coronavirus (COVID-19)																																							
Dengue Fever																																							
Monkeypox																																							
Tuberculosis																																							
Yaws																																							
Adverse Event Following Immunization (AEFI)																																							
Meningitis																																							
Neonatal Tetanus	X		X			X		X			X		X			X		X			X		X			X		X			X		X			X		X		
Viral Hemorrhagic Fever (inc Ebola)																																							
Yellow Fever																																							
Maternal Death	X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X			X	X	X		
Neonatal Death	X	X		X		X	X		X		X	X		X		X	X		X		X	X		X		X	X		X		X	X		X		X	X		X	
Unexplained cluster of health events																																							
Unexplained cluster of deaths	X	X				X	X				X	X				X	X				X	X				X	X				X	X				X	X			
Other (write in):																																							
Other (write in):																																							
TOTAL CASES AT FACILITY																																							

*SC: Number of samples collected for disease

Reported by:_____ Position/title:_____ Signature:_____ Date:_____

Reporting Instructions: Health Facility Surveillance Focal Person (HFSP) summarizes all of the daily reports and send a copy to the District Surveillance Officer (DSO) by Saturday by 5:00AM and file a copy

v1.6 (2/21)

Annex 9M: IDSR Outbreak Line List

A line list captures the relevant information from each reported case for analysis and action. Listing each case and their information will help provide the data needed to assess characteristics of cases to help guide response activities. This is an important tool to collect information and analyze quickly.

During an outbreak, the line list is used as a primary data collection tool. The IDSR Line List is based directly on the IDSR Case Alert Form; however the columns in the line list may be adapted for the specific outbreak under investigation. The information from each reported case should be added to a single row in the spreadsheet.

This paper form should populate the IDSR Database to facilitate analysis and reporting to the CSO and DPC on a weekly basis.

Ministry of Health

IDSR OUTBREAK LINE LIST

Name of Disease:_____ County of Report:_____ District Report:_____

Date investigation started: _____

*Specimen collection information and classification such as Epi-linked may be important to collect based on disease of investigation

IDSR ID County Health Facility CaseID	**Name**	**Health Facility**	**Village / Town**	**Sex** M/F	**Age** In yrs. mths. if <1yr	**Date of onset of illness** (dd/mm/yy)	**Date seen at Health Facility** (dd/mm/yy)	**Inpatient or Outpatient** I/O	**Number of vaccinations** Only for disease or investigation	**Current status** Alive/Dead	**Test Results**

Note: This form is for investigating outbreaks. Change this form by adding or removing columns needed

Annex 9N: Contact Listing Form

The contact listing form is used to list the possible contacts from a case. This form should be used only in specific circumstances, where it is important to find other cases in order to stop the spread of disease.

To use this form, ask the patient the names of persons they have had contact with. The number of days of contact history depends on the specific disease. For Ebola, the standard is a 21 day history. For some diseases, only certain types of contacts will be asked about. After the form is filled out, submit to the CSO or the rapid response team for follow-up.

Ministry of Health

Integrated Disease Surveillance and Response

Contact Listing Form

Case's IDSR ID: _____-_____-_____ Case Name: _____ Case's Sex: M F

Case's County: _____ Case's District: _____ Case's Village: _____

Case's Head of Household: _____ Date of symptom onset: ____/____/____ (dd/mm/yy) Date Hospitalization: ____/____/____ (dd/mm/yy)

No.	Surname	First name	Sex (M/F)	Age (yrs)	Phone Number	Head of Household	Village	District	Relationship to Case	Date of Last Contact (dd/mm/yy)	Type of contact* (1, 2, 3, list all)

*Contacts= 1 - slept, ate or spent time in the same household or room as case 2 - Direct physical contact with the case (dead or alive)

3 - has touched or shared linens, clothes or dishes/eating utensiles of the case body fluids (blood, urine, saliva, feces)

4 - has touched his / her body fluids (blood, urine, saliva, feces, semen) 5 - needs to be followed for other reason, specify (e.g. contact with affected animal)

Completed by (Print Name): _____ Title: _____ Date: _____

Reporting Instructions

Return this completed form to the outbreak investigation team

(v3.0 6/16)

v2.5 (6/16)

Annex 9O: Contact Follow up Form

Contact follow-up is an investigation tool which tracks persons who have come in contact with a case, and follows the contact until either symptoms occur or the maximum incubation time is passed. It is only used for certain outbreaks.

The Contact Follow-up Form should be tailored to the specific disease, tracking common symptoms and following the case for the number of days specified in the Epidemic Preparedness and Response Guidelines. This form should be filled out and submitted to the CSO or rapid response team lead.

Ministry of Health

Integrated Disease Surveillance and Response

Contact Tracing Form

Contact Information:

Contact First Name:_____ Contact Last Name:_____ Circle One: Sex: M F Age:_____ Circle One: Years Months

Contact County:_____ Contact District:_____ Contact Village:_____

Contact Phone #:_____ Locating Information:_____

Contact Head of Household:_____ Contact Type:_____

Source Case Information: Name_____ IDSR-ID:_____
(County-Health Facility-CaseID)

	DAYS OF FOLLOW-UP																												
Contact seen? (mark with 'X' if seen)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
SYMPTOMS/SIGNS*. Mark with an 'X' if contact has symptom.																														
Fever																														
Painful muscles or joints																														
Weakness																														
Nausea or Vomiting																														
Diarrhea (non-bloody / bloody)																														
Headache																														
Painful throad or swallowing																														
Red eyes																														
Any bleeding from nose, mouth, ears, or rectum																														
Other 1:																														
Other 2:																														
Other 3:																														
Temperature reading 1:																														
Temperature reading 2:																														

**Record symptoms and signs as appropriate for disease of outbreak, specify other when used*

If contact developed symptoms: Date of symptom onset:____/____/_____ dd/mm/yy Date of hospitilisation: ____/____/_____ dd/mm/yy

Completed by:_____ Position/Title:_____ Date:_____/_____/_____ (dd/mm/yy)

v2.0 (6/16)

Annex 9P: Acute Flaccid Paralysis Investigation Form

The Acute Flaccid Paralysis Reporting Form is used when reporting or alerting to any case of AFP. This form should be used in place of the IDSR Case Alert and Lab Submission Form for AFP cases, but follows the same reporting structure as the IDSR Case Alert form.

EPI ID

The EPI ID is used on some forms which will be reported internationally. This code uses the form: [County Code] – [County Code] – [Year of Onset (YY)] – [Case ID]

County Code – This is filled out at the national level. Three letter abbreviation of the county name.

Year of Onset – The two digit year of the onset of symptoms. For example, a case with symptom onset in 2016 would have "16" in this field.

Case ID – The case ID is counted numerically, starting at "1" for each case. This count restarts at 1 every year.

CASE INVESTIGATION FORM: ACUTE FLACCID PARALYSIS (v3 11/16)

Ministry of Health Liberia

Official Use Only: EPID Number: _____-_____-_____-_____-_____ Received: ____/____/____
Country County County Year onset Case Number by the Program at National level

IDENTIFICATION

District:_____ County: _____ Nearest Health Facility: _____

Address:_____ Village/City/Town:_____ Parent Name:_____

AFP Case Coordinates *(WGS 1984 format)* Latitude: _____ Longitude:_____

Patient name: _____ Age: _____ years _____months (If DOB Unknown) Sex: ☐ M=Male F=Female

Date of Birth (DOB)____/_____/_____

NOTIFICATION/INVESTIGATION:

Notified by:_____ Date of Notification____/_____/_____ Date of Investigation: ____/_____/_____

HOSPITALIZATION

Hospitalized: ☐ 1=Y 2=N Date of admission to hospital (if applicable):_____/_____/_____

Hospital record #:_____ Name of hospital:_____

CLINICAL HISTORY

(1=Y, 2=N, 99=Unknown)

Fever at the onset of paralysis? ☐ Progressive Paralysis < 3 days? ☐

Date of onset of paralysis: ____/_____/_____ Is Paralysis flaccid and acute? ☐ 1=Y, 2=N, 99=Unknown Asymmetric? ☐ 1=Y, 2=N, 99=Unknown Site of Paralysis LA ☐☐ RA LL ☐☐ RL

