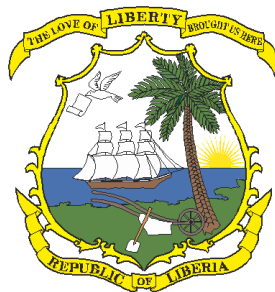


MINISTRY OF HEALTH LIBERIA

NATIONAL TECHNICAL GUIDELINES FOR
**Integrated Disease
Surveillance & Response**



Adapted June 2016



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

Adapted June 2016

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FOREWORD

More than ten years ago, the Ministry of Health (MOH) adapted a generic integrated disease surveillance and response technical 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 (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:

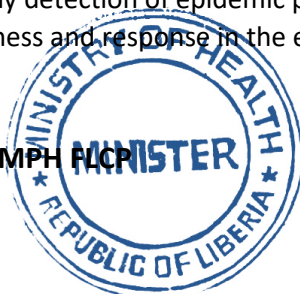
- health workers at all levels (including clinicians and public health workers)
- county and district health teams
- data managers
- IHR National Focal Point
- competent authorities at points of entry
- veterinary and wildlife health officers
- environmental health officers
- health training institutions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

The guidelines are intended for use as a:

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



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- Disease Prevention and Control Department (DPC)
- Expanded Program on Immunization (EPI)
- Health Management Information Systems; Monitoring and Evaluation; Research Units (HMER)

Ministry of Agriculture

County Health Teams (CHTs)

Bomi	Grand Bassa	Grand Kru	Maryland	Rivercess
Bong	Grand Cape Mount	Lofa	Montserrado	River Gee
Gbarpolu	Grand Gedeh	Margibi	Nimba	Sinoe

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- NSTCC Operations
- Community Event Based Surveillance
- Epidemic Preparedness and Response
- Disease Surveillance and Information Systems
- Laboratory
- Border Control Group
- Health Promotion and Social Mobilization
- Maternal and Neonatal Death Surveillance

Key Partners

- World Health Organization—Liberia
- US Centers for Disease Control and Prevention—Liberia
- Johns Hopkins University—Liberia
- International Organization for Migration
- International Rescue Committee
- International Medical Corps
- Last Mile Health
- Academic Consortium to Combat Ebola in Liberia
- Global Communities
- Partners in Health
- Epidemic Preparedness and Response Consortium (IRC, IOM, SCI, IMC, GC, PCI, MTI)
- United Nations Children’s Emergency Fund
- Office of Foreign Disaster Assistance

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ABBREVIATIONS

AEFI	Adverse Events Following Immunization
AFP	Acute Flaccid Paralysis
AFRO	WHO Regional Office for Africa
AWD	Acute Watery Diarrhea
CDC	Centers for Disease Control and Prevention
CDO	County Diagnostic Officer
CBIS	Community Based Information System
CEBS	Community Event Based Surveillance
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
CSO	County Surveillance Officer
DDO	District Diagnostic Officer
DHIS2	District Health Information System version 2
DHO	District Health Officer
DHT	District Health Team
DPC	Disease Prevention and Control Department
DSO	District Surveillance Officer
eDEWS	Electronic Disease Early Warning System
EOC	Emergency Operations Center
EPI	Expanded Program on Immunization
EPR	Emergency Preparedness and Response
EVD	Ebola Virus Disease
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
HPO	Health Promotion Officer
IDSR	Integrated Disease Surveillance and Response
IEC	Information, Education and Communication
IMC	International Medical Corps
IOM	International Organization for Migration
IPC	Infection Prevention and Control
IHR 2005	International Health Regulations (2005)
IRC	International Rescue Committee
LISGIS	Liberian Institute of Statistics and Geo-Information Services
MCH	Maternal Child Health
MOH	Ministry of Health
MTI	Medical Teams International
NGO	Non-governmental organization
NNT	Neonatal Tetanus
NSTCC	National Surveillance Technical Coordination Committee

OIC	Officer in Charge
PCI	Project Concern International
POE	Points of Entry
PHEIC	Public Health Emergency of International Concern
PHEMC	Public Health Emergency Management Committee
PPE	Personal Protective Equipment
RRT	Rapid Response Team
RTA	Road Traffic Accident
SARS	Severe Acute Respiratory Syndrome
SCI	Save the Children International
SFP	Surveillance Focal Point
STI	Sexually Transmitted Infections
UNICEF	United Nations Children's Emergency Fund
VHF	Viral Hemorrhagic Fever
WHO	World Health Organization

GLOSSARY (DEFINITION OF TERMS)

Acute	Any disease having a rapid (sudden) onset and following a short course.
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, region 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	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	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 are reported to the MOH from every healthcare facility electronically or on paper.
International Health Regulations (2005)	An 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

This document introduces the concepts of disease surveillance and integrated disease surveillance and response (IDSR), the objectives of IDSR, and how International Health Regulations (IHR) requirements can be achieved through IDSR. It describes how counties can strengthen surveillance and response with support from the Liberian Ministry of Health (MOH).

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 occur 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.

What Is Disease Surveillance?

Disease surveillance is the ongoing, systematic collection, collation, analysis, and interpretation of data related to disease. It includes the timely dissemination of analyzed data to those who need it for action. Surveillance data are used for planning, implementing, and evaluating public health practices at all levels of the health system. There are several types of surveillance used in disease programs:

- Healthcare facility based or community-based surveillance: a term to describe when a particular location (such as healthcare facility or community) is the focus of surveillance activities.
- Sentinel surveillance: a health facility or reporting site designated for early warning of pandemic or epidemic events. The site is usually designated because it is representative of an area or is in an area of likely risk for a disease or condition of concern.
- Laboratory-based surveillance: surveillance conducted at laboratories for detecting events or trends that may not be seen as a problem at other locations.
- Disease-specific surveillance: surveillance that involves activities aimed at targeted health data for a specific disease.
- Event-based surveillance: surveillance that involves activities aimed at collecting health data on specific events.

Regardless of the type of surveillance, the important issue is that the health data are used for public health action.

Diseases, Conditions and Events Under Surveillance in Liberia

Diseases of public health importance in Liberia were identified and categorized into 3 reporting frequencies: those that are designated for routine reporting to district, county or national level on a monthly basis; those that are diseases, conditions and events of international concern that require reporting under International Health Regulations (IHR) 2005 to World Health Organization (WHO); and those that are of high epidemic potential or high morbidity/mortality and require immediate and weekly reporting. IDSR supports the integrated surveillance of all of these diseases, conditions and events. The diseases, conditions and events selected for reporting are collectively referred to as **priority diseases and conditions**.

The priority diseases for IDSR in Liberia are selected based on the following criteria:

- Diseases with high epidemic potential for serious public health impact due to their ability to spread rapidly within Liberia and internationally
- Conditions that require notification under IHR
- Diseases or conditions which are principle causes of morbidity and mortality in the region
- Non-communicable disease priorities in Liberia
- Diseases for which effective control and prevention interventions are available for addressing the public health problems they pose
- Diseases for which intervention programs exist (supported by MOH and WHO) for prevention and control, eradication or elimination

The priority diseases, conditions and events that are reportable in Liberia are listed in **Table 1**. Every Healthcare Facility (HCF) in Liberia is required to report any case or suspected case that presents at the facility or community level to the district level.

Table 1 shows the epidemic prone diseases, conditions and events requiring immediate reporting (column 1); diseases or events of international concern that must be notified under IHR (column 2); and diseases and conditions that are under routine monthly surveillance in the Health Management Information System (HMIS) (column 3).

TABLE 1. PRIORITY REPORTABLE DISEASES, CONDITIONS AND EVENTS, LIBERIA, 2016

Immediately reportable epidemic prone diseases/conditions and events	Diseases or events of international concern that are notifiable under IHR 2005	Monthly reportable diseases/conditions of public health importance
Acute Bloody Diarrhea (<i>Shigella</i>) Acute Flaccid Paralysis (AFP) Cholera (Severe AWD) Human Rabies Lassa Fever Maternal Deaths Measles Meningitis ¹ Neonatal Deaths Neonatal Tetanus Viral Hemorrhagic Fevers (including Ebola Virus Disease) Yellow Fever Unexplained cluster of health events Unexplained cluster of deaths	Guinea Worm (<i>Dracunculiasis</i>) Human Influenza (due to a new subtype) Severe Acute Respiratory Syndrome (SARS) Smallpox Other Public Health Event of International Concern (PHEIC) Includes: infectious, zoonotic, food borne, chemical, radio nuclear, or due to unknown condition	Acute Watery Diarrhea Acute Viral Hepatitis Adverse Events Following Immunization (AEFI) Cataract Diabetes Diarrhea w/dehydration (in <5 years) Encephalitis Epilepsy HIV/AIDS (new cases) Hypertension Hookworm Injuries (RTAs, domestic violence) Malaria Malnutrition (< 5 years) Mental Health Onchocerciasis Pertussis (Whooping Cough) Severe Pneumonia (<5 years) Schistosomiasis Sexual Assault STIs Trachoma Trypanosomiasis Tuberculosis Typhoid Refer to Health Management Information Systems monthly reporting tools (DHIS2)

Note: Disease specific summary pages are available in **Annex 9** of this guide.

¹ Includes meningitis caused by *Haemophilus influenzae* type b (Hib), *Neisseria meningitidis*, and *Streptococcus pneumoniae*)

One Health Strategy

“The One Health concept recognizes that the health of humans is connected to the health of animals and the environment” (source: <http://www.cdc.gov/onehealth>). The One Health strategy promotes the integration and coordination within and across many sectors for disease surveillance, outbreak investigation and response activities. It ensures the strengthening of each sector and enhances inter-sectoral linkages for efficient use of scarce resources, effective and timely involvement of all sectors for improved disease prevention and control. Together with MOH, the other sectors in Liberia include Environmental Protection Agency, Ministry of Agriculture, and Forestry Development Authority. The goal of One Health is to achieve optimal health for people, animals and the environment.

Integrated Disease Surveillance and Response

The World Health Organization (WHO) Regional Office for Africa (AFRO) proposed an integrated disease surveillance and response approach for improving public health surveillance and response in Africa linking community, health facility, district, county, and national levels. This was widely adopted in Africa, including Liberia, in 2004. Surveillance activities for different diseases often involve similar functions (detection, reporting, analysis and interpretation, feedback, and action) and use the same structures, processes and personnel. IDSR promotes rational use of resources by integrating and streamlining common surveillance activities. Instead of using scarce resources to maintain separate activities, resources are combined to share activities and processes and to collect information from a single focal point at each level.

Objectives of IDSR in Liberia

The broad objective of IDSR in Liberia is to contribute to the reduction of mortality, morbidity and disability from diseases through accurate, complete and timely reporting and analysis of data for public health action. Specific objectives are to:

- Strengthen the capacity to conduct effective surveillance activities; train personnel at all levels; develop and carry out plans of action; and advocate and mobilize resources.
- Integrate multiple surveillance systems so that resources can be used more efficiently.
- Improve the use of information to enable rapid detection, analysis and response to suspected epidemics and outbreaks; to monitor the impact of interventions; and to facilitate evidence-informed public health policy, planning and action.
- Improve the flow of surveillance information across levels of the health system.
- Strengthen laboratory capacity for pathogen detection and monitoring of drug resistance.
- Increase involvement of clinicians in the surveillance system.
- Emphasize community participation in detection and response to public health problems.

What is an Integrated System?

Integration refers to harmonizing different methods, software, data collection forms, standards and case definitions in order to promote consistent information gathering and to maximize efforts among all disease prevention and control programs and stakeholders. Counties use a common reporting form, a single data entry system for multiple diseases, and common communication channels. Training and supervision are integrated, common feedback is provided, and other resources such as computers and vehicles are shared.

IDSR involves coordination of surveillance activities and joint action (planning, implementation, monitoring, evaluation) whenever it is 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 in order to provide accurate, consistent and relevant data and information to policy-makers and stakeholders at regional, inter-country and national levels. To facilitate coordination and collaboration, a national, county and district multi-sectoral, multidisciplinary co-ordination body or committee is constituted. It is responsible for coordination of surveillance activities in close collaboration or synergy with the committee set up for epidemic response (see **Section 5**).

Features of an integrated system include:

- All surveillance activities are coordinated and streamlined. Rather than using scarce resources to maintain separate vertical or disease specific activities, resources are combined to collect information from a single focal point at each level.
- 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 acute flaccid paralysis (AFP) often address surveillance for neonatal tetanus, measles and other diseases or unusual events. Thus, health workers who routinely visit health facilities to supervise AFP cases also review district and health facility records for information about other priority diseases in the area.
- The district level is the focus for integrating surveillance functions. The district is the first level in the health system with staff dedicated to all aspects of public health such as monitoring health events in the community, mobilizing community action, encouraging national assistance and accessing regional resources to protect the district's health.
- Surveillance focal points at the district, county and national levels collaborate with epidemic response committees at each level to plan relevant public health response actions and actively seek opportunities for combining resources.
- The focus is on the creation of an overall public health surveillance system with sufficient capacity for detecting, confirming and responding to communicable and non-communicable disease threats.

Surveillance Functions in These Guidelines

All levels of the Liberian health system are involved in conducting surveillance activities for detecting and responding to priority diseases and conditions (even though the different levels do not perform identical functions). These activities include the following core functions:

- Step 1. *Identify* cases and events by using standard case definitions.
- Step 2. *Report* suspected cases, conditions or events to the next level.
- Step 3. *Analyze and interpret* findings by compiling the data, analyzing it for trends, and comparing it to information from previous periods.
- Step 4. *Investigate and confirm* suspected cases, outbreaks or events and take action to ensure there is laboratory confirmation where feasible and to gather evidence to what may have caused the outbreak and use it to select appropriate control and prevention strategies.
- Step 5. *Prepare*, so that teams may respond quickly to epidemics or emergency public health events with essential supplies and equipment available for immediate action.
- Step 6. *Respond* by coordinating and mobilizing resources and personnel to implement the appropriate public health response.
- Step 7. *Provide* feedback to all levels through rapid and complete communication about the investigation outcome and success of response efforts, thereby encouraging future cooperation.

Step 8. *Evaluate and improve* the system by assessing the effectiveness of the surveillance and response so action can be taken to improve the system.

Each level of the health system (community, health facility, district, county, labs, national) plays some role in each surveillance function. The levels are defined as the community, healthcare facility, district, county, and national. These are described in more detail in **Table 2**. See **Annex 10** for detailed job aids for CSOs, DSOs, and health facility surveillance focal points. While IDSR encompasses the entire surveillance system framework (Table 1), the operational details of this document cover only the epidemic-prone diseases and selected high priority events (Table 1, Column A), and events that require reporting by IHR (Table 1, Column B) when relevant.

IDSR and International Health Regulations (2005)

The purpose of the International Health Regulations (IHR) 2005 is to prevent, control and respond to the international spread of diseases while avoiding unnecessary interference with international traffic and trade.

IHR (2005) is a binding legal instrument in effect in 196 WHO member states, including Liberia, that aims to help the international community prevent and respond to acute public health risks that have the potential to cross borders and threaten people worldwide. The IHR obliges member states to meet minimum core capacity requirements for surveillance and response including at points of entry, i.e. ports, airports and ground crossings.

IHR (2005) promotes cross-border collaboration which can be supported by a functional IDSR program. IHR (2005) has introduced the notion of “event-based” surveillance to IDSR in order to address rumors of “unexplained illness or clusters” as an event category for reporting from lower levels to national level. IDSR and IHR share common functions (detection, reporting, confirmation and verification, notification and reporting and timely response).

The National IHR Focal Point, located within the Ministry of Health, is the only person to notify WHO of any public health event of international concern that may arise. The National IHR Focal Point uses the IHR “decision instrument” that includes the implementation of core IDSR functions to determine if a report should be made. A summary of the event reporting required by the IHR is included in **Annex A** (column 2).

The three main categories of events that require notification under the IHR are:

- The four conditions that require WHO notification: smallpox, poliomyelitis due to wild-type poliovirus, human influenza caused by a new subtype, and Severe Acute Respiratory Syndrome (SARS).
- Other diseases and events may require notification if they are considered to be events of potential international public health concern. The Liberian MoH has designated a list of priority diseases (see Table 1, and **Annex 9**).
- Any event of potential international public health concern including those of unknown cause or source, and those involving events or diseases other than those listed in above (see **Annex A**).

One of the requirements of the IHR (2005) is that routine measures should be in place at Points of Entry (POE) for the detection of ill travelers. Further information regarding surveillance at POE is in **Annex 2B**. Healthcare facilities located close to the POE are responsible for the management of any ill travelers. Communities near POE are responsible for ensuring that any person with recognizable signs and symptoms is notified to the CHA, or other authority, for follow up. This is further discussed in the Community Event-Based Surveillance section of these guidelines.

Strengthening Surveillance and Response

Liberia tailored the WHO/AFRO surveillance matrix to incorporate surveillance functions for the IDSR surveillance system. The matrix (**Table 2**) provides a systematic framework for improving, integrating, and strengthening the system and helping each level understand their role and the support they should expect.

Practical uses of the surveillance matrix shown in **Table 2** include:

- Ensuring that all necessary functions and capacities have been identified
- Establishing accountability to assign functions at appropriate levels
- Developing activities and training for human resource development
- Planning for surveillance personnel, supplies, and materials
- Managing and monitoring programs

Table 2 illustrates several key assumptions about surveillance systems. If one or more of the elements at each level is performed poorly, the risk of failure of the system to achieve surveillance and control objectives increases. An effective system will be supported at each level from the levels above and below. A complete system minimizes any delay in taking public health actions. Depending on the capability at different levels of the system, an activity may need to move up or down the matrix between levels. For example, if the District cannot conduct the outbreak investigation then it moves up to the County or down to the healthcare facility as necessary.

The functions of detection, analysis, investigation, response, feedback and evaluation are interdependent and should always be linked. IHR (2005) requires surveillance and response core capacities to ensure a strong national response to a potential outbreak or event of public health concern (**Annex B**).

TABLE 2: SURVEILLANCE MATRIX: CORE FUNCTIONS AND ACTIVITIES BY HEALTH SYSTEM LEVEL

	Identify	Report	Analyze and Interpret	Investigate and confirm
Community and Points of entry	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Report essential information on alert triggers to HCF and appropriate authorities 	<ul style="list-style-type: none"> • Involve local leaders in observing, describing, and interpreting disease patterns, events, and trends in community. • Map community catchment area. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Prepare and periodically update graphs, tables, and charts to describe time, person and place for reported diseases and conditions • Map community catchment area. • From the analysis, report immediately any disease or condition that: <ul style="list-style-type: none"> – Exceeds an action threshold – Occurs in locations where it was previously absent – Presents unusual trends or patterns 	<ul style="list-style-type: none"> • Take part in investigation of reported outbreaks • Collect, package, store and transport specimens for laboratory confirmation during investigation
District	<ul style="list-style-type: none"> • 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 specimen collection and transport 	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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.

TABLE 2: SURVEILLANCE MATRIX: CORE FUNCTIONS AND ACTIVITIES BY HEALTH SYSTEM LEVEL

	Prepare	Respond	Communicate (Feedback)	Monitor, Evaluate, and Improve
Community and Points of entry	<ul style="list-style-type: none"> Participate on community health and emergency preparedness committees Participate in identifying potential hazards Participate in training and simulation exercises 	<ul style="list-style-type: none"> Assist health authorities to select response activities and encourage community participation Ensure community seeks care immediately in case of emergency and signs of disease Participate in prevention and response based activities Mobilize resources appropriate for the activity Follow and model best practices in basic infection prevention and control (IPC) measures and social distancing Carry out community health education for behavior change 	<ul style="list-style-type: none"> Build relationships, communicate and coordinate for information sharing Give feedback to community members about reported case, events, and prevention activities Liaise with Healthcare facility 	<ul style="list-style-type: none"> Verify the community response to the public health action Verify if public health interventions took place as planned
Healthcare facility	<ul style="list-style-type: none"> Participate in emergency preparedness and response committees Participate in response training and simulation exercises Monitor and maintain emergency response supplies 	<ul style="list-style-type: none"> Manage cases and contacts according to standard case management guidelines Take relevant additional control measures Participate as part of rapid response team 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Assess community participation Conduct a self-assessment on the surveillance and response activities Monitor and evaluate prevention activities and modify them as needed
District	<ul style="list-style-type: none"> Participate in emergency preparedness and response committees Participate in risk mapping and community assessment Organize district outbreak and rapid response teams Participate in and support response training for HCF and community 	<ul style="list-style-type: none"> Together with County select and implement appropriate public health response Plan timely community information and education activities Document response activities In case of epidemics send daily district sitrep 	<ul style="list-style-type: none"> Alert communities about outbreaks or events Give feedback to the HCF and community on surveillance activities and priority events Conduct district level surveillance review meetings to include key community members and partners and report findings. Give health care facilities and communities regular, periodic feedback about routine control and prevention activities and outbreaks 	<ul style="list-style-type: none"> Conduct regular supervisory visits of healthcare facilities Monitor and evaluate program timeliness and completeness of reporting from health facilities in the district Monitor and evaluate timeliness of response to outbreaks Gather information from affected communities on needs and impact of response

TABLE 2: SURVEILLANCE MATRIX: CORE FUNCTIONS AND ACTIVITIES BY HEALTH SYSTEM LEVEL

	Identify	Report	Analyze and Interpret	Investigate and confirm
County	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 regional and international networks about confirmed outbreak • Process specimens from investigation and send timely results

TABLE 2: SURVEILLANCE MATRIX: CORE FUNCTIONS AND ACTIVITIES BY HEALTH SYSTEM LEVEL

	Prepare	Respond	Communicate (Feedback)	Monitor, Evaluate, and Improve
County	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 • Disseminate health education and behavior change messages • During epidemics send daily sitrep 	<ul style="list-style-type: none"> • Alert nearby areas and districts about the outbreak including cross border areas • Give feedback to districts on surveillance and data quality findings • Give District regular, periodic feedback about routine control and prevention activities and outbreaks • Conduct County level surveillance review meetings to include key community members and partners • Produce monthly County surveillance bulletin 	<ul style="list-style-type: none"> • Monitor and evaluate program targets and indicators for measuring quality of the surveillance system for Districts and health care facilities • Provide regular assessment of staffing needs for IDSR implementation and inform the next level • Conduct regular supervisory visits • Monitor and evaluate timeliness of response to outbreaks and events • Assess acceptability of response to community and refine as needed • Ensure involvement of partners in surveillance and response activities
National	<ul style="list-style-type: none"> • Set policies, procedures, and training for each level • Undertake risk mapping • Prepare and distribute emergency preparedness and response plans • Develop National risk communication plan including messages for community education • Organize and support National Rapid Response Teams (RRTs) • Develop and organize simulation exercises (including cross border) • Develop and manage contingency plans • Establish and maintain a national public health emergency operations center (EOC) 	<ul style="list-style-type: none"> • Set policies and procedures for responding to outbreaks of priority diseases and events • Develop and support response activities that promote the psychological wellbeing of patients, HCWs, affected families and communities • Coordinate response with county and district health teams • Support epidemic response and preparedness activities including deployment of RRTs • Follow and adapt risk communication guidelines and social mobilization (Health Promotion Unit MOH) 	<ul style="list-style-type: none"> • Develop and periodically distribute national bulletin for epidemiology and public health • Give Counties regular feedback about routine and prevention control activities • Release information quickly in a transparent manner • Document provision of appropriate and timely feedback • Disseminate results of outbreak response in bulletins, media, press releases and briefings. • Share epidemiological data and reports including outbreak response information with neighboring countries 	<ul style="list-style-type: none"> • Monitor IDSR and laboratory core indicators regularly • Conduct IDSR regular review meetings • Conduct regular supervisory visits • Ensure involvement of partners in surveillance and response activities • After action review including lessons learned of outbreak investigation and response • Support annual monitoring of IHR core capacities • Update and revise workplan and budget line for implementation of IDSR activities

TABLE 2: SURVEILLANCE MATRIX: CORE FUNCTIONS AND ACTIVITIES BY HEALTH SYSTEM LEVEL

	Identify	Report	Analyze and Interpret	Investigate and confirm
WHO Country Office, WHO AFRO Regional Office	<ul style="list-style-type: none"> • 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 centers of excellence 	<ul style="list-style-type: none"> • Collect and compile reports of outbreaks and international notifiable diseases and events • Produce annual regional profiles or situation reports by priority diseases, conditions and events 	<ul style="list-style-type: none"> • Develop and disseminate best practices for analysis of data for each priority disease • Provide technical support to national level to improve capacity for analysis 	<ul style="list-style-type: none"> • 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

TABLE 2: SURVEILLANCE MATRIX: CORE FUNCTIONS AND ACTIVITIES BY HEALTH SYSTEM LEVEL

	Prepare	Respond	Communicate (Feedback)	Monitor, Evaluate, and Improve
WHO Country Office, WHO AFRO Regional Office	<ul style="list-style-type: none"> • Mobilize resources for training, logistics and supervision • Develop, update or revise guidelines for disaster or risk management • Maintain and update a roster of experts for rapid response teams • Develop, update/revise training for IDSR and IHR implementation • Maintain the Regional Emergency Operations Centre and support the Incident Management System. 	<ul style="list-style-type: none"> • Coordinate and support response activities (Strategic Health Operations Center, technical experts, SOPs, guidelines, etc.) • Mobilize resources and facilitate partnerships 	<ul style="list-style-type: none"> • Provide feedback to aid collaboration with national and regional levels • Disseminate risk communication guidelines • Share information with partners and stakeholders 	<ul style="list-style-type: none"> • Use reports from counties to assess IDSR systems and advocate for improvements • Develop, update or revise guidelines and tools for IDSR/IHR monitoring and evaluation • Promote, guide and support operational research

SECTION 1: IDENTIFY CASES

This section describes:

- Use of standard case definitions for immediately reportable selected diseases and events of public health concern at healthcare facilities.
- Implementing IHR (2005) requirements for Liberia through IDSR.
- The role of Community Event Based Surveillance (CEBS) in IDSR.
- The use of community alert triggers for identifying and reporting alert cases at the community level.
- The laboratory network and procedures to improve capacity for surveillance and response, including the ability to confirm suspected outbreaks.
- Updating the description and listing of catchment areas, the health assets and risks.