AFTER INVESTIGATION, WAS THIS A TRUE AFP? ☐ 1=Y 2=N *If not, do not fill out the rest of the form and record 6 under final classification*

IMMUNIZATION HISTORY

Total Number of Polio vaccine doses *Exclude doses at birth* ☐ 99=Unknown

OPV Dose at Birth____/____/____ 1st ____/____/____ 2nd____/____/____ 3rd____/____/____ 4th ____/____/____ Last dose (If > 4) ____/____/____

Total OPV (bOPV/mOPV2) doses received through SIA: ☐ 99=Unknown Total OPV (bOPV/mOPV2) doses received through RI: ☐ 99=Unknown

Total IPV doses received through RI and/or SIA: ☐ 99=Unknown Date of last IPV dose received through RI or SIA:____/____/_____

STOOL SPECIMEN COLLECTION:

_____/_____/_____ Date 1st specimen collected

_____/_____/_____ Date 2nd specimen collected

_____/_____/_____ Date specimen sent to the to the national laboratory

_____/_____/_____ Date specimen received at the national laboratory

_____/_____/_____ Date specimen sent reference laboratory

STOOL SPECIMEN RESULTS:

Condition of Stool: ☐ 1= Adequate 2= Not adequate

_____/_____/_____ Date combined Cell Culture Results available

____/_____/_____ Date Results sent to national EPI

____/_____/_____ Date Results received at national EPI

____/_____/_____ Date specimen received at reference lab

____/_____/_____ Date sent from national laboratory to regional lab

____/_____/_____ Date I-T differentiation results sent to EPI

____/_____/_____ Date I-T differentiation results received at EPI

Final cell Culture Results: ☐ 1-Suspected Poliovirus 2-Negative 3-NPENT 4-Suspected Poliovirus+NPENT

W1 W2 W3 ☐☐☐ 1=Y, 2=N

Discordant Sabin ☐ Type 1,2,3

V1 V2 V3 ☐☐☐ 1=Y, 2=N

(R) NPENT ☐ 1=Positive 2=Negative

NEV ☐

FOLLOW-UP EXAMINATION

____/_____/_____ Date of Follow-up exam

Residual Paralysis? LA ☐☐ RA LL ☐☐ RL

Results of exam: ☐ 1= Residual Paralysis 2= No residual paralysis 3= Lost follow-up 4= Died before follow-up

Immunocompromised status suspected: ☐ 1=Y, 2=N, 99=Unknown

FINAL CLASSIFICATION

☐ 1=Confirmed Polio 2=Compatible 3=Discarded 6=Not an AFP case

☐ 7=cVDPV 8=aVDPV 9=iVDPV

☐ Sero-type (1, 2, 3)

INVESTIGATOR: Name_____ Title_____

Unit:_____ Address_____ Tel:_____

Annex 9Q: Acute Flaccid Paralysis 60-day Follow Up Exam Form

The AFP 60-day Follow Up Exam Form is used on all cases with inadequate stool. Inadequate stool is defined as a case with less than two specimens collected, or were collected more than 14 days after onset. This form is used for the clinical classification of Polio.

EPI ID

The EPI ID is used on some forms which will be reported internationally. This code uses the form: [County Code] – [County Code] – [Year of Onset (YY)] – [Case ID]

County Code – This is filled out at the national level. Three letter abbreviation of the county name.

Year of Onset – The two digit year of the onset of symptoms. For example, a case with symptom onset in 2016 would have "16" in this field.

Case ID – The case ID is counted numerically, starting at "1" for each case. This count restarts at 1 every year.

ACUTE FLACCID PARALYSIS FOLLOW-UP EXAM COMPLEMENTARY FORM

(To be conducted between the 60th and the 90th days after date of onset of the paralysis)

Official Use

EPID Number:_____-_____-_____-_____-_____
Country County County Year onset Case Number

Received:____/____/_____
by the Programme at national level

IDENTIFICATION

Nearest Health

District:_____ Region/Province: _____ Facility: _____

Address:_____Village:_____ Ville : _____

Father/Mother:_____

Patient Name: _____ Age :_____years_____months (If DOB unknown) Sex: ☐ M=Male F=Female

Date of Birth (DOB)____/_____/_____

CLINICAL HISTORY (1=Y, 2=N, 9=Unknown)

Fever at the onset of paralysis? ☐

Progressive Paralysis < 3 days ☐

Date of onset of paralysis:____/_____/_____

Is Paralysis flaccid and acute ☐ (1=Y, 2=N, 9=Unknown)

Asymmetric ☐ (1=Y, 2=N, 9=Unknown)

Site of Paralysis LA ☐☐ RA LL ☐☐ RL

FOLLOW-UP EXAMINATION

____/____/_____
Date of Follow-up exam

Residual Paralysis? LA ☐☐ RA LL ☐☐ RL

Results of exam ☐

1= Residual Paralysis
2=No residual paralysis
3= Lost follow-up
4=Died before follow-up

Medical history

_____

_____

_____

_____

_____

Clinical examination:
Current Symptoms _____

_____

_____

_____

Physical Symptom _____

_____

_____

_____

Others: _____

_____

_____

_____

Investigator
Name:_____Title_____

Unit:_____Address:_____Tel: _____

Date:_____/_____/____

Annex 9R: EVD Outbreak Case Investigation Form

The EVD Outbreak Case Investigation Form is used for investigating EVD cases during an outbreak.

1. Assign a **IDSR-ID**, provided by the county health team, in the top right corner of **all forms** in the Case Investigation Package to allow linking of all forms for one case. See Annex 8A for details.
2. A family member or friend's phone number MUST BE collected for all suspect Ebola cases to enable follow-up with the patient's family.
3. When collecting information on the date a patient first became sick (date of illness onset) and symptoms, collect the information directly from the patient if possible, or otherwise from a family member or friend if there is someone who would know when the suspect person started to feel sick
   - Use the provided calendars as a reference to help determine a precise date when interviewing
   - If the interviews are unable to provide a specific date of onset, a reasonable estimate based on information learned can be used.
4. Where patient lives - ask the patient where they are currently living now
5. Ask the patient about each of the symptoms on the form and indicate Yes, No, or Unknown for each symptom on the list. If there is bleeding that is not caused by an accident (by trauma), check this box and list all body areas with bleeding.
6. A healthcare worker includes any individual who is involved with or works in a health care facility e.g. hygienist, cleaner, ambulance driver as well as a nurse or doctor
7. If the patient is in an ETU or CCC, list the name of the facility and the date when they arrived there. Indicate if they are going to be taken to one today or as soon as possible. If the patient refuses to leave or the family refuses to allow them to go, describe why (e.g., cannot leave family, fear of ETU, community resistance).
8. Every form should classify the person as either Suspect, Probable, or Not A Case

   Suspect Case: Any person with acute fever and three or more of the symptoms on this form, OR any person with acute fever and signs of hemorrhage, OR any unexplained death

   Probable Case: A suspect case who also had contact with a confirmed or probable case in the three weeks prior to becoming ill OR a person with acute fever who had contact with a confirmed or probable case in the three weeks prior to becoming ill

   Not A Case: A person who was investigated but does not meet any of these definitions

LIBERIA EBOLA CASE INVESTIGATION FORM

Date of report DD MM YY **County of report**
Village of report
Investigation initiated by ☐ Case Investigation Team ☐ ETU ☐ CCC ☐ Burial ☐ Other

IDSR ID ----------
County ID **Facility ID** **Patient ID**

REQUIRED FIELDS

Patient's surname **Patient's other names**

Age (yrs) {0 if <1 y.o.} **Sex** ☐ M ☐ F **Date patient first became sick** DD MM YY

Healthcare worker / Works in health setting ☐ Y ☐ N ☐ Unk

If yes, Position Healthcare facility

Family/friend/immediate contact name **Phone number**

Religion ☐ Christian ☐ Muslim ☐ Atheist ☐ Traditionalist ☐ Other ☐ Unk

Where patient lives Village/Town Clan/Zone
District County Country

Where patient first became sick Village/Town Clan/Zone
District County Country

Ask the patient about the following symptoms if possible, or else ask a close relative or friend