Health workers conduct surveillance activities at all levels of the health system so they can detect and respond to public health problems of concern to their community. An essential function of a public health surveillance system is 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.

Standard Case Definitions

A standard case definition is an agreed-upon set of criteria used to decide if a person has a particular disease or condition. The definition specifies clinical criteria and limitations on time, place and person. Using standard case definitions ensures that every case is diagnosed in the same way, regardless of where or when it occurred, or who identified it. This allows for comparing the number of cases of the disease or condition 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 and use thresholds for public health action. 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.

The case definitions for the priority diseases and conditions that are reported for IDSR in Liberia are listed in **Annex 1A**. For the community level and land border points of entry (POE) a simplified version of the agreed case definitions is used. These are called alert triggers and are also shown in **Annex 1A**.

Implementing IHR (2005) Requirements

Using standard case definitions 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 World Health Organization (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 the Director of Disease Prevention and Control at the MOH. This is the only

person that can notify WHO of an event that may constitute a public health emergency of international concern using the decision instrument.

Community Event Based Surveillance (CEBS)

CEBS is the organized and rapid collection of information from community events that are a potential risk to public health. CEBS is an active process of community participation in detecting, reporting, responding to and monitoring health events in the community. CEBS encourages the creation of a sense of responsibility, urgency and ownership at 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 by identifying and acting on community alerts of possible suspect cases. Further details are provided in **Annex 1B**.

The Role of CEBS in IDSR

CEBS 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 healthcare workers, 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 1A** along with standard and community case definitions.

Alert Triggers for Community 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), Points of Entry (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 Alert Notification form for reporting these alert triggers is in **Annex 11C**.

*When any member of the community see 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 community-based surveillance 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 Officer in Charge (OIC) at the Healthcare Facility (HCF), by telephone or in person. The CHV/CHA/POE should also complete the Alert Trigger Notification form (**Annex 11C**) 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 officer in charge at the health facility or a surveillance focal point. Once the Alert trigger is verified, it is reported to the 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 CEBS and IDSR are part of the Standard Operating Procedures (SOPs) for CEBS is in **Annex 1B** and provide details on all aspects of CEBS.

Describe the Catchment Area and Maintain Updated Information

Data about local catchment areas (community and surrounding area) should be regularly reviewed and updated for planning and reporting purposes. This activity should be in the Health Team work plan at district and county levels and will always include the community key informants and workers. For example, an annual review of catchment area data could involve updating descriptions and listings of the catchment area, updating reporting sites (including HCFs and POE) and a risk assessment for a particular disease. Also, available assessment and evaluation results may be used to plan improvements for surveillance and response activities in the area. Describe who is in the catchment area, what activities are happening, what risks should be accounted for, and what surveillance assets and gaps exist.

When updating data about the catchment area, you could consider details such as:

- The size of key target populations in the district (e.g. 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.). Other risk factors to consider include 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, MCH, and LISGIS.
- Major public health activities in the area including public, private, and non-governmental organizations (NGO), immunization activities, clean water projects, family planning clinics, feeding centers for undernourished children, information related to risk factors for non-communicable diseases.
- CEBS activities and previous numbers and types of notifications. This information may show where any gaps in community surveillance may be.
- 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 1D**.

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 health care workers and subnational levels since it is the single most important driver of reporting completeness and integrity. Supervision checklists are found in **Section 8** of this guideline.

Laboratory Capacity for Surveillance and Response

The role of laboratory testing is a vital part of IDSR. Laboratory confirmation of disease diagnoses is essential to:

- accurately diagnose illness in an individual patient, and
- verify the cause (or etiology) of a suspected outbreak.

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 therefore laboratory confirmation is a critical part of the surveillance system to confirm the initial diagnosis. The functions of the laboratory at each health system level are in **Annex 1E**. A list of national laboratories used to confirm diseases is in **Annex 1F**.

Specimen collection and transportation

Specimens may be collected at the healthcare facility 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 packed and labeled correctly 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.

Many factors can affect the reliability of results and interpretation. Reliable specimens must:

- be collected correctly and within the time of disease onset specified;
- be transported to the lab in a timely manner; and
- be 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.

Annex 1G details disease specific laboratory procedures for testing specimens for the epidemic prone diseases and conditions in Liberia. These include:

- the diagnostic test for confirming the disease or condition;
- the type of specimen to be collected;
- the appropriate precautions and PPE for sample collection;
- when to collect the specimen;
- how to prepare, store and transport specimens to the lab;
- when to expect the results; and
- sources of additional information.

Implementing public health measures before laboratory confirmation has been received can be undertaken.

Responsibilities at each health 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) 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. An example is in **Annex 1C**.

SECTION 2: REPORT PRIORITY DISEASES, CONDITIONS AND EVENTS

This section describes:

- Reporting lines in the Liberian public health system.
- Immediate reporting of IDSR epidemic prone diseases, conditions and events.
- Weekly reporting for all IDSR epidemic prone diseases, conditions and events.
- Monthly reporting for all priority diseases, conditions and events of public health importance through HMIS.
- Ongoing improvement of reporting practices.

Objectives of Reporting

Data is collected and reported to guide public health **action** to address current outbreaks or to plan for future health programs and interventions.

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. Overall objectives of disease and event reporting are to:

- Identify emerging problems and plan appropriate responses
- Take action in a timely manner
- Monitor disease trends in the area
- Evaluate the effectiveness of a response

Data Reporting in Liberia

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:

- Community Health Assistants, Community Health Volunteers, Port Health Officers, and Environmental Health Officers report to the Surveillance Focal Point (normally the OIC) at the Health Care Facility
- The Surveillance Focal Point (SFP) at health facilities report to the District Surveillance Officer (DSO)
- The DSO provides district level data to the County Surveillance Officer (CSO) or other identified member of the County Health Team (CHT) e.g. data manager or Monitoring & Evaluation officer
- The CHT provides County level data to the Ministry of Health.

MOH then 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 **Annex B**.

In emergency situations, (such as public health events of concern), a different data flow may be used in line with IHR (2005) in keeping with the decision instrument show in **Annex 2A**. For example, during emergencies, a situation report is sent to the next level. In all such cases, the Ministry of Health is

expected to share the situation report and data with the World Health Organization in compliance with Article 7 of IHR (2005). Emergency response is discussed in Sections 4 and 5 of this document. Counties piloting the electronic disease early warning system (eDEWS) will report from both the electronic devices and the manual reporting system. There is planned national eDEWS rollout in 2016, please refer to separate eDEWS specific documentation as required.

Immediate Reporting

In Liberia all epidemic prone diseases and selected high priority events are immediately reportable via IDSR to the next level (**Annex A**). Immediate reporting allows for timely action to be taken to prevent the reemergence or rapid transmission of epidemic prone diseases or events.

Information that is reported immediately, such as single cases or clusters of reportable events, generate an alert or suspect case-based reporting. This means that specific information about each case is collected and reported to the next level to inform them about possible concerns and begin more careful surveillance and an initial investigation. In **Section 3** of these guidelines the alerts and thresholds are discussed in more detail. The information reported is obtained through a preliminary investigation of the suspected case and includes:

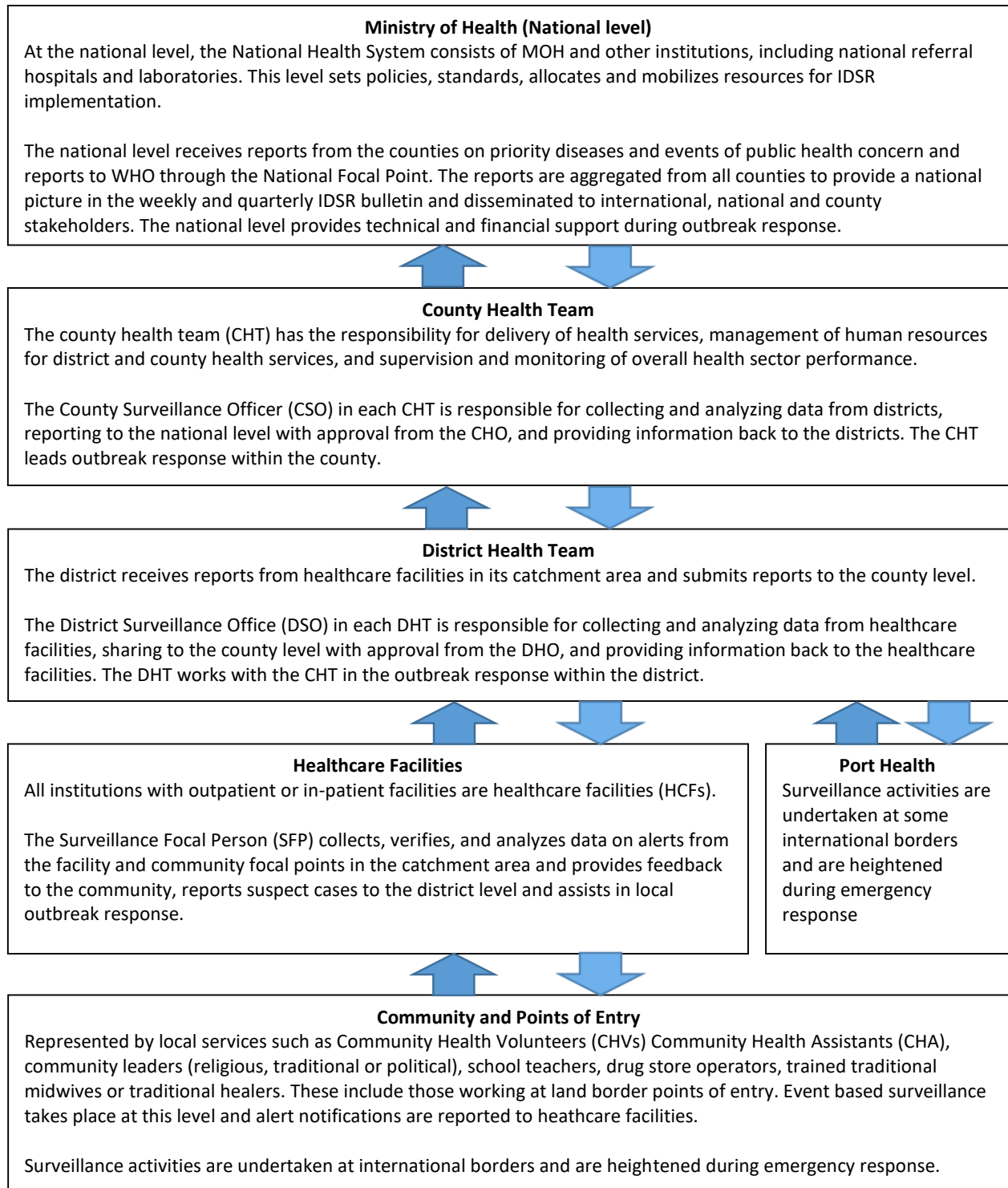
- patient's geographical location
- patient identification and demographic information
- information about onset of symptoms, vaccination history and any relevant risk factors
- laboratory results or details if specimen was collected

If an epidemic prone disease or immediately reportable condition is suspected the surveillance focal point (SFP) at the healthcare facility (HCF) should:

- Make the initial report by the fastest means possible; the HCF should contact the DSO immediately and provide information about the case.
- Follow up the initial verbal report with a written report using the IDSR Case Alert and Laboratory Sample Form (**Annex 11B**).
- Determine if a specimen is required for laboratory confirmation
- If a specimen is collected for laboratory testing, double check the labeling of the specimen and its packaging. A copy of the completed alert form must also go with the specimen to the laboratory and second copy to the DSO. (**Annex 11B**).
- Depending on the alert thresholds for a given condition, begin a line listing of cases reported as part of initial and ongoing investigation (**Annex 11G**). Disease-specific case investigation reporting forms for particular diseases of concern (AFP, EVD, VHF, neonatal tetanus, maternal death, neonatal death) are in the **Annex 11**. These forms may be used to begin gathering initial information for the case investigation.
- Note: Some epidemic-prone diseases (listed in **Annex A**) may have specific reporting requirements depending on national or regional policies. Refer to disease-specific requirements in **Section 9** and **Section 9 Annexes** for more information.
- If a potential Public Health Event of International Concern (PHEIC) is suspected (**Annex A**) the reporting County Health Officer must notify the National IHR Focal Point at DPC MOH using the fastest means possible.
- The CSO must report any event, or traveler identified at a POE with a disease of epidemic potential to the National IHR Focal Point at DPC MOH. National level will assess for an appropriate response or action. For more information on border health surveillance, see **Annex 2B**.

In those counties where the electronic disease early warning system (eDEWS) is being piloted, immediate and other routine reporting should be carried out using both the devices provided for reporting purposes AND the normal reporting mechanisms.

FIGURE 1: IDSR FLOW OF INFORMATION AT EACH LEVEL OF LIBERIA’S PUBLIC HEALTH SYSTEM



* arrows indicate flow of information

Weekly Reporting

Weekly reporting provides data that can be analyzed to monitor trends of diseases or conditions in order to detect potential outbreaks or epidemics early. By identifying possible epidemics or outbreaks early interventions can be put in place to stop the spread of disease.

HCFs should use weekly reports to monitor local trends and evaluate any risks to their catchment area (or population). The weekly reporting process from HCFs is summarized as follows:

- At the end of each Epi week, HCFs (the surveillance focal point or OIC) calculate the total number of cases and deaths due to epidemic prone diseases and events that presented at that facility during the preceding week using the IDSR weekly ledger.
- HCFs update the graphs and tables displayed on the walls with the weekly data.
- HCFs send the summary totals to the District Surveillance Officer (DSO).
- The DSO then validates the information submitted from each HCF, ensures zero reporting has taken place where necessary, ensures all HCFs have reported and stores copies of the data submitted
- The DSO completes the district level IDSR ledger, aggregates the totals from all HCFs that have reported and submits the district numbers to the CSO.
- The CSO validates the information submitted from each district, and ensures all districts have reported and stores copies of the data submitted
- The CSO then completes the weekly county IDSR ledger and spreadsheet template and sends the totals to the DPC MOH.
- If no cases of an immediately reportable disease have been reported during the week, a zero (0) is recorded on the reporting form for that disease; no field should be left blank.

Monthly Reporting

Routine monthly reporting in Liberia is carried out through the Health Management Information System (HMIS). Healthcare facilities must report via HMIS the total number of patients who presented at the facility with any of the priority or routine diseases, conditions or events under surveillance in Liberia as summarized in **Annex A, Column 3**. These data are reported through the Health Management Information System (HMIS) at healthcare facilities along with other routinely monitored health services and programs. Monitoring and Evaluation officers or data managers at the county collect monthly data and input into the electronic District Health Information System (DHIS2). This information is sent to MOH HMIS team. This information is valuable to disease specific programs for use when monitoring progress with prevention and control activities as well as for detecting any emerging, unexplained or unusual events or disease trends.

On a monthly basis the County Surveillance Officer and Monitoring and Evaluation Officer should review the cases reported through the IDSR and HMIS systems in order to harmonize the disease and event reporting activities.

Important Concepts

Summary information is surveillance data that is combined or aggregated, giving the total number of cases and deaths seen in a particular time period (for example, weekly, monthly, or quarterly). This information is important for detecting emerging diseases or other health events and should be analyzed and used for action. For example, weekly reporting provides data for monitoring trends of diseases or conditions in order to detect epidemics. Monthly reporting about other endemic diseases is used for monitoring progress with or impact of prevention and control activities. It may also assist the other levels in detecting emergent or unusual events.

Zero reporting means a 0 (zero) is recorded on the reporting form when no cases of a reportable disease have been diagnosed during the week. Submitting a zero for each disease when no cases were detected during the week tells the staff at the next level that a complete report has been filed. If the space is blank the staff will not know. If no information has been received during the week do not enter "0". A dash "-" indicates no data has been received.

Improving Reporting

In order to improve collection and reporting of data, feedback must be provided to all levels of the health system as they provide data for reporting. This enables the healthcare workers who provide the data to see how this information is used for action. It also enables them to understand what is happening in other counties.

Strengthening IDSR reporting can also be achieved through regular supervisory visits to improve knowledge and skills of the healthcare workers who are seeing patients and collecting data. In some HCFs, more than one person may be responsible for recording information. Supervisory visits provide an opportunity for on the job training to update skills, encourage local ownership of the process, address constraints and to motivate all HCWs involved in the system. If possible, supervisory visits should be coordinated with other areas or teams from the MOH in order to provide an overall, or integrated, picture of the health system. Visits can be coordinated with teams from EPI, HMIS, Health Promotion or other technical units (or partners).

Section 8 and its annexes provide further information on supervision and the checklists.

SECTION 3: ANALYZE AND INTERPRET DATA

This section describes:

- Managing data received from reporting sites.
- Preparing data for analysis.
- Analyzing and interpreting the data (time, place and person analysis).
- Thresholds for public health action.
- Drawing conclusions from the analysis to support public health action.

Organizing, analyzing and interpreting data is an important function of surveillance. Data analysis provides information for supporting relevant, timely and appropriate public health action. Every site that receives data from reporting sites should prepare and follow a plan for managing these data, including analysis and use of results. **Annex 3A** contains detailed information on the types of analysis, objectives, tools and methods that can be used to interpret and draw conclusions from surveillance data to support public health actions.

Managing data received from reporting sites

Receive, handle and store data

The routine flow of surveillance data is usually from the community and HCF to district to county level and then to the Ministry of Health as indicated in the IDSR flow diagram (Figure 1, **Section 2**). At the HCF level, both in-patient and outpatient areas are surveillance sites. The information collected from these sites is compiled, analyzed and then forwarded to the District Surveillance officer (DSO) who then aggregates data to send to the County Health Team (CHT). CHTs will merge, aggregate and send their reports to the Ministry of Health.

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 the specified time). Data may be received as excel spreadsheets, word documents, paper records, or information over the telephone. Each reporting site (or receiving health officer) should:

- Acknowledge receipt of the data
- Record receipt of the data in an appropriate logbook specifying the type and subject of the data, where and who it came from (including contact details), and date of receipt.
- Record whether the data arrived timely or was late
- Review and verify the quality of the data (whether completed correctly and accurately with no discrepancies)
- If you need to clarify any of the data, call the person who provided it
- Store the data in a way that is logical and easy to retrieve as well as secure.

Preparing data for analysis

Enter and clean data

After receipt of the data has been logged, the officer responsible should ensure that data from all reporting sites has been provided in a standard way. This involves reviewing the quality of the data provided to check whether the form (hard copy or electronic file) is filled out accurately and

completely. This may be referred to as ‘cleaning the data’. If there are errors or missing data, the person who provided the data should be contacted to clarify the issue.

Troubleshooting and cleaning data prior to analysis is an important data management practice. Disease trends and maps will not be accurate if information about numbers of cases, time of onset, or geographic location of cases is missing. Use opportunities during supervisory visits to sensitize clinicians about the importance of quality practices for recording patient information in patient register or reporting forms. Emphasize that individual patient medical forms 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.

At the district/county levels, the surveillance team should take steps to correctly enter the data into aggregated reporting forms listing data from all the reporting sites. Similarly, when data is received at the National level, the surveillance team should take steps to validate, enter and clean the data. Since surveillance data informs decisions about disease control and prevention actions, there are important ethical, social and economic consequences if data are not entered and managed correctly or on time.

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

- Update aggregate totals for each week or month that data was received.
- Record a zero when no cases were reported. If a space that should have been filled in is left blank, 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 lets the next level know that surveillance did not detect a case of the particular disease or condition.
- Ensure that weekly totals include only those cases or deaths actually reported for that week. Late reports from previous weeks should be entered with the relevant week and totals updated accordingly.
- Avoid duplicate entries by using the report or case record unique identifier to prevent, and also check for, multiple entries of the same records.
- Establish frequent contacts with the reporting sites in order to clarify issues, remove missing information and address inconsistencies detected in the reporting.

Once the data have been received and entered into the aggregate forms, review them carefully to ensure no mistakes were made during entry.

Analyzing and Interpreting the Data

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:

- Observing trends over time.
- Identifying geographic areas of high risk.
- Characterizing personal variables such as age, gender, and occupation of persons at high risk for the disease or event.
- **Table 3** shows type of analysis, objectives and some examples of tools and methods that may be applied to the data. See **Annex 3A** for details on how to undertake time, person, and place analysis.

TABLE 3: TYPES OF ANALYSIS, OBJECTIVES, TOOLS AND METHODS

Type of analysis	Objective	Tools	Method
Time	Detect abrupt or long-term changes in disease patterns or unusual event occurrence, how many occurred, and the period of time from exposure to onset of symptoms.	Record summary totals in a table or on a line graph or histogram.	Compare the number of case reports received for the current period with the number received in a previous period (e.g. weeks, months, seasons or years)
Place	Determine where cases are occurring (for example, to identify high risk area or locations of populations at risk for the disease)	Plot cases on a spot map of the district or area affected during an outbreak. Alternatively, a bar graph can be used.	Plot cases on a map and look for clusters or relationships between the location of the cases and the health event being investigated.
Person	Describe reasons for changes in disease occurrence, how it occurred, who is at greatest risk for the disease, and potential risk factors	Extract specific data about the population affected and summarize in a table. Alternative ways include pie chart and bar graph.	Depending on the disease, characterise 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 disease.

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

- Have any of the priority diseases or other events of public health concern been detected during the reporting period (week, month or quarter)? Is a disease outbreak or unusual event of public health concern suspected?
- Of the cases, deaths or events detected, how many were confirmed?
- Where did the cases occur?
- How is the observed situation in comparison to the situation of the previous reporting periods for the year? For example, when compared to the last reporting period, is the problem increasing?
- Are the trends stable, improving or worsening?
- Is the reported surveillance information representative enough of the reporting site's catchment area? Out of all the sites that should report, what proportion has actually reported?
- How timely were the data received from the reporting sites?
- Do I need to contact the reporting site to ask for additional information?

Each site that collects or receives data should prepare and follow an analysis plan for analyzing routine surveillance information.

Weekly, using the line lists, the DSO and CSO should undertake analysis of the data collected from healthcare facilities and districts respectively, in order to detect potential outbreaks early. It should include verification of the quality of the data coming from the reporting sites and the completeness and timeliness of these reports. In addition, after an initial suspect case has been detected the weekly data analysis should highlight possible high-risk groups with regard to location of the case, age group, sex and common exposures (including social events like funerals or weddings; occupational exposures including animal slaughter; and eating bush meat or drinking contaminated water). See **Section 3** for more details on analysis.

For further details on analysis of investigation findings see **Section 4**.

Thresholds for Public Health Action

Determine if thresholds for action have been reached. When analyzing and interpreting data, thresholds are critical points that indicate when something should happen or change. They help surveillance and program managers to answer the question, “When should I take action, and what will that action be?” In IDSR there are two types of thresholds: an alert threshold and an action threshold. Thresholds for alerts and epidemics for epidemic prone diseases, conditions or events are shown in **Annex 1A**.