Fever	☐ Yes ☐ No ☐ Unk	Joint pain	☐ Yes ☐ No ☐ Unk
Vomiting/nausea	☐ Yes ☐ No ☐ Unk	Headache	☐ Yes ☐ No ☐ Unk
Diarrhea	☐ Yes ☐ No ☐ Unk	Cough	☐ Yes ☐ No ☐ Unk
Intense fatigue/weakness	☐ Yes ☐ No ☐ Unk	Difficulty breathing	☐ Yes ☐ No ☐ Unk
Anorexia/loss of appetite	☐ Yes ☐ No ☐ Unk	Difficulty swallowing	☐ Yes ☐ No ☐ Unk
Abdominal pain	☐ Yes ☐ No ☐ Unk	Hiccups	☐ Yes ☐ No ☐ Unk
Chest pain	☐ Yes ☐ No ☐ Unk	Unexplained bleeding	☐ Yes ☐ No ☐ Unk
Muscle pain	☐ Yes ☐ No ☐ Unk	*If yes,* list areas of body	

Has the patient previously visited a health care facility for this illness? ☐ Yes ☐ No ☐ Unk
If yes, dates in facility DD MM YY to DD MM YY
Facility name County

Was the case previously a contact? (i.e. followed by contact tracers) ☐ Yes ☐ No ☐ Unk
Did the patient contact an ill person in the last 21 days before becoming ill? ☐ Yes ☐ No ☐ Unk

Name of source case	Last contact date	County	Village/Town	Status	Date of Death
	/ /			☐ Alive ☐ Dead	/ /
	/ /			☐ Alive ☐ Dead	/ /

Did patient attend a funeral in the last 21 days before becoming ill? ☐ Yes ☐ No ☐ Unk
If yes, Name deceased Funeral date DD MM YY Village
County Did the patient touch or carry the body? ☐ Yes ☐ No ☐ Unk

Did patient travel outside their home town in the last 21 days before becoming ill? ☐ Yes ☐ No ☐ Unk
If yes, Country of travel ☐ Liberia ☐ Guinea ☐ Sierra Leone ☐ Other
If Liberia, Village County Dates DD MM YY to DD MM YY

Patient current status
☐ Admitted to ETU ☐ Admitted to CCC *if yes* ETU/CCC name on DD MM YY
☐ Awaiting transportation to ETU or CCC
☐ Refused to go to an ETU or CCC because
☐ Dead *If dead,* **Date of death** DD MM YY ☐ Not applicable

Epidemiological case classification ☐ Suspected ☐ Probable ☐ Not a case ☐ Unknown

Other comments

Completed By Phone number Position

RETURN COMPLETED FORM TO THE COUNTY HEALTH TEAM - Date received DD MM YY V1.5 {6/11/16}

LIBERIA EBOLA CASE INVESTIGATION PACK-AGE

IDSR ID ----------
County ID **Facility ID** **Patient ID**

FIll OUT THIS SECTION AND GIVE TO ETU/CCC

Patient's surname **Patient's other names**

Age (yrs) {O if <1y.o.} **Sex** ☐ M☐ F

Where patient lives Village/Town Clan/Zone

District County Country

Family/Friend/Immediate contact name **Phone number**

Investigator name **Investigator phone number**

Date outcome information completed DD MM YY

Final status of patient ☐ Discharged/Recovered ☐ Dead

☐ Discharged/Never tested positive ☐ Discharged/Triage {no testing}

If patient recovered and discharged

Hospital/Ebola Treatment Unit discharged from

County Date of discharge DD MM YY

If patient is dead

Date of death DD MM YY

Place of death ☐ Community location ☐ ETU ☐ CCC ☐ Hospital ☐ Specify location name

Date of burial DD MM YY Burial conducted by ☐ Family/Community ☐ Burial Team

Completed By Phone number Affiliation ☐ CIT ☐ Burial team ☐ ETU ☐ CCC

Form 6/11/2016

Keep this form at location where patient is isolated (e.g. hand to ambulance driver).

Fill out at time of patient1s recovery and discharge OR at time of patient1s death.

Once patient outcome known, return to County Health Team

Annex 9S: Viral Hemorrhagic Fever Case Investigation Form

The VHF case investigation is used to investigate Yellow Fever, Lassa Fever, Marbug, and other viral hemorrhagic fevers during a confirmed outbreak.

Ministry of Health

INTEGRATED DISEASE SURVEILLANCE AND RESPONSE

Viral Hemorrhagic Fever – Case Investigation Form (v0.6)

IDSR-ID:
Date form received:
__/__/____

Date of detection of the case ___/___/___(dd/mm/yyyy)

This Case was notified by (tick off the right answer and specified)

☐ Mobile team, # _____ ☐ Health Centre _____

☐ Hospital _____ ☐ Others: _____

Form filled by (first name and surname) _____

Information given by (first name and surname) _____

Family link with the patient _____

Identity of the patient

First name: _____ Surname _____

Nickname _____

For the babies, son/daughter of (name of father): _____

Birth date:___/___/___(dd/mm/yyyy) Age (years)_____ Sex ☐ M ☐ F

Permanent address: Head of Household (first name and surname) _____

Village/Suburb_____Country_____GPS lat_____long _____

Nationality:_____Ethnic group _____

Profession of the patient (tick off the right answer)

☐ Miner ☐ House wife ☐ Hunter/trading game meat ☐ No profession

☐ Pupil/ Student ☐ Farmers ☐ Health staff

If profession is health staff:

Name of health care facility: _____

Service_____Qualification _____ ☐ Others _____

Status of the patient

Status of the patient at detection ☐ Alive ☐ Dead

If dead, please specify date of death: ___/___/___ (dd/mm/yyyy)

Place of death: ☐ Community, name village _____Country_____

☐ Hospital, name and service _____Country _____

Place of the funerals, name village: _____ Country _____

History of the disease

Date of onset of symptoms:___/___/___ (dd/mm/yyyy)

Name of the village where the patient got ill _____ Country _____

Did the patient travel during illness : ☐ Yes ☐ No ☐ DNK

If Yes, specify::

Village _____ Health Centers _____ Country_____

Did the patient have fever? ☐ Yes ☐ No ☐ DNK.

If yes, date of onset for the fever:___/___/___ (dd/mm/yyyy)

Does/did the patient have the following symptoms (tick off when apply)

Headache:	☐ Yes	☐ No	☐DNK	Skin Rash	☐Yes	☐ No	☐DNK
Vomiting/Nausea	☐ Yes	☐ No	☐DNK	Bleeding from injection sites	☐Yes	☐ No	☐DNK
Anorexia/Loss of Appetite	☐ Yes	☐ No	☐DNK	Bleeding gums	☐Yes	☐ No	☐DNK
Diarrhea	☐ Yes	☐ No	☐DNK	Bleeding into eyes (red eyes)	☐Yes	☐ No	☐DNK
Intense Fatigue	☐ Yes	☐ No	☐DNK	Black or bloody stool	☐Yes	☐ No	☐DNK
Abdominal Pain	☐ Yes	☐ No	☐DNK	Blood in vomits	☐Yes	☐ No	☐DNK
Muscle or Joint Pain	☐ Yes	☐ No	☐DNK	Bleeding from nose	☐Yes	☐ No	☐DNK
Difficulty swallowing	☐ Yes	☐ No	☐DNK	Bleeding from vagina	☐Yes	☐ No	☐DNK
Difficulty breathing	☐ Yes	☐ No	☐DNK	Hiccoughs	☐Yes	☐ No	☐DNK

Exposure Risks

- Was the patient hospitalized or did he visit anyone in the **hospital** anytime in the three weeks before becoming ill? ☐ ☐Yes ☐ No ☐ DNK; If Yes, where_____between (dates)___/___/___and__/___/__

- Did the patient have visit/consult a **traditional healer** during the three weeks before becoming ill or during illness? ☐ Yes ☐ No ☐ DNK

  If Yes, name of the traditional healer_____Village_____Country_____; When and where did the contact take place? Place_____date:__/___/___

- Did the patient receive traditional medicine? ☐ Yes ☐ No ☐ DNK;

  If Yes, explain which kind:_____

- Did the patient attend **funeral ceremonies** during anytime in the three weeks before becoming ill? ☐ Yes ☐ No ☐ DNK;

- Did the patient travel anytime in the three weeks before becoming ill? ☐ Yes ☐ No ☐DNK

  If Yes, where_____between (dates)____/___/___and____/___/___

- Did the patient have a contact with a **known suspect case** anytime in the three weeks before becoming ill? ☐ Yes ☐ No ☐ DNK;

  If Yes, Surname_____First name_____DSR-ID

- During the contact, the suspect case was ☐ Alive ☐ Dead date of death ___/___/___

  Date of last contact with the suspect case ___/___/___

- Did the patient have contact with a **wild animal** (non-human primate or others), that was found dead or sick in the bush, or animal behaving abnormally anytime in the three weeks before the illness?

  ☐ Yes ☐ No ☐ DNK; If Yes, kind of animal_____Location_____Date___/___/___

Has a sample been collected? ☐ Yes ☐ No ☐ DNK; If yes, date ___/___/___

☐ Blood sampling ☐ Urine ☐ Saliva ☐ Skin Biopsy

Was the patient sent to a hospital? ☐ Yes ☐ No

Was the patient admitted in the isolation ward? ☐ Yes ☐ No

If Yes, name of Hospital_____No. of hospital_____Hospitalization date___/___/___

Update on the Hospital information ID Case: _____

Reception date:___/___/___ Country: _____

Member of family helping the patient:_____Name and Surname _____

Date of discharge___/___/___OR Date of death___/___/___

Laboratory

A specimen was collected ☐ before the death ☐ After the death

Date sample ___/___/___ Date results___/___/___ IDSR -ID_____

Sample: ☐ blood ☐ blood with anti-coagulants

☐ skin biopsy ☐ cardiac function

☐ other: _____

Results

PCR	☐ pos	☐ neg	☐ NA	date ___/___/___
Antigen detection	☐ pos	☐ neg	☐ NA	date ___/___/___
Antibodies IgM	☐ pos	☐ neg	☐ NA	date ___/___/___
Antibodies IgG	☐ pos	☐ neg	☐ NA	date ___/___/___
ImmunoHistochemistry	☐ pos	☐ neg	☐ NA	date ___/___/___

Outcome (verified 4 weeks after the onset of symptoms)

☐ Alive ☐ Dead; If dead, date of death___/___/___

Case Classification

☐ Alert Case ☐ Suspect ☐ Probable

Annex 9T: Neonatal Tetanus Case Investigation Form

The Neonatal Tetanus Case Investigation Form is used when alerting and investigating to any case of neonatal tetanus. This form should be used in place of the IDSR Case Alert and Lab Submission Form, but uses the same reporting structure.

EPI ID

The EPI ID is used on some forms which will be reported internationally. This code uses the form:

[County Code] – [County Code] – [Year of Onset (YY)] – [Case ID]

County Code – This is filled out at the national level. Three letter abbreviation of the county name.

Year of Onset – The two digit year of the onset of symptoms. For example, a case with symptom onset in 2016 would have "16" in this field.

Case ID – The case ID is counted numerically, starting at "1" for each case. This count restarts at 1 every year.

CASE INVESTIGATION FORM – NEONATAL TETANUS

Official Use Only — **Epid Number:** _____-_____-_____-_____ (completed by county team) County / County / Year Onset / Case Number — Received at National _____/_____/_____

IDENTIFICATION

District: _____ **County:** _____

Nearest Health Facility to Village: _____ **Village/ Neighborhood:** _____ **Town/ City:** _____

Address: _____

Name(s) of patient: _____ Mother: _____

Sex: ☐ 1 = Male, 2 = Female Father: _____

NOTIFICATION/INVESTIGATION

Notified by: _____ **Date Notified:** _____/_____/_____ (.dd / mm / yyyy) **Date Case Investigated:** _____/_____/_____ (.dd / mm / yyyy)

MOTHER'S VACCINATION HISTORY

Please use the following key, 1=Y, 2=N, 9=U, where applicable.

Question	Answer
Mother vaccinated with TT?	
Have card?	
Number of doses:	
Vaccination status of mother prior to delivery? **	

1st _____/_____/_____ 4th _____/_____/_____

2nd _____/_____/_____ 5th _____/_____/_____

3rd _____/_____/_____ If >5, last dose_____/_____/_____

***1= up-to-date, 2= not up-to-date, 9= unknown*

BIRTH OF INFANT

Date of birth: _____/_____/_____ (dd / mm / yyyy)

Please use the following key, 1=Y, 2=N, 99=U, where applicable.

Mother received antenatal care?		Location of birth: ***	
How many prenatal visits?		If birth in institution, name of institution:	
Attended by a TTM/midwife?		Cut cord with a sterile blade?	
If attended by a TTM /midwife, give name		Cord treated with anything?	
Attended by doctor/nurse?		Describe treatment of cord: Where?	

****1=Hospital, 2=Health facility, 3=Home, trained attendant, 4=Home, untrained attendant, 5=Home, no attendant, 9=Unknown*

INITIAL CLINICAL HISTORY

Please use the following key, 1=Y, 2=N, 99=U, where applicable.

Was baby normal at birth?		Spasms or Convulsions?	
Normal cry and suck during first 2 days?		Complications?	
Stopped sucking after 2 days?		Did the baby die?	
Arched back?		Age at death:	Days
Stiffness?		Age of onset in days:	Days (99=Unknown)

Onset of symptoms: ____/_____/_____ (..dd / mm / yyyy)

TREATMENT

Date of admission _____/_____/_____ (.dd / mm / yyyy)

Medical record number: _____

Facility Address: _____

Questions	Answer 1=Y, 2=N, 99=U
Seen in OPD?	
Admitted?	

COMMENTS: _____

RESPONSE

Please use the following key, 1=Y, 2=N, 99=U, where applicable.

Questions	Answer
Mother given protective dose of TT within 3 months of report?	
Supplemental immunization within same locality as the case?	

Date of response: _____/_____/_____ (.dd / mm / yyyy)

Details of response: _____

FINAL CLASSIFICATION OF THE CASE: **Neonatal Tetanus:** ☐ 1=Yes, 2=No, 99=Unknown

INVESTIGATOR

Name: _____ Title: _____

Unit: _____ Address: _____ Phone: _____

Annex 9U: Maternal Death Variable List

Refer to the MNDSR Guidelines or contact the Disease Prevention and Control Unit at the Ministry of Health for the Maternal Death Review Form. This form must be completed for every maternal death.

The following is a list of critical variables used in the investigation for reference:

Variable	Description
County	County where the mother died
District	District where the mother died
Reporting Site	Name of nearest health facility or place the mother died
How many of such maternal deaths occurred cumulatively this year at this site?	The number of maternal deaths so far this year
Date this maternal death occurred (day/month/year)	The date when the mother died
Maternal death locality	The name of the village or town the mother is from
IDSR identifier	The county code, health facility code, and case ID that make the IDSR ID). See Annex 8
Maternal death place	The place where the mother died. Can be: Community, health facility, district hospital, referral hospital or private hospital, on the way to health facility or hospital, or other place
Age (in years) of the deceased	The age in years of the mother
Gravida	The number of times the woman was pregnant
Parity	Number of times the woman delivered a baby of 22 weeks/500g or more, whether alive or dead
Time of death	Specify "During pregnancy, At delivery, during delivery, during the immediate post-partum period, or long after delivery"
If abortion: was it spontaneous or induced?	
Maternal death history and risk factors	
Was the deceased receiving any antenatal care?	Yes or no
Did she have Malaria?	Yes or no
Did she have Hypertension?	Yes or no
Did she have Anaemia?	Yes or no
Did she have Abnormal Lie?	Yes or no
Did she undergo any Previous Caesarean Section?	Yes or no
What was her HIV Status?	Choose HIV+; HIV-; or Unknown HIV status
Delivery, puerperium and neonatal information	
How long (hours) was the duration of labor	

What type of delivery was it?	(choose one from "1=Vaginal non assisted delivery, 2= vaginal-assisted delivery (Vacuum/forceps), or 3=Caesarean section"
What was the baby status at birth?	(Alive or Stillborn)
In case the baby was born alive, is he/she still alive or died within 28 days after his/her birth?	(choose 1=Still alive, 2=neonatal death, 3=died beyond 28 days of age)
Was the deceased referred to any health facility or hospital?	(Yes/No/Don't know)
If yes, how long did it take to get there	Hours
Did the deceased receive any medical care or obstetrical/surgical interventions for what led to her death?	Yes/No/Don't know
If yes, specify where and the treatment received	I.V. Fluids; Plasma; Blood Transfusion; Antibiotics; Ocytocin; Anti-seizure drugs; Oxygen; Anti-malarial; Other medical treatment; Surgery; Manual removal of placenta; Manual intra uterin aspiration; Curettage, laporotomy, hysterctomy, intsrumental delivery (Forceps; Vacuum), Caesarian section, anesthesia (general, spinal, epidural , local)
Primary cause of the Maternal Death	
Secondary cause of the Maternal Death	
Analysis and Interpretation of the information collected so far	Give the investigator's opinion on this death
Maternal death notification date	Write the day/month/year of report
Investigator	Include the title, name and function

Annex 9V: Neonatal Death Variable List

Neonatal deaths are investigated using the Neonatal Death Review Form found in the National MNDSR Guidelines.