The alert and epidemic thresholds are determined by trained health care workers. An **alert threshold** suggests that further investigation is needed. Depending on the public health event, an alert threshold is reached when the following are reported in a district in a week: (as listed in **Annex 1A**)

- One suspected/unconfirmed case of acute flaccid paralysis, cholera, human rabies, measles, Lassa fever, VHF, Yellow fever
- Two suspected/unconfirmed cases of meningitis
- Five suspected/unconfirmed cases of acute bloody diarrhea
- One confirmed case of maternal or neonatal death
- Cluster of unexplained deaths or unusual health events
- When there is an unexplained increase seen over a period of time for those diseases under monthly reporting

The OIC/SFP responds to an alert threshold by:

- Immediately reporting the suspected case or public health event to the next higher level (DSO)
- Completing the IDSR Alert Notification and Lab Sample Submission Form
- Requesting laboratory confirmation to see if the suspected case is one that fits a case definition

The DSO together with the OIC/SFP will:

- Verify and validate the suspect case alert
- Alert the appropriate disease-specific program manager and CSO to a potential problem
- Consider whether the rapid response team needs to be activated
- Use the specific case investigation form to investigate the case or condition
- Undertake active case search in the community and health facility
- Be more alert to new data and the resulting trends in the disease or condition
- Review data from the past

An **action/epidemic threshold** triggers a definite response. It marks the specific data or investigation finding that signals an action beyond confirming or clarifying the problem. *Action thresholds for specific diseases/events are listed in **Annex 1A**.*

Possible actions include:

- Continuing response activities implemented during the alert phase
- Communicating laboratory confirmation to affected health centers
- Activating rapid response team as required
- Implementing response actions such as
- Immunizing susceptible populations
- Conducting community awareness campaign
- Improving infection prevention and control measures

See **Section 4-6** for more details on response actions.

Drawing Conclusions from the Analysis

Regular reporting provides data that can be analyzed to show strong evidence that can be used to support public health actions or programs. After the data has been analyzed,

Review the updated charts, tables, graphs and maps to make sure that the total number of cases and deaths (including case fatality rate) under surveillance is accurate and up-to-date and the geographical distribution of these is described

Compare the current situation with previous months, seasons and years to observe the trend and determine whether the number of cases, deaths and case fatality rate for any given disease is stable, increasing or decreasing

Summarize the analysis results but consider that increases and decreases may be due to factors other than a true increase or decrease in the number of cases and deaths being observed and deaths are most likely to be detected for those cases hospitalized. Consider other factors which may affect reporting, including:

- Has there been a change in the number of health facilities reporting information?
- 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)?

Compare the month's achievement towards disease reduction targets. There may be targets for individual health facilities, for communities and for the county as a whole. Collaborate with the managers of the public health activity programs to discuss progress towards the targets based on the analysis results. If analysis results indicate that the program strategy is not leading to a change or an increase in the number of cases being detected and treated, then discuss ways to improve the situation.

Summarize the results to improve public health actions and share your conclusions and reports. Make statements that describe the conclusions you have drawn from the analysis results. Use them to take action to:

- Conduct an investigation to find out where there is an increase in the number of cases.
- Collaborate with specific disease reduction programs to intensify surveillance if an alert threshold has been crossed.
- Advocate 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.

SECTION 4: INVESTIGATE A SUSPECTED OUTBREAK OR OTHER PUBLIC HEALTH EVENT OF CONCERN

This section describes:

- Identify a suspected outbreak or other public health event.
- Verify reported information and decide to investigate.
- Prepare to conduct an investigation.
- Investigate a suspected outbreak or other public health event.
- Analyze the investigation results to determine what caused the event.
- Record outbreaks, public health events and rumors.

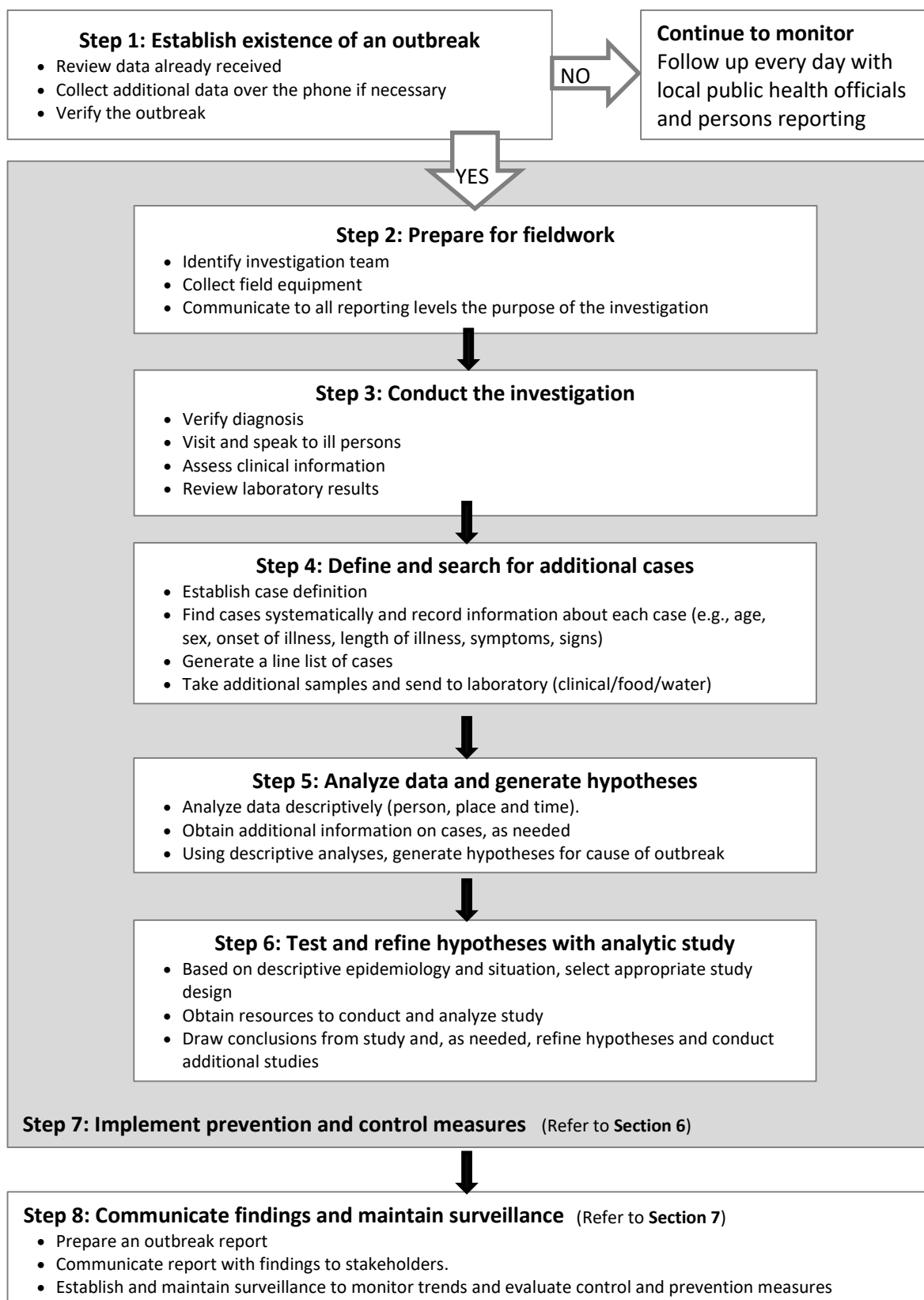
The results of the investigation of a suspected outbreak or other public health event leads to the identification and assessment of people who have been exposed to the infectious disease or affected by an unusual health event. The investigation team gathers relevant information for taking immediate action to prevent further morbidity and mortality and for improving long-term disease prevention activities. The steps for conducting an investigation of a suspected outbreak due to an infectious disease can also be used to investigate other public health problems such as when an increase in chronic or non-communicable disease (e.g. maternal death) is detected. This information characterizes the outbreak and provides evidence for the appropriate response. Investigating the factors associated with a health event is an ongoing process that continues during the response to refine and evaluate the public health activities.

The purpose of an investigation is to:

- verify the outbreak report of the public health event and risk,
- identify additional cases that have not been reported or recognized,
- collect information and laboratory specimens for confirming the diagnosis,
- identify the source of infection or cause of the outbreak,
- describe how the disease is transmitted and the populations at risk, and
- select appropriate response activities to control the outbreak or the public health event.

Following is a list of the steps in responding to a suspected outbreak or other public health event. **Section 5** will further discuss preparation activities and **Section 6** will provide an overview of response activities.

FIGURE 2: STEPS FOR INVESTIGATING AND RESPONDING TO AN OUTBREAK



Step 1: Establish the Existence of an Outbreak or Event

Investigation into a suspected outbreak or public health event is initiated when the alert threshold level for the epidemic prone diseases or event has been met at district level (see **Annex 1A**). The majority of epidemic prone diseases in Liberia require immediate investigation after a single suspected case due to the potential for rapid transmission or high case fatality rates. District health teams should aim to investigate suspected outbreaks and events within 48 hours of notification. The decision to investigate a reported event should be made by the DHO after discussions with the team.

Events that may initiate an investigation include:

- A report is received from a HCF of a patient meeting the suspected case definition for a immediately reportable disease or event.
- Alert or epidemic thresholds have been reached or passed for a specific epidemic prone disease.
- An unusual event that may affect the population's health and/or a situation that has never occurred in that area. Examples of unusual events include:
 - A group of people are sick with similar symptoms in one place (village, school, or HCF) at the same time.
 - A group of people are sick or have another unusual reaction after consuming the same food or drinking from the same water source.
 - Any person is sick with symptoms who have not been seen before or not been seen for a long time (e.g. an emerging infectious disease is suspected).
 - Community members are sick at the same time that animals are sick or die in their community.
 - Any cluster of death: two or more people die of unknown cause after suffering from similar symptoms in one place (e.g., community, school, or HCF) at the same time.

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 CHV) who reports a cluster of patients with a certain disease at their HCF or in the community.
- A community leader or CHV who notices an unusual health event in their community and reports it to the authorities and is verified.

To establish that an outbreak or event is occurring verify the information obtained. Not every report of a possible outbreak or unusual event will turn out to be real. Each level of the public health system is responsible to verify the information that is reported to them by lower levels.

Reporting and verifying cases and events in IDSR is shown in **Annex B**.

For every reported suspected case it is very important that the DSO or surveillance focal person promptly verifies (follow ups and confirms) to decide if further action is required and to provide feedback to the source of the report.

To verify the information and to help decide whether to investigate the DSO/CSO will review the data already received, including:

After taking these factors into consideration, the decision about the urgency of the situation is determined. Either the situation is treated as an outbreak and further action is planned, or the

- The source of information (for example, is the source of the rumor reliable? Is the report from a HCF or community member?)
- The severity of the reported illness and use of standard case definition for reporting
- Number of reported cases and deaths
- The age and gender of reported cases or deaths
- Reported preliminary clinical and epidemiological data available on initial case or cases (symptoms, travel and exposure history)
- Alert thresholds for priority diseases, conditions and events
- Information on whether the event limited to one area in the district
- Political and geographic considerations
- Available resources

situation will be closely monitored for any change and reassessed if there is any change. If the information is found to be correct further steps must be taken to stop the spread of disease. If it is determined an outbreak is not occurring, a short report should be written and submitted to the reporting HCF and to higher levels. Also, the situation should be monitored closely for future response as necessary.

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

Once the report has been received and at any point in the investigation consider whether the situation should be declared a public health event of international concern (PHEIC) using the IHR decision instrument as described in **Annex 2A**.

Step 2: Prepare to Conduct an Investigation and Fieldwork

Mobilize the investigation team and make arrangements for investigating the report. The composition of the team will vary depending on the suspected outbreak. The outbreak or rapid response team members to include are described in **Section 6**. With the team, define the objectives of the investigation so that the essential information will be gathered for implementing the most appropriate and relevant response. Include standard methods that are relevant to the disease or condition being investigated (for example, collecting the correct laboratory specimen). Figure 2 in this section gives an overview of the steps for investigating an outbreak or other public health event.

Preparations for the field investigation include:

Make sure to notify other levels in the health system that the investigation team is being deployed and the reason for deployment. This will involve informing local authorities of the investigation and to obtain any required authorizations.