The following is a list of critical variables used in the investigation for reference:

Variable	Description
County	County where the newborn died
District	District where the newborn died
Name of health facility reporting death	Name of nearest health facility or place the newborn died
Health facility catchment population?	The number of people who are covered by this health facility
General place of death	Place where the newborn died (can be: facility or community)
Name of the death place	The name of the place where the newborn died (e.g. community/street/quarter, clinic, health center, district hospital, referral hospital or private hospital, on the way to health facility)
Date of neonatal death	The date when the newborn died (day/month/year; the month should be written in words for consistency at all levels)
Record's unique identifier (year-Country code-District-site-neonatal death rank)	The county code, health facility code, and case ID that make the IDSR ID
Age (in days) of the deceased	The age in days of the deceased newborn
Time of death	The time of death of the newborn (specify, during delivery, early neonatal period (1st 7 days) late neonatal period 8-28 days
Time of death	Specify "During pregnancy, At delivery, during delivery, during the immediate post-partum period, or long after delivery"
Risk factor of the mother associated with the death	
Did she have Fever?	Yes/No/Unknown
Did she have Hypertension?	Yes/No/Unknown
Did she have Anaemia?	Yes/No/Unknown
Did she have Abnormal Lie?	Yes/No/Unknown
Did she have diabetes?	Yes/No/Unknown
If still birth:	MACERATED OR FRESH?
Was the delivery at heath facility or in the community?	
Did she have convulsion/jerking	Yes/No/Unknown
Was there any bleeding	Yes/No/Unknown
Did she have premature labor?	Yes/No/Unknown
Did she have premature rupture of the membrane (PROM)?	Yes/No/Unknown
Did she have multiple births?	Yes/No/Unknown
Any other risk factor? Specify	
Postpartum/neonatal information	
How long (hours) was the duration of labor?	The total number of hours that the mother was in labor
Was the labor monitored by pathograph?	Yes/No/Unknown

What type of delivery was it?	Choose one from: 1=spontaneous vaginal delivery/normal, 2=vaginal-assisted delivery (Vacuum/forcep), or 3=Caesarean section
Risk factor for the newborn	(choose 1=Still alive, 2=neonatal death, 3=died beyond 28 days of age)
Was the baby born asphyxiated?	Yes/No/Unknown
Was the baby born preterm?	Yes/No/Unknown
Was the baby born small for gestational age?	Yes/No/Unknown
Did the baby have any problem with temperature? (hypo/hypothermia)	Yes/No/Unknown
Was the baby presenting with any or all of the danger signs (jaundice, convulsion, chest in drawing, unable to suck/feed, difficulty breathing, no movement, infected cord)?	Yes or no
Was the birth assisted by a skilled care provider (midwife, nurse, PA, medical doctor)?	Yes/No/Unknown
Was the delivery at health facility or in the community?	
Was the deceased referred to any health facility?	Yes/No/Unknown
If yes, how long did it take to get to the health facility?	Write how long it took to get to the health facility in hours
How long did it take for the decease to receive any medical care or surgical interventions?	Write how long it took for the decease to receive any medical care or surgical interventions in hours.
Specify the treatment received	Can be: I.V. Fluids; Plasma; Blood Transfusion; Antibiotics; Anti-seizure drugs; Oxygen; Anti-malarial; Other medical treatment; Surgery; chlorhexidine, resuscitation, KMC, vitamin K, photo therapy, ARVs
Primary cause of the Neonatal Death, including still birth	Describe the main reason for newborn's death
Secondary cause of the Neonatal Death, including still birth	Describe the subordinate reason for newborn's death
Care provider	Include the title and qualification (signature and contact
Was the care provider trained in newborn care protocol or EmONC?	Yes/No/Unknown
Provide analysis and interpretation of the information collected	Give the investigator's opinion on this death
Neonatal death notification date	The date of neonatal death notification (day/month/year; the month should be written in words for consistency at all levels)
Neonatal death investigation date	The date of neonatal death investigation (day/month/year); the month should be written in words for consistency at all levels)
Investigator(s)	List name(s), title(s), and qualifications (signature and contact)

Annex 9W: Cholera Variable List

Refer to the Cholera Guidelines or contact the Disease Prevention and Control Unit at the Ministry of Health for the Cholera Investigation Form.

The following is a list of critical variables used in the investigation for reference:

Variable	Description
Patient and Clinical Laboratory Related Information	
Detection Day	The date of detection (dd/mm/yyyy)
Detection place	The place of detection (e.g. health facility or community)
Patient surname or last name	The last name of the patient
Patient first name(s)	The first name of the patient
Age (years)	The age in years of the patient
Sex (F/M)	The sex of the patient—Female or Male
Number of people in same household	The number of people living in the same house space—regarded as one unit
Patient's residential address	The location of the where the patient lives
Village/Town	
Neighborhood	
District	
Province	
Country	
Date of onset (first symptoms)	The date of when patient's first symptoms appeared (dd/mm/yyyy)
Clinical signs and Symptoms	Description of any observable or recognizable signs and symptoms from the patient
Was patient exposed to any known risk factor for this disease?	Yes or no
If yes, specify risk factor(s):	List of cholera risk factors patient was exposed to (e.g. tap water, borehole, unprotected well, protected well, river, dam, lake, pond)
Number of doses of cholera Vaccine	The number of doses of cholera Vaccine that patient received
Date last dose was administered	The date of the last dose of cholera Vaccine that patient received
Laboratory related information: at least first and last cases	
Vibrio cholera identified in stools?	Yes or no
Drugs to which the vibrio strain is sensitive	List of drugs to which the vibrio strain
Drugs to which the vibrio strain is resistant	List of drugs to which the vibrio strain
Outcome	Choose one from: 1=Died, 2=Survived, 3=Unknown)
Final Classification	Choose one from: 1=Not a case, 2= Suspect, 3= Probable, 4=Confirmed by Lab, 5=Confirmed by epidemiological link, 6=Pending)
Other Notes and Observations	
Date latest update of this record	The date of the most recent update of this record (dd/mm/yyyy)

Cholera Risk factor search (Information to be obtained from the water and sanitation group of the investigation team)	
Potential vibrio vehicles: drinking water	
Drinking water source 1	Name of water source 1
Drinking water source 2	Name of water source 2
Drinking water source 3	Name of water source 3
Drinking water source 4	Name of water source 4
Potential vibrio vehicles: non drinking water	
Non drinking water source 1	Name of non drinking water source 1
Non drinking water source 2	Name of non drinking water source 2
Non drinking water source 3	Name of non drinking water source 3
Non drinking water source 4	Name of non drinking water source 4
Potential vibrio vehicles: Food items	
Food items 1	Name of food 1
Food items 2	Name of food 2
Food items 3	Name of food 3
Food items 4	Name of food 4
Food items 5	Name of food 5
Food items 6	Name of food 6
Food items 7	Name of food 7
Food items 8	Name of food 8
Bacteriology lab findings	
Drinking water found infected by vibrio	Yes or no
Non drinking water found infected by vibrio	Yes or no
Food items found infected by vibrio	List food items found to be infected by vibrio
Looking out for exposure to the identified hazards	
Water used by the patient for drinking:	List by type (e.g. tap water, Borehole, unprotected well, protected well, river, dam, lake, pond)
Within 3 days prior to the onset of the disease did the patient drink from:	
Water source 2	Yes or no
Water source 3	Yes or no
Water source 4	Yes or no
Water source 5	Yes or no
Within 3 days prior to the onset of the disease did the patient eat:	
Food item 1	Yes or no
Food item 2	Yes or no
Food item 3	Yes or no
Food item 4	Yes or no
Food item 5	Yes or no
Within 3 days prior to the onset of the disease did the patient attend any:	
Funerals	Yes or no
Other social event	Yes or no

Annex 9X: Sample of Situational Report

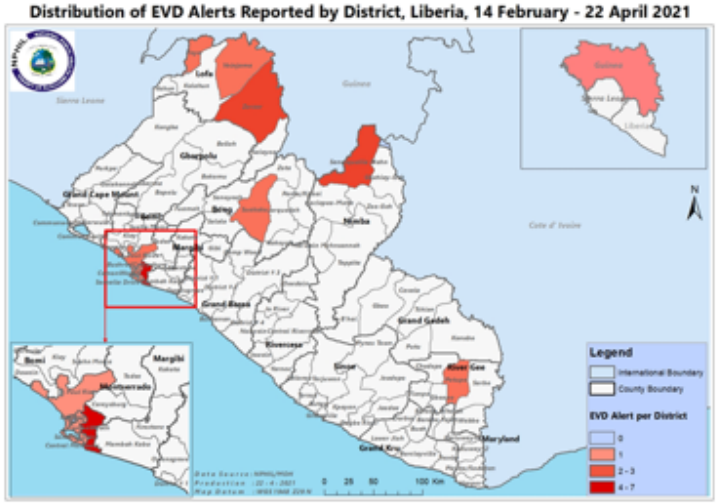
Report No. 36, 2021

SITUATION: LIBERIA EVD PREPAREDNESS AND READINESS UPDATE	**LOCATION:** LIBERIA
DATE OF REPORT: 23 APRIL, 2021	**PREPAREDNESS START DATE:** 14 FEBRUARY 2021

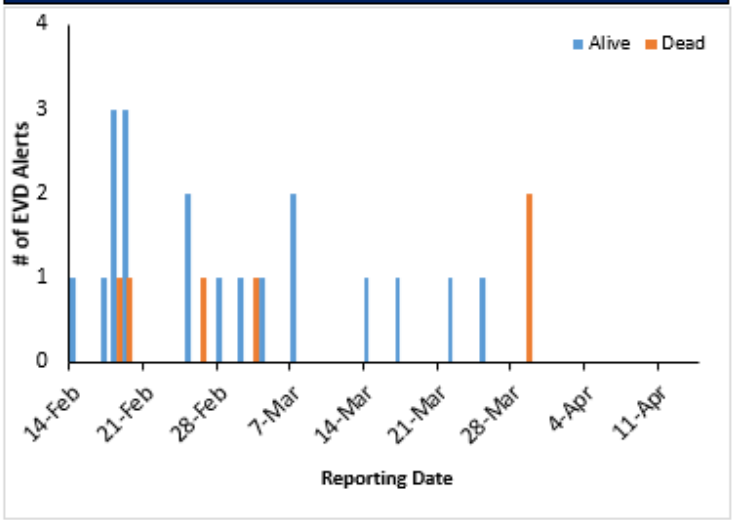
I. KEY HIGHLIGHTS

- **No new alerts** reported as of April 23, 2021
  - All contacts line listed are undergoing daily monitoring
  - No contact has developed symptoms
- Cumulatively, since 14 February 2021, a total of 31 Ebola Virus Disease alerts including 8 deaths have been reported and investigated
  - 23 tested negative for EVD and 5 not tested *(because they did not meet case definition)* and 3 pending testing
- Proportion of alert cases with sample collected 80.6% (25/31)
- Proportion of alert cases with sample tested 77.4% (24/31)
- All 15 counties are now in preparedness (alert) mode
- Concept and budget for a functional Simulation exercise completed
- Surveillance tools disseminated to counties
- Finalization of Integrated Disease Surveillance and Response (IDSR) 3rd edition ongoing
- Remain engaged with the counties
- Pillar meeting for every Wednesday is ongoing
- Active case search in high-risk communities and health facilities bordering Guinea initiated
- Community engagement with community leaders continues across high-risk counties
- Multidisciplinary Rapid Response Team (RRT) continue to be activated for heightening surveillance in border counties

Distribution of EVD Alerts Reported by District, Liberia, 14 February - 22 April 2021



Epi curve of Reported Alerts by Outcome in Liberia, 14 February - 23 April 2021



II. SITUATIONAL CONTEXT

Liberia has not confirmed any case of EVD since Guinea declared EVD outbreak on 14 February 2021, in Nzérékoré Prefecture near the Liberia- Guinea border which has numerous porous points of entry.

As of 11th April 2021, a total of 31 alerts including 6 deaths have been investigated from seven counties (Montserrado-15, Nimba-3, Lofa-7, River Gee-1, Grand Gedeh-2, Grand Bassa-1, and Bong-2). Two of the alerts were reactive for Lassa fever.

Risk factors for potential EVD outbreak into Liberia include the movement across the numerous official and unofficial borders of Liberia with Guinea for seeking medical care and commercial purposes; Similar cultural practices, inter-marriages including day to day interaction/movement of people for across these porous ground crossing points among the three countries.

III. PUBLIC HEALTH MEASURES

a) Coordination

- Engagement with partners and stakeholders for local resource mobilization continues at national and subnational level
- The PHEOC remains activated in alert mode for preparedness and readiness led by the Director General of the National Public Health Institute of Liberia (NPHIL)
- The remaining 13 counties are in alert mode
- EVD technical meeting continues with all pillar leads and critical counties every Mondays, Wednesdays, and Fridays
- Coordination meeting with all partners and other stakeholders is taking place every Tuesdays and Thursdays.

b) Surveillance and border crossing points

- In order to improve alerts, NPHIL has submitted request to WHO to support
  - active case findings along bordering communities and counties
  - EOC in three high risk counties
- Development of Concept paper and budget for a controlled Simulation exercise on EVD to test:
  - Case detection in two (2) bordering counties
  - RRT functions
  - IHR notification
- Active case search in communities by CHVs and CHAs and health facilities for alerts detection and rumors investigated
- EVD tools that include case definition, investigation and reporting tools, SoPs, RCCE massages have been printed and disseminated to bordering counties with support from WHO
- Seven (7) of the 15 counties reported daily updates on alerts notification
- Thirty-one (31) alerts have been reported, investigate.
- ToT training conducted targeting 54 PoEs (2Per PoE)-Supported by CDC/ JHPIEGO
- Sixty (60) surge staff (4 CHVs per PoE) deployed at all 15 official PoEs in Lofa County
- Action Against Hunger (AAH) has completed IPC & WASH readiness capacity assessment for EVD Preparedness at PoEs and referral health facilities in Bong, Lofa and Nimba Counties

c) Laboratory

- Diagnostic training conducted in 3 counties on EVD testing and reporting
- List of essential EVD lab reagents, equipment and consumables submitted to partners and GOL for procurement
- Lab Technical working group updated relevant documents
  - Sample collection guidelines
  - Refresher training presentation
  - Assessment checklist
- Capacity exist at national and sub national for samples collection, packaging and testing

- Couriers have been stationed across the 15 counties for timely EVD samples transportation including other priority diseases
- Mobilization for additional EVD test kits and supplies through WHO and partners has been initiated
- Documents reviewed and validated
- Preparation for refresher training is on going

Diagnostic officers undergoing training on EVD sampling and testing

d) Infection Prevention and Control (IPC)