Request assistance for logistic support and to mobilize local resources for the investigation. Work with local health workers and key community contacts to ensure access to the local community and the participation of a respected local spokesperson for communication. These local personnel can make sure the investigation begins in the most affected place and facilitates the engagement of the community.

In addition specify the roles for health workers and local staff in the area. Request that they assist by providing the following types of support:

- Establish clear roles for each team member, including who will manage the investigation and be responsible for the investigation report.
- Periodically review and update immunization status of members of the outbreak investigation or rapid response team and availability of personal protective equipment (PPE) for investigation
- Ensure appropriate supplies are available to prepare standard disinfectant solutions as detailed in **Annex 6B**.
- Develop a plan for PPE based on the suspected cause of illness and the modes of transmission. Ensure adequate supplies for the investigation team.
- Describe the lines of supervision and communication.
- Review information already known about the suspected illness including its mode of transmission, severity and potential risk factors
- Finalize forms and methods for collecting information. Select those variables needed to identify, record, and analyze the disease being investigated.
- Ensure appropriate supplies for specimen collection and specimen transport.
- Establish an initial investigation plan that is flexible to address the priority questions. For example, objectives of the investigation may be:
 - To determine the size of the outbreak
 - To interview cases about their clinical symptoms and their exposures, including a travel history
 - To investigate what exposure may be responsible for the outbreak
 - To take samples from cases to determine what infectious agent is responsible for the outbreak
 - To take environmental samples to help determine the source of the outbreak
 - To provide health education and other control measures to prevent further morbidity and mortality from the outbreak
- provide information on suspected outbreak area and local health risks,
- lead investigation team to the area and introduce them to local leaders,
- participate in active case searching in the community and add new cases to the line list.
- assist in specimen collection
- support the team in health education and activities
- support infection prevention and control activities to contain spread of infectious agent.

Prepare a checklist for activities that should be conducted in the field. For example:

Activity	Completed/Comments
Review clinical and laboratory findings (with ill persons and health care workers)	
Complete case investigation form for all suspected cases	
Add each suspected case to the line list of the outbreak	
Active case finding in health care facilities and nearby villages	
Appropriate clinical samples have been taken from suspected cases& labeled	
Appropriate treatment / clinical management provided	
Appropriate control measures advised and started	
Appropriate community education and advice has been left with Village Head and Village Health Volunteer for what to do with ill persons and how to try and prevent new cases	
Village Head and Village Health Volunteer have been given instructions on daily reporting until the outbreak is over	
Establish psychosocial factors contributing to outbreak and challenging response	

Step 3: Conduct the Investigation

Use standard precautions with all patients in the healthcare facility, especially during an outbreak of a disease transmitted by contact with contaminated supplies and body fluids.

Review the clinical history and epidemiology. Using risk appropriate PPE, visit and speak to ill persons. Conduct a physical examination to confirm that their signs and symptoms meet the case definition. Collect information about the cases and risk factors by asking the patient or a family member who can speak for the patient. Ensure you ask them:

- Where do you live?
- When did the symptoms begin?
- Who else is sick in your home, school, workplace, village, and neighborhood?
- What is your travel history in past few months?
- Where have you been living during the past 3 weeks prior to the onset of symptoms (residence at time of infection)?
- Have you been in contact with sick or dead poultry or birds or animals recently (for zoonosis)?
- What vaccines have you received recently (is there a card to verify)?
- Additional disease specific questions as required. For example, have you attended a funeral recently? Where do you collect your water?

Collect laboratory specimens and obtain laboratory results to confirm the diagnosis

If the disease can be confirmed by laboratory testing ensure specimens have been collected, appropriately packaged and transported for testing (specimen collector should wear risk appropriate PPE).

Review laboratory results with the investigation team, clinicians, and laboratory persons at the health facility; are the laboratory results consistent with the clinical findings?

Isolate and treat initial cases

As indicated by the disease-specific management guidelines, strengthen infection control measures (including isolation of patients if indicated) and active case management where the patients are being treated. Provide the health facility with advice, support, and IPC supplies if required.

Isolation is a critical step in limiting spread of disease and keeping healthcare facilities open and healthcare workers available. Early determination of whether isolation is needed and what level of protection is required is an essential step in ensuring this. Depending on the suspected disease immediate isolation may be required to protect staff, patients, and community members.

Step 4: Search for additional cases, contacts and deaths

In health facilities records

In the healthcare 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. See **Annex 4A** for details about how to conduct a register review.

In the community

Identify areas of likely risk where the patients may have lived, worked, or travelled. Also talk to other informants in the community such as pharmacists, schoolteachers, trained traditional midwives, livestock and wildlife officers (to know about the animal health situation and involve them in the investigation and response, if appropriate), farmers, traditional healers, religious leaders 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 analysis. 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 or if anyone has recently died. Find out if anyone else in the area around the case has been ill with signs or symptoms that meet the case definition.

Record information about the additional cases

- Complete the case investigation form for any new cases and record the details on the line list (**Annex 11G**)
- List any contacts on the contact listing form and ensure they are monitored daily for the required time for signs and symptoms of the disease

Step 5: Analyze data about the outbreak and generate hypotheses

The methods for analyzing outbreak data are similar to how the analysis of routine surveillance data is described in **Section 3**. Data about the outbreak is analyzed and reanalyzed many times during the course of an 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, for example, a well or a funeral), and the persons at risk of becoming ill (for example, young children, refugees, persons living in rural areas, and so on). Present the data in the following way (refer to the steps in **Annex 3**):

- Draw a histogram representing the course of the disease (an Epi curve) .
- Plot the cases on a spot map.
- Make tables of the most relevant characteristics for cases (for example, comparing age group with vaccination status, sex ratio).
- Calculate case fatality rates.
- Calculate attack rates.

During an outbreak, these 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.

Interpret analysis results

Review the analysis results and make conclusions about the outbreak. For example:

For a review of basic analysis and descriptive epidemiology refer to **Annex 3A**. To analysing data from an investigation give special emphasis to the following:

Time analysis:

Place analysis use the map to:

- What was the causal agent of the outbreak?
- What was the source of infection?
- What was the transmission pattern?
- What control measures were implemented and to what effect?
- What is the population affected and what is the risk?
- What are the possible sources of infection, mode of transmission, attack rate, case fatality rate and possible risk factors?
- Have any measures already been initiated to contain the outbreak?
 - 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 flat 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.
 - Describe the geographic extent of the problem and identify high-risk areas.
 - 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.

Person analysis:

Information developed 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 measles affects children under 15, but mortality is highest in children under age 2, an immunization response might just target the younger children (considering other factors such as vaccine supply and extent of outbreak).

Step 6: Test and refine hypotheses with an analytic study

Based on the findings from the descriptive epidemiology the County or National epidemiologists will help determine the type of analytic to undertake.

After reviewing the analysis and additional information and data gathered, formulate conclusions and recommendations about the outbreak or event. Consider recommendations, including

- interventions for controlling the situation,
- necessary further investigation/studies.
- additional resources required

Step 7: Implement Prevention and Control Measures

See **Section 6** about response measures for the prevention and control of outbreaks and events.

Step 8: Communicate Findings, Document and Report the Outbreak Investigation, and maintain surveillance

All reported outbreaks that are verified, should be recorded in an outbreak log to track and ensure that action has been taken.

At the end of the outbreak a report on the investigation should be completed and distributed to the HCF involved, DHTs, CHT and National level for information. The investigator should keep the report as a reference in case a similar event occurs to provide lessons learned (see **Section 7**).

SECTION 5: PREPAREDNESS: PREPARE TO RESPOND TO OUTBREAKS AND OTHER PUBLIC HEALTH EVENTS

This section describes:

- Structure of the epidemic preparedness and response committee.
- Supporting the epidemic preparedness and response plans.
- Supplies necessary for emergency response and investigations.
- Establishing a rapid response team (RRT).
- Risk mapping for outbreaks and other public health events.

A public health emergency such as an outbreak of an epidemic prone disease or public health event calls for an immediate and appropriately scaled response. Being prepared to detect and respond to such an event is an essential role of the local and national public health system.

This section describes steps for organizing the preparedness activities. The IDSR surveillance matrix (**Table 2**) shows the roles undertaken at all levels of the health system in Liberia with regard to the IDSR focus area of “Prepare”. These are the roles that are allocated in the EPR Plan at any level.

County Epidemic Preparedness and Response (EPR) 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 5A** 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 5A**.

Epidemic Preparedness and Response Plan

The National Epidemic Preparedness and Response (EPR) Plan for Liberia was finalized in April 2016 and will be updated annually. 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 rapid response team 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:

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

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

Supplies Necessary for Emergency Response and Investigations

Outbreaks and other public health emergencies require the rapid mobilization of resources including personal protective equipment, vaccines, medicines, lab reagents and supplies, and appropriate forms for reporting. These materials and supplies should be stockpiled onsite by the county health team 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.

Consider:

- Case investigation and contact tracing forms
- Laboratory supplies
- Case management (treatment options) and field intervention materials including Personal protective equipment and disinfection equipment
- Prophylaxis and other logistics supplies
- Make an inventory and note the quantity of each item that is available.
- Observe expiry dates and practice best logistical practices for packing, shipping, storing and disposing of supplies and materials.
- 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 5B contains a checklist of supplies for responding to epidemics.

Establishing a Rapid Response Team

The Rapid Response Team (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**.

Before leaving for the field it is important to prepare an outbreak plan specific to the situation. Refer to **Section 4** for more details. The RRT can be activated at district or county level. The DHO/CHO will make the decision to deploy the RRT following verification of the reported event. The roles of the RRT are to:

- Investigate and verify rumors and reported outbreaks and other public health events
- Propose and initiate appropriate strategies and control measures in the event of an outbreak
- Establish appropriate and coordinated risk communications messaging system through a trained spokesperson
- Coordinate rapid response actions with partners and other agencies (including lab testing)
- Conduct ongoing monitoring and evaluation of effectiveness of control measures through continuous epidemiological analysis of event
- Prepare detailed investigation reports
- 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

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

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

- Coordination – Team Lead
- Surveillance and epidemiology
- Including data management
- Case management, including Infection Prevention and Control (IPC)
- Implemented at HCF level by OIC
- Overall coordination of case management activities by DHO if needed
- Laboratory
- Environmental Health, including WASH and 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.
- Veterinary/Live Stock Officers
- Health promotion/Social Mobilization
- Psychosocial Support (PSS)
- Logistics

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.

SECTION 6: RESPOND TO OUTBREAKS AND OTHER PUBLIC HEALTH EVENTS

This section describes:

- declaring an outbreak and convening incident management system,
- mobilizing response teams for immediate action,
- implementing response activities,
- outbreak reporting, and
- documenting the response.

The goal of IDSR is to use data for public health action. When an outbreak, acute public health event or condition is verified, an investigation will take place to determine the cause of the problem and prevent spread of the illness or further morbidity and mortality. (**Section 4**). 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 as indicated. Successful responses are carried out with community involvement and often include a community education and behavior change component. Rarely will a RRT be needed to 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 District or County Health team may decide to initiate a response to stop the transmission of a potentially epidemic disease in to order reduce morbidity and save lives

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.

This section describes steps for conducting a public health response and provides general directions for immediate response actions for leading causes of illness, death, and disability. Refer to **Annex 9** 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 National Emergency Preparedness and Response Plan 2016 from Liberian MOH.

Declaring an Outbreak and Convening the Incident Management System

When an alert threshold is reached at county level the national DPC/EPR focal person is notified. If the following criteria are met a national response will be activated:

- Significant number of people at risk as defined by MOH and WHO
- Once the disease specific action threshold is reached
- Response coordination required exceeds county capacity; an outbreak which is widespread (e.g. impacts multiple counties, cross borders, etc.)
- Resource coordination required exceeds county capacity
- A county requests national assistance
- Declaration of a state of emergency

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

- Number of cases (single versus cluster outbreak)
- Potential impact of the illness on the population
- Geographic location (2 or more counties, cross border, etc.)
- 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 action threshold of a disease is reached the county will immediately inform the national DPC/EPR focal person, 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 potentially carriers/survivors. For high risk and outbreak scenarios refer to National Epidemic Preparedness and Response plan (EPR) 2016.

The CHO will determine if an outbreak is declared. When an outbreak is declared the established County or National EPR teams are 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.