- Conducted IPC assessment in Margibi and Montserrado
  - Forty-five (45) health facilities targeted
  - 97% (43) assessed
- Funding source- **Resolve to Save Life through AFENET**
- Revised IPC training modules to reflect current trend
- Worked with other pillars (Case Management Pillar) and conducted IPC refresher trainings for all health care providers at POEs and selected health facilities and ETUs
- Working with counties to reinforce IPC guidelines and SOPs in all health facilitiesthrough vigorous supportive supervision and mentorships to POEs and nearby health facilities

e) EVD vaccine and Therapeutics

- Microplanning for vaccine deployment and administration has started
- EVD vaccination preparedness meetings started at national level
- Vaccine deployment protocol is out for approval
- Principal Investigator identified by the Minister

f) Case Management

- EVD case management and IPC training of ETU staff conducted in Lofa, Bong and Nimba from - **with funding and support from WHO**
- HCF isolation and EVD screening capacity assessment to be conducted after the CM training- with funding and support from WHO
- Possible treatment units identified in 4 counties (Nimba, Bong, Lofa and Montserrado)
- HR data base of surge capacity identified
- WHO treatment guidelines adapted and finalized
- Assessment for the renovation of border holding unit and triage facility completed in Nimba Countycompleted

g) Dead Body Management

- Inventory on existing supplies for dead body management conducted alongside the IPC supplies inventory in the 3 counties bordering Guinea

h) SOPs for safe and dignified burials updatedLogistics

- UNICEF provided IPC supplies to five (5) alert counties
- JICA has committed to providing medical consumables for Montserrado County and quantified listing has been submitted
- Distributed some IPC supplies to the Counties including Gloves, Chlorine, Thermo-flash, body – bag, back-pack sprayer etc.
- Working in collaboration with USAID team, Supply Chain-MOH, GSA, CMS, Procurement, and every other pillar
- Mapping and quantifying supplies from CMS, taking into consideration the stock level for COVID-19 supplies
- Have mapped both International and National Suppliers
- MOU has been developed from the Government end for suppliers
- There is planned strategy to move available supplies from Gbarnga Hub to Northern Liberia,

while supplies at the Maryland hub will supply South-East due to the rains and the accessibility factor and the Western Cluster can be supplied from Montserrado

i) Communication and Information sharing

- UNICEF delivered IEC/SBCC Materials
  - Materials are being dispatched to counties
- Public Awareness and Radio interactive engagement continues with INTERNEWS Contracted 30 Radio institutions across the five counties, including summer-cast
- Rumors tracking and information enhancement strategy training is ongoing in bordering counties with support from Irish Government through WHO
- Production of EVD jingles in vernaculars is being finalized – GIZ has committed support
- GIZ has also committed support for rumor tracking dashboard from social media
- Revised EVD prevention and control messages
- Conducted Radio Talk shows in Nimba, Lofa, Bong, and at National

IV. KEY CHALLENGES

- Limited EVD alerts detection and notification in high risk counties;
- Inadequate IPC supplies in healthcare facilities and POEs;
- Limited IEC materials;
- Limited test kits and specimen's collection materials including swab for EVD specimen collection from dead bodies

V. NEXT STEP

- Improve EVD alerts detection across all 15 counties and preposition IPC supplies and other operational logistics;
- Finalize the assessment of sites identified for isolation/treatment and print revised EVD tools for case management and dissemination to all counties;
- Conduct refresher training for cadres of HCW for surveillance, case management, IPC, laboratory and others
- Reinforce screening of outgoing and incoming travelers at points of entry along the Guinean-Liberian borders
- Local Resource mobilization to support preparedness efforts

For comments or questions, please contact

Ralph W. Jetoh, MD, MPH
Epi Surveillance-Lead/Deputy Director
Infectious Disease and Epidemiology Division
National Public Health Institute of Liberia
Republic of Liberia
Email: ralphica2000@gmail.com
Phone: +231 886526388/777372655
Website: www.nphil.gov.lr

Hon. Jane A. Macauley
Director General
National Public Health Institute of Liberia
Republic of Liberia
Email: msjmacauley@gmail.com
Phone: +231 555152926
Website: www.nphil.gov.lr

Annex 9 Y1: Point of Entry Reporting Form

POINT OF ENTRY REPORTING FORM							
Month of reporting: _____		**Name of Point of Entry:** _____	**Community:** _____		**District:** _____	**County:** _____	
Date	**Species**	**Number of species entered**	**Number of entered animal and poultry showing signs below**			**Disease suspected**	**Country of origin**
			Respiratory	Nervous	Digestive		

Name of reporting officer: Tel.: Submission date: Signature:

Annex 9 Y2: Point of Entry Weekly Report Form

POINT OF ENTRY WEEKLY REPORT FORM							
Month and year of reporting: _____	**Name of Point of Entry:** _____	**Longitude:** _____ **Latitude:** _____	**Community:** _____	**District:** _____	**County:** _____		
Date	**Species entered[1]**	**Number of species entered**	**Number of animal and poultry showing symptoms below**			**Diseases suspected[2]**	**Origin of animal and poultry entered**
			Respiratory	Nervous	Digestive		

Main Challenges

Name of reporting officer: Tel.: Submission date: Signature

[1] Cattle, goat, sheep, pig, dog, cat, chicken, guinea fowl, duck, pigeon, parrot, monkey, bat, rat, chimpanzee, wild bird etc.

[2] If you have suspected a disease, please also use Email or fill in the ''disease suspicion form'' and ''sample form'' and send it immediately to the Central unit

Annex 9 Z1: Liberia Monkeypox Case Declaration Form

Case number:

Date of reception :_____/___/____

Collect at least two specimens from each patient. For each specimen: place a label on this form and a label on the specimen tube. Ensure that the two labels have the same name/number of the specimen.

Liberia Monkeypox Case Declaration Form

Declaration

1. Date of declaration ___/___/___
2. Case reported by *(check all that apply and specify)*
   - Mobile team, No. _____
   - Health Center _____
   - Hospital_____
   - Other _____
3. Form completed by (first and last name) _____
4. Information given by (first and last name) _____
5. Relationship with patient _____

Patient Identity

6. Last Name _____ First Name _____
7. For children, father's name _____
8. Date of birth ____/_____/_____
9. Age (years) _____
10. Gender M F
11. Village of residence during the last 12 months _____
12. Neighborhood _____
13. Health district or Zone _____
14. Nationality _____
15. Ethnicity / tribe _____
16. Occupation of the patient (*check all that apply*
    - Child (no-student)
    - Student
    - Seller/merchant of bush meat (game)
    - Seller/merchant (other)

- Hunter
- Domestic employee
- Planter/farmer
- Miner
- Healthcare worker (specify)
- Other occupation

Patient Status

17. Status of patient
    - Alive
    - Dead
    - Presumed alive
    - Presumed dead
18. If dead, date of death ____/____/____
19. Place of death (name of village)
20. County
21. Is a smallpox vaccination scar present? YES NO Do Not Know

Medical History

22. Does the patient have a cutaneous eruption YES NO

OR

Has the patient had a cutaneous eruption in the last two months? YES NO

23. a) Date the rash began: ____/____/____
    b) Name of village where the patient developed rash _____
    c) Country where the patient developed rash _____
24. a) Does the patient have a fever? YES NO Do No Know
    b) If yes, date the fever began: ____/____/____
    c) did the fever precede the rash? YES NO Do Not Know
25. If there is active disease with a rash or presence of scars, count the number of lesions or scars on each part of the body

	Lesion	Scars
Face		
Thorax		
Arms		

Legs		
Palms of hands		
Soles of feet		
Genitals		

26. If there is active disease,

a) Are the lesions in the same state of the development of the body?

YES NO Do Not Know

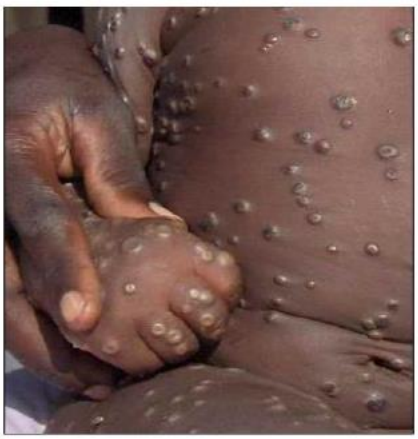
b) Are all the lesions the same size and state of development?

YES NO Do Not Know

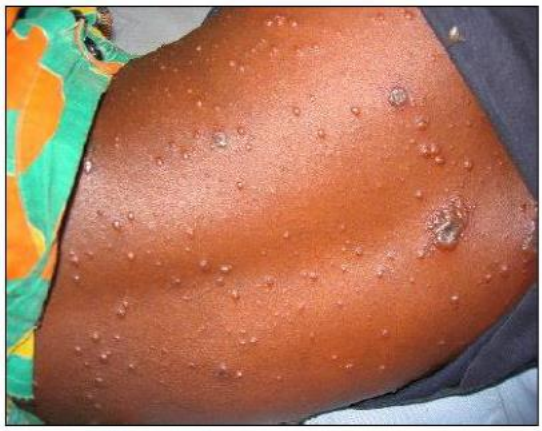
c) Are the lesions deep and profound?

YES NO Do Not Know

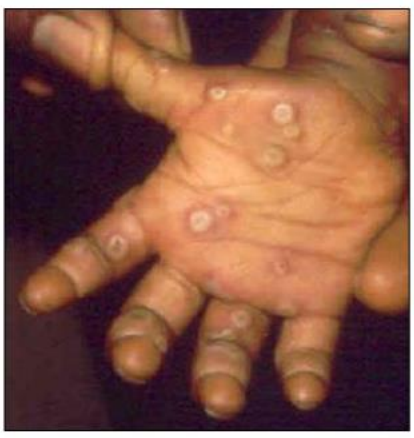
27. Do the lesions resemble (for each photo):



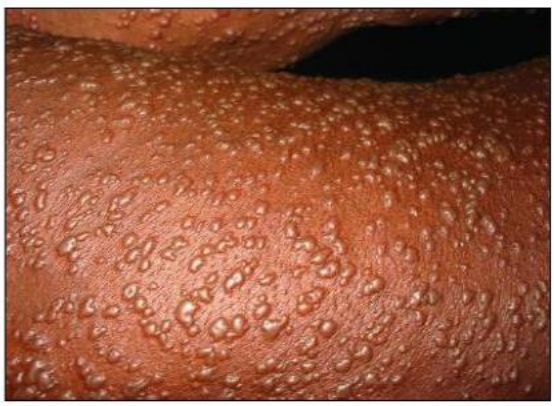
a. · Yes · No



b. · Yes · No



c. · Yes · No



d. · Yes · No

28. Does or did the patient have any of the following symptoms (check all that apply)

Vomiting/nausea	YES	NO	Do Not Know
Cough	YES	NO	Do Not Know
Lymphadenopathy, inguinal	YES	NO	Do Not Know
Lymphadenopathy, axillary	YES	NO	Do Not Know
Lymphadenopathy, cervical	YES	NO	Do Not Know
Chills or sweats	YES	NO	Do Not Know
Sore throat when swallowing	YES	NO	Do Not Know
Oral ulcers	YES	NO	Do Not Know
Headache	YES	NO	Do Not Know
Lesions that itch	YES	NO	Do Not Know
Muscle pain (myalgia)	YES	NO	Do Not Know
Fatigue	YES	NO	Do Not Know
Conjunctivitis	YES	NO	Do Not Know
Sensitivity of light	YES	NO	Do Not Know
Is the patient bedridden?	YES	NO	Do Not Know

Exposures

29. During the three weeks preceding the onset of symptoms, did the patient have contact with one or more persons who had with similar symptoms?

YES NO Do Not Know

If Yes, respond to the following questions concerning these additional ill people (indicate all of the ill people). There is additional space for the multiple contacts at the end of this form)

30. Last name _____ First Name _____

31. Relationship with patient _____

32. First date of contact with the ill person ____/____/____

33. Interaction with this person (choose all that apply)

- Family contact / live together
- Prepared food together
- Shared a bed / slept together
- Took care of this sick person
- Friend at school or for play
- Met at the market
- Hunted together
- Friend / social acquaintance
- Were at the church, assisted at a religious service together

- Other

34. Other information about the contact

_____

35. Did the patient touch a domestic or wild animal during the three weeks preceding symptoms onset? YES NO Do Not Know

36. If Yes, what kind of animal _____

37. Date of contact ____/____/____

38. Type of contact *(check all that apply)*

- Rodents alive in the house
- Alive animal living in forest
- Dead animal found in the forest
- Animal bought for meat

Laboratory

39. Was a specimen collected? YES NO

40. If Yes, date ____/____/____

41. Type: Crust Swap Blood

42. Additional comments about the case:

_____

Additional contacts of patient

43. Last name _____ First name _____

44. Relationship with the patients _____

- Family contact / live together
- Prepared food together
- Shared a bed / slept together
- Took care of this sick person
- Friend at school or for play
- Met at the market
- Hunted together
- Friend / social acquaintance
- Were at the church, assisted at a religious service together
- Other

Other information about the contact

_____

Additional contacts of patient

Last name _____ First name _____

Relationship with the patients _____

- Family contact / live together
- Prepared food together
- Shared a bed / slept together
- Took care of this sick person
- Friend at school or for play
- Met at the market
- Hunted together
- Friend / social acquaintance
- Were at the church, assisted at a religious service together
- Other

Other information about the contact

Annex 9 Z2: Buruli Ulcer Case Investigation Form

Buruli Ulcer Case Investigation Form

I DSR ID:_____**County:**_____**District:** _____

Date of notification:___/_____,/_____**Date of investigation:**_____/_____/_____**Date of report**_____/____/_____

Date of onset:_____**District of residence:** _____

Date seen:____/_____/ _____

Patient Information

Name_____Age:_____Sex:_____**Patient ID:**_____**Community of residence** _____

Health Facility:_____**Occupation:** _____

Brief description of the lesion: Painless ☐ **Painful** ☐

Patient classification: New case ☐ **Recurrent case** ☐ **If recurrent, Same sites** ☐ **Different site** ☐

Patient / caregiver contacts: _____

Location of Lesion

Upper Ext: Right ☐ **Left** ☐ **Lower Ext: Right** ☐ **Left** ☐

Abdomen ☐ **Back** ☐ **Buttocks** ☐ **Perineum** ☐ **Thorax** ☐ **Head and Neck** ☐

Clinical Forms

Nodule ☐ **Plaque** ☐ **Edema** ☐ **Ulcer** ☐ **Osteomyelitis** ☐

Specimen for Laboratory Diagnostic

Name of Health Facility:_____District:_____County: _____

Name of Clinician completing the form:_____Contacts: _____

Site of collection:_____Type of specimen: Swab FNA

Type of test: PCR

Date and time collection: _____

For Lab Use Only

Laboratory name: _____ District: _____ County:_____

Name of Clinical completing the form: _____ Contacts: _____

Site of collection: _____ Type of specimen: Swap FNA

Type of test: PCR

Date and time collection: _____

Annex 9 Z3: Yaws Investigation and Reporting Form

Country:_____ County:_____ County Code: _____
District: _____ Health facility:_____
Health Facility Code:_____

Name of Father:	Name of Mother:
Section A: Demographic data	
1. Name of Case	Caregiver contact:
2. Case ID number:	
3. Date of birth (dd/mm/yy):	Age (years):
4. Sex: M F	Community/ village:
Section B: History and clinical examination	
Reporting date (dd/mm/yy)	
5. Date of onset (dd/mm/yy)	
6. Duration of illness (in weeks)	
7. Date seen at health facility (dd/mm/yy)	
8. Previous treatment (if any):	
9. Travel history	
10. Clinical forms of yaws (Refer to WHO pictorial guide)	
☐ Papilloma/papules ☐ Hyper-keratosis of palm/sole ☐ Ulcers	☐ Swelling of bones and joints ☐ None of the above ☐ Macules
11. Photograph of lesion: ☐ Yes ☐ No	
Section C: Diagnosis	
Sampling method: ☐ Finger prick blood for RDT	☐ Finger prick blood for DPP POC ☐ Swap/scraping from lesion for PCR
Enter laboratory results once available:	
RDT test ☐ Positive ☐ Negative ☐ Not Done	**PCR results** ☐ Positive ☐ Negative ☐ Not Done
DPP ☐ Positive ☐ Negative ☐ Not Done	
Section D: Conclusion of clinical assessment	
☐ Suspected Case ☐ Confirmed Case ☐ Not a Yaws Case	
Name and contact (health worker):	
Comment	

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