Depend on the event the national level in collaboration with the County will assess whether the event is a potential public health event of international concern (PHEIC) using the International Health Regulations (IHR) decision instrument (**Annex 2A**). Alert nearby counties about the outbreak. If they are reporting a similar outbreak, coordinate response efforts with them.

If the decision is made to activate a RRT:

Mobilizing Rapid Response Teams for Immediate Action

The County and District RRTs have already been identified during preparedness activities. The County or District Health Officer determines when to mobilize a rapid response team (RRT) and will ensure that the membership of the team is tailored to the context, based on the initial investigation of the event. Refer to **Section 5** of these guidelines for recommendations on the composition of the rapid response team and the team's roles and responsibilities.

- Provide orientation or training along with relevant supplies for the county RRT and healthcare facility 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
- Assign clear responsibilities to individuals or teams for specific response activities.
- Mobilize logistics support (travel of RRT, accommodation arrangement, communication, other essential equipment). If supplies are not available locally:
 - Contact the national level (MOH) to request alternate suppliers
 - Borrow from other services, activities, or non-governmental organizations in your district
 - Identify practical low-cost substitutes

Implementing Response Activities

Implementing a response means carrying out the operational steps to take planned action. Select the appropriate public health response 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 disease, 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. More detail is provided to support an escalated response in the National Epidemic Preparedness and Response Plan (2016).

The selected response activities that are common when responding to outbreaks or public health events include:

- Strengthen case management and infection control measures.
- Provide training and update health staff skills
- Enhance surveillance during the response
- Engage with community leaders and inform and educate the community to ensure a dialogue about events, fears, and actions associated with the outbreak
- Conduct a mass or targeted vaccination campaign
- Ensure access to safe water
- Ensure safe disposal of infectious waste
- Improve food handling practices
- Reduce exposures to environmental hazards
- Ensure safe and dignified burial and handling of dead bodies

Each of these response activities are detailed in **Annex 6A**.

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:

- Partner mapping by their areas of support/operation improves coordination and reduces duplication
- Providing terms of reference and deliverables for all technical assistance or implementing partners assisting the CHT/DHT.

Monitoring the Response to the Outbreak

Monitoring the implementation of the outbreak or event is key for outbreak control. The monitoring results will be important for including in the report of response to supervisory levels, to community leaders and for future advocacy.

For example, make sure there is ongoing monitoring of:

- Disease trends in order to assess the effectiveness of the response measures, the extension of the epidemic and risk factors
- Effectiveness of the response: case fatality rate, incidence
- Implementation of the response: program coverage, meetings of the epidemic management committee etc.
- Availability and use of adequate resources, supplies and equipment
- 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.
- Well-coordinated ambulance system with communication facilities that will have two categories of services: specific for infectious diseases and maternal complications/other conditions.

Providing Regular Feedback on the Outbreak and Events

Periodically, report on progress with the outbreak response through Situational Reports (SitRep). Provide information developed by the IMS to the affected communities and health facilities. In the situation updates, provide information such as:

- Details on the response activities. Include dates, places, and individuals involved in each activity. Also include the Epi curve, spot map, table of person analyses, and the line list of cases
- Any changes that were made since the last report
- Recommended changes to improve epidemic response in the future such as a vaccination strategy to make the vaccination activity more effective or a transporting procedure for laboratory specimens to allow specimens to quickly reach the reference laboratory in good condition.

In addition to the SitRep, throughout the process give regular continuous updates and feedback to HCFs, communities, and districts.

Document the response, including lessons learned and recommended improvements

At the end of the response, the county health team should:

- Collect all the documents including minutes of the meetings, activities, processes, epidemic reports, evaluation reports and other relevant documents.
- Prepare a coversheet listing of all the above documents.
- Document lessons learned and recommended improvements and update county EPR plan in line with these where appropriate

This will become an essential source of data for evaluating the response (**Section 8**).

SECTION 7: COMMUNICATE PUBLIC HEALTH INFORMATION

This section describes communicating public health information to inform media, decision makers and stakeholders and healthcare workers:

- routinely on surveillance activities,
- during a response, and
- after a response.

Effective communication is an essential function of surveillance. Effective communication 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.

Routine Communication

Providing regular feedback aims at reinforcing the participation of the healthcare workers and community in the surveillance system. Feedback includes communicating with health staff from other levels about the data (including any gaps), results of the analysis of these data and measures that were taken to respond to the potential public health event reported. It is important to provide feedback to any health levels that have provided the data for analysis. Feedback may also include providing participating healthcare workers with any outbreak or event response reports for future reference. Feedback may be written, such as information summary sheets, or it may be given orally through a telephone call or periodic meetings. At the community level, communication includes building relationships, communicate and coordination with other community key informants, resource persons and existing formal and informal networks for information dissemination and reporting.

In most cases, health facilities and districts reliably report surveillance data as required. But if the facility does not receive information from the district, county or national on how the data was used or what the data meant, health workers may think that their reporting is not important. As a result, future reporting may not be as reliable because the health workers will not know if the information they submitted to higher levels was important or necessary. They will have a good understanding of the health situation at their own level, but they will not have the information they need for characterizing the situation at a county or national level. The purpose of the feedback is to reinforce health workers' efforts to participate in the surveillance system, to raise awareness about certain diseases and any achievements of disease control and prevention projects in the area.

Develop and disseminate information bulletins

In Liberia, the MoH publishes weekly and quarterly epidemiological bulletins, Health Management Information Systems (HMIS) reports, and annual statistical abstracts. The bulletins and reports provide information on disease patterns and achievement of program objectives in the country. They are usually brief and are important for reaching policy makers, legislators, development partners, program technical staff and stakeholders. As a minimum, they contain:

- A summary table with the number of reported cases and deaths to date for each priority disease
- A commentary or message on a given disease or topic

In addition the county health team should produce monthly epidemiological bulletins with more detailed information pertaining to their county. The county office should display bulletins where everyone can see them and make copies to distribute to health facility staff, for example take copies on the next supervisory visit to show health workers how data they report contributes to public health. **Annex 7B** shows a sample template for preparing a bulletin.

Provide feedback through supported supervisory visits

The MoH carries out supervisory visits every quarter and during these visits, discussions are held with the CHT, DHT, HCF SFP and the individual health workers. They discuss their performance in implementation of health programs including surveillance and feedback can be provided during these visits. In addition the CHT should be conducting regular supervisory visits to all DHTs and HCF.

During the Response

Communication during and after a response is referred to as **risk communication**.

Risk communication is a tool to achieve control of the outbreak or situation as quickly as possible and with as little social disruption as possible.

The National Risk Communication Plan approved in June 2016 should be referred to for guiding principles, objectives, and proposed interventions.

During the response, communicate with the affected communities, population at risk, community leaders and other stakeholders to inform, guide actions and update all those involved on progress of the response.

Coordinate communication

Outbreaks usually create fear in the community. Involvement of several different stakeholders sometimes leads to uncoordinated and duplication of effort. Provision of timely and accurate information through a well-coordinated mechanism is important (who says what and when). The IMS or coordinating group may take responsibility for ensuring communications are consistent and reflect the data that has been analyzed. Ensure the focus of the communication activities are transparent and accurate, and take into account community experiences and expectations regarding the outbreak.

Proper coordination of epidemic responses requires clear and open methods of communication that will reach the intended target audience. These may include:

- Electronic media
- Radio, television, SMS, telephone, fax and e-mail
- Print media e.g. Newspapers
- Information, Education and Communication (IEC) materials, bulletins, and letters

Communicate with the affected community

Providing correct information to the community during a response is crucial. Outbreaks are frequently marked by uncertainty, confusion and a sense of urgency. Information that should be communicated to the community includes but is not limited to: signs and symptoms of the disease; how it is transmitted; what to do to prevent infection; what to do if signs and symptoms occur.

Best practices for health promotion and communication to the community are:

- **Establish** trust from the beginning of the outbreak. Trust-building measures such as acknowledging uncertainty, avoiding excessive reassurance should be endorsed by all involved persons (senior managers, RRT members, communicators, etc.)
- **Announce the outbreak early.** In today's world, information about an outbreak is almost impossible to keep hidden from the public. It is best to announce as early as possible after contacting important partners. However, it is important to acknowledge that early information may change as situation develops or is verified.
- **Be transparent.** Information on the different steps involved in an outbreak response and the decisions made should be communicated to the public in a way that is easily understood, complete and factually accurate.
- **Know and understand the public.** It is the job of the communicator to understand the public's belief, opinion and knowledge about specific diseases/risks.
- **Plan in advance.** Involve the Health Promotion Officer at district or county level who is familiar with the National Risk Communication Plan and is part of coordination.

Effective communication results in greater public trust and resilience and participation to support the rapid containment of an outbreak.

Media

It is important to provide appropriate information to the media and involve them as a partner in disseminating accurate information. The Health Promotion Officer (HPO) in the CHT or DHT will coordinate with National level to provide up to date materials (such as fact sheets) for distribution to media. The HPO at county or district level works with national level and partners to ensure consistent, accurate and appropriate updates are provided to the media. Also, media will enable the dissemination of messages on radio or other appropriate means.

Media kits are being developed which would include fact sheets and community messages about the priority diseases and events. CEBS messages and job aids are meant to be used at community level. See **Annex 7B** for more information.

Stakeholders

An information summary is a short report that presents data and its interpretation in a table or other graphic formats in a simple manner. They can be used to give stakeholders a quick understanding of the outbreak response. Summary sheets can be used to support requests made to higher levels for additional funds, supplies and resources.

Healthcare workers

Providing regular feedback aims at reinforcing the participation of the healthcare workers in the surveillance system. Feedback includes communicating with health staff from other levels about the data (including any gaps), results of the analysis of these data and measures that were taken to respond to the potential public health event reported. It is important to provide feedback to any health levels that have provided the data for analysis. Feedback may also include providing participating healthcare workers with any outbreak or event response reports for future reference.

Distribution of Information, Education and Communication (IEC) materials

IEC materials are developed by the Health Promotion Unit at MOH and distributed to counties who will share them with HCFs and communities as required. Fact sheets can guide and inform the general public about the cause and management of the outbreak. Fact sheets are brief summaries of 1 to 2 pages and deal with a single topic or message related to the response in language appropriate to the audience. See **Annex 7A** for further information and a fact sheet template.

After the Response

Prepare a report to document the actions taken

After an outbreak or event response has taken place, county or district staff who led the investigation should prepare a report. The purpose of the report is to document how the outbreak was identified, investigated, responded to, what the outcomes were, what decision were taken and to make recommendations in order to improve future responses. The report can be circulated within the MOH at the national level, within CHTs, DHTs, and to any HCF that participated in the response, as well as any non-government agencies involved in the response. See **Annex 7C** for an example of a recommended format.

SECTION 8: MONITOR, EVALUATE, AND IMPROVE SURVEILLANCE AND RESPONSE

This section describes:

- Monitor the quality of surveillance activities.
- Supervise surveillance and response activities.
- Evaluate the surveillance and response system.
- Take action to improve the surveillance and response system.

Monitoring surveillance and response systems is important for tracking progress and finding out whether the goals of the program are being met. Monitoring involves ensuring systematic collection of valid, routine data that have been identified for program monitoring purposes. Monitoring in IDSR includes the routine and continuous tracking of the implementation of planned surveillance activities (for example making sure reports are received on time). Monitoring takes place regularly, for example weekly, monthly, or quarterly. In this way, problems can be detected in time to make improvements before the next regular monitoring takes place.

Evaluation assesses whether surveillance and response activities have contributed to the achievement of the targets. By evaluating surveillance programme regularly, for example at the end of each implementation cycle, supervisors can see if surveillance and response targets have been achieved through programme activities and if they are of high quality, they can also compare results to the previous evaluation undertaken.

The results from monitoring and evaluation are used to improve surveillance and response activities.

In order to monitor and evaluate surveillance and response activities the following should be addressed:

- Identify key activities and targets
- Identify indicators for routine collection that will be measured if key targets are met
- Monitor performance of IDSR system through systematic collection of specific program activity data
- Evaluate surveillance system through periodic assessment
- Supervise surveillance and response activities
- Analyze data to monitor and evaluate performance of IDSR system
- Report results
- Take action to improve surveillance and response activities

Identify Key Targets

Targets should be used in accordance with national goals and specific plans for improving IDSR activities at county or district level. **Annex 8A** provides details about recommended indicators and targets (including how to calculate them) for epidemic preparedness, case identification, data analysis and epidemic response.

Identify Indicators for Routine Collection

In order to monitor if targets are met, indicators that are measurable must be identified. These are data elements that are collected regularly and can be used in analysis. These data can be used to calculate if targets have been met (**Annex 8A**).

Using indicators is a method for measuring the extent of achievement for a particular activity. The achievement can then be compared to previous results and to desired or key targets. The data you need for the indicators must be available or be able to be collected.

Monitor the Quality of the Surveillance Activities at District and County Levels

An important indicator of a quality reporting system is the **timeliness** and **completeness** at each level. Timeliness of reporting refers to the proportion of expected reports received by a pre-defined specified time. When reports are sent and received on time, the possibility of detecting a problem and conducting a prompt and effective response is greater. If reports are late, or are not submitted, the aggregated information for the county (or other area) will not be accurate. Completeness of reporting describes whether all the reporting units (HCF, district or county) have reported as expected. These are both important indicators to ensure outbreaks do not go undetected, and other opportunities to respond to public health problems are not missed.

Monitoring may include:

- the detection and notification of epidemic prone diseases and events.
- the timeliness and completeness of immediate, weekly, and monthly reporting.
- identifying problems and taking action to improve the system.

When routine reports on the number of cases are sent to the county or national level, also send the necessary data for timeliness and completeness. This will help the other levels understand the situation more clearly and evaluate the quality of the data that is being sent.

Supervise Surveillance and Response Activities

- Review tasks for surveillance staff
- Prepare a supervision plan (**Annex 8B**)
- Use a supervisory checklist (**Annex 8C-H**)
- Conduct supervisory visits and consider
- Appropriate supplies and required standard case definitions/ guidelines are available
- HCWs know how to identify and use standard case definitions to record suspected cases of priority diseases seen in their healthcare facility
- Priority diseases are recorded in the case register according to the case definition
- The IDSR weekly ledger is correctly completed
- Data is analyzed in the health facility to identify thresholds to take action for epidemic prone diseases Reported 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
- Write a report of the supervisory visit
- Use supervisory visits to improve surveillance activities

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:

- Patient Load e.g. high, medium or low
- Accessibility e.g. whether hard to reach or not
- 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:

- High priority – weekly supervision
- Medium priority – bi-weekly supervision
- 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.

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:

- Were the surveillance reports complete, on time and accurate?
- What were significant changes in disease or event trends during the year? If an increase occurred, was the problem identified?
- If additional cases are still occurring, why are they occurring? Where are they occurring?
- Were appropriate and timely actions taken in response to the surveillance data?
- Were supervisory visits conducted as planned and follow up tasks carried out as planned?
- Did the community feel that response activities were successful?
- Were any actions taken to address health staff requests or suggestions about services or surveillance?
- 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:

- State the objectives and corresponding activity
- Specify the personnel who will carry out the activity
- Estimate the cost of the activity (if any)
- Develop a timetable for the activity and define the sequence of activities in logical order
- Specify the logistics for the new activity (equipment, personnel, transportation, resource allocation)

Provide Evaluation Feedback to All Levels of the Surveillance System

Provide a report and give feedback to health facilities and other stakeholders in the county about the results of the evaluation activity.

The report should include:

- The objectives for the reporting period (quarter or year)
- What was actually achieved
- What may be reasons for any differences between what was planned and what was achieved
- Recommended solutions and prioritized activities for improving surveillance and response

SECTION 9: SUMMARY GUIDELINES FOR EPIDEMIC PRONE DISEASES, CONDITIONS AND EVENTS

This section provides guidance to:

- support action to respond to alert and epidemic thresholds for specific diseases;
- identify surveillance goals and objectives for each epidemic prone disease, condition or event; and
- identify surveillance data to analyze and interpret for each epidemic prone disease, condition or event.

For each epidemic prone disease, condition or event identified for action in Liberia, guidelines for surveillance and response activities are provided in **Annex 9**. Below is an explanation of how the information is organized for each disease, condition or event in that Annex.

Surveillance and response guidelines: <disease or event>	
Background	Background of disease or details of public health event of concern <ul style="list-style-type: none"> • 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 is a priority disease for surveillance. For example, the disease is responsible for a high number of deaths, disability and illness, especially in African countries • General and specific risk factors in African countries • Additional background information that might serve the county and district teams
Surveillance goals	Use of surveillance information for action for this specific disease <ul style="list-style-type: none"> • Interventions • Contact tracing
Standard case definition	Standard case definition Standard case definitions are provided for suspected cases, probable cases and confirmed cases.
Alert and Action threshold	Alert thresholds and public health action <ul style="list-style-type: none"> • As discussed in Section 3, there are thresholds for public health action for each of the priority diseases, conditions and events. There are two types of thresholds: alert and epidemic. • 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 public health action. • 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.

Analyze and interpret data	This section contains generic information about the minimum data elements to collect, analyze and interpret. The key points to consider for interpreting the data and specific elements for analysis are also stated (time, place, and person). Suggestions for graphs and analysis.
Laboratory confirmation	Diagnostic test, specimen to be collected, storing the specimen and when results can be expected. Guidelines on laboratory confirmation are provided including: relevant diagnostic test, how to collect, store and transport the specimens needed for lab 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.

ANNEXES

Annex A: Reportable Diseases, Conditions, and Events, Liberia 2016

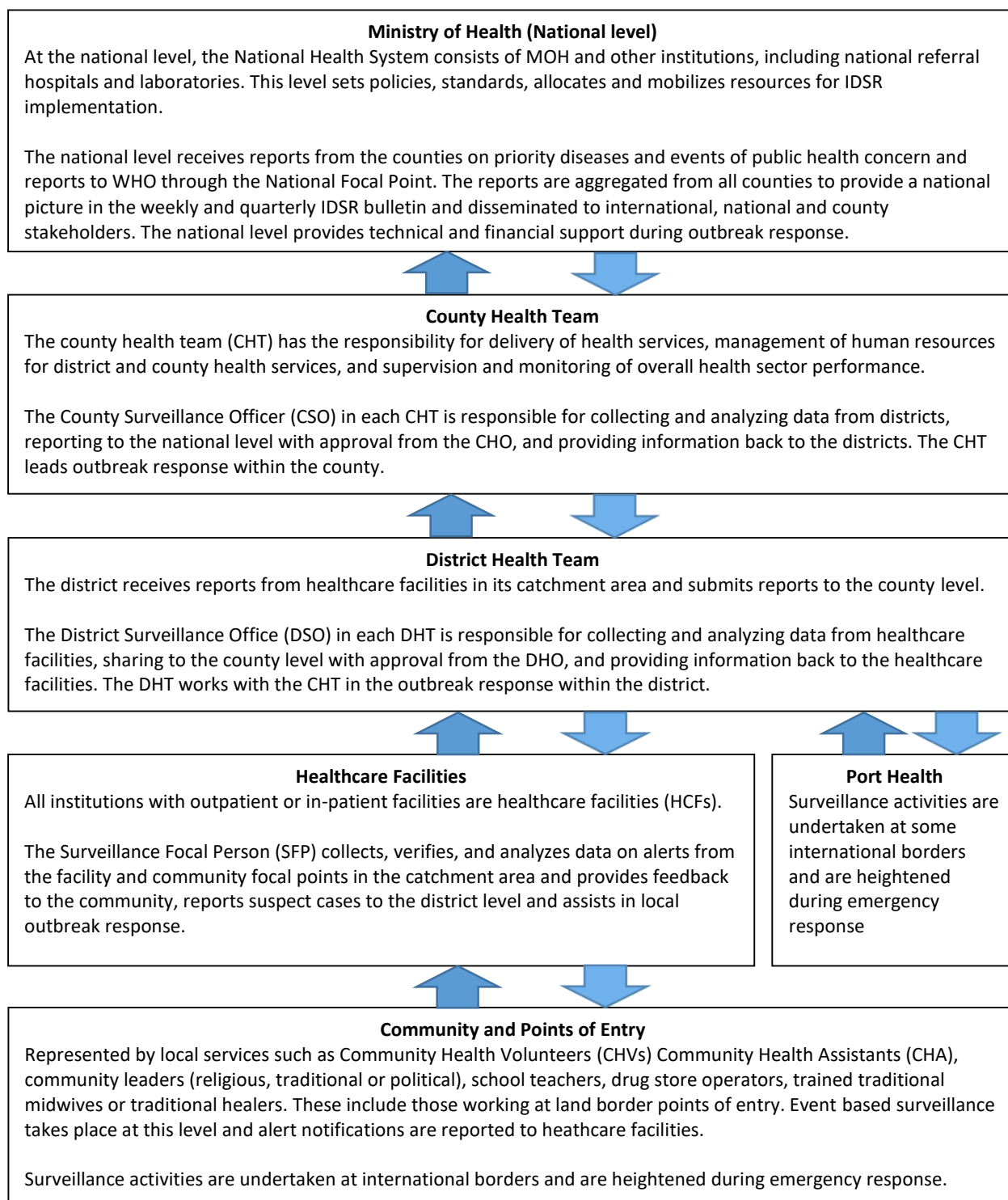
TABLE 1. PRIORITY REPORTABLE DISEASES, CONDITIONS AND EVENTS, LIBERIA, 2016

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

Note: Disease specific summary pages are available in **Annex 9** of this guide.

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

Annex B: IDSR Flow of Information at Each Level of Liberia’s Public Health System



* arrows indicate flow of information

Annex C: Events of Potential International Health Concern Requiring Reporting to WHO under the 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, which fall within the scope of the International Health Regulations (2005). There are already existing control programs, which address infectious diseases as well as food and environmental safety and contribute significantly to WHO global alert and response system.

The environmental hazards include but are not limited to chemical, food, ionizing radiation, and non-ionizing radiation. Technical information on these risks can be obtained from various sources.

Areas of interest for the purpose of capacity building of integrated surveillance should include partnerships to address the following:

- Environmental health emergencies including natural events, technological incidents, complex emergencies, deliberate events
- Chemical risks in food including acute and chronic dietary exposure (environmental or intentional pollution)
- Zoonoses including emerging zoonoses and neglected zoonoses

Topics for surveillance on specific risks

Infectious disease hazards

Known, new and unknown infectious disease threats.

Zoonotic events

The emergence and re-emergence of zoonoses and their potentially disastrous effect on human health has made zoonoses a priority issue for veterinarian services.

Food safety events

Food and waterborne diarrheal diseases are leading causes of illness and death in less developed countries, killing approximately 1.8 million people annually, most of whom are children. The identification of the source of an outbreak and its containment are critical to the IHR.

Chemical events

The detection and control of chemical, toxic and environmentally-induced events are critical for the implementation of the IHR.

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 health care facility, while the source of exposure may not yet be 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 D: Required Surveillance and Response Core Capacities as Described in the IHR

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 **Table 2**. 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 E: IHR 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.

Capacities	Indicators
Emergency Response Operations	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 Deployment	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 Rumour 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 1

Annex 1A: Case definitions, Alert Triggers, and Thresholds for Immediately Reportable Diseases, Conditions and Events, Liberia, 2016

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 (<i>Shigellosis</i>)	Any person passing bloody pu-pu or slimy (slippery) pu-pu with stomach pain	A person with diarrhea with visible blood in stool.	5 suspected cases	1 confirmed case
Acute Flaccid Paralysis (Poliomyelitis)	Any person with weakness in the legs and arms and not able to walk	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	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	A person aged 5 years or more with severe dehydration or death from acute watery diarrhea.	1 suspected case	1 confirmed case
Human Rabies	Any person who is bitten by a dog or other animal	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.	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	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	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	

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
Measles	Any person with hot skin (fever), spot-spot (rash), and/or red eyes	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.	1 suspected case	5 or more suspected cases OR 3 or more confirmed cases in a district in a month
Meningitis	Any person with hot skin (fever) and stiff neck.	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.	2 suspected cases	Population ≥30,000: 15 suspected cases per 100,000 per week Population <30,000: 5 suspected cases per week
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	
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 11P)
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	Any person, alive or dead with onset of fever and 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.	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	Any person with acute onset of fever, with jaundice appearing within 14 days of onset of the first symptoms.	1 suspected case	1 confirmed case

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
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

*See IDSR Guidelines **Annex 9** for more details on standard health care facility case definitions.

Annex 1B: Summary of Community Event-Based Surveillance (CEBS)

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 the community level to ensure maximum coordination and cooperation. The goal is 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 Officer in Charge at the health facility (OIC).

Health Care Facility Officer in Charge (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.

CEBS 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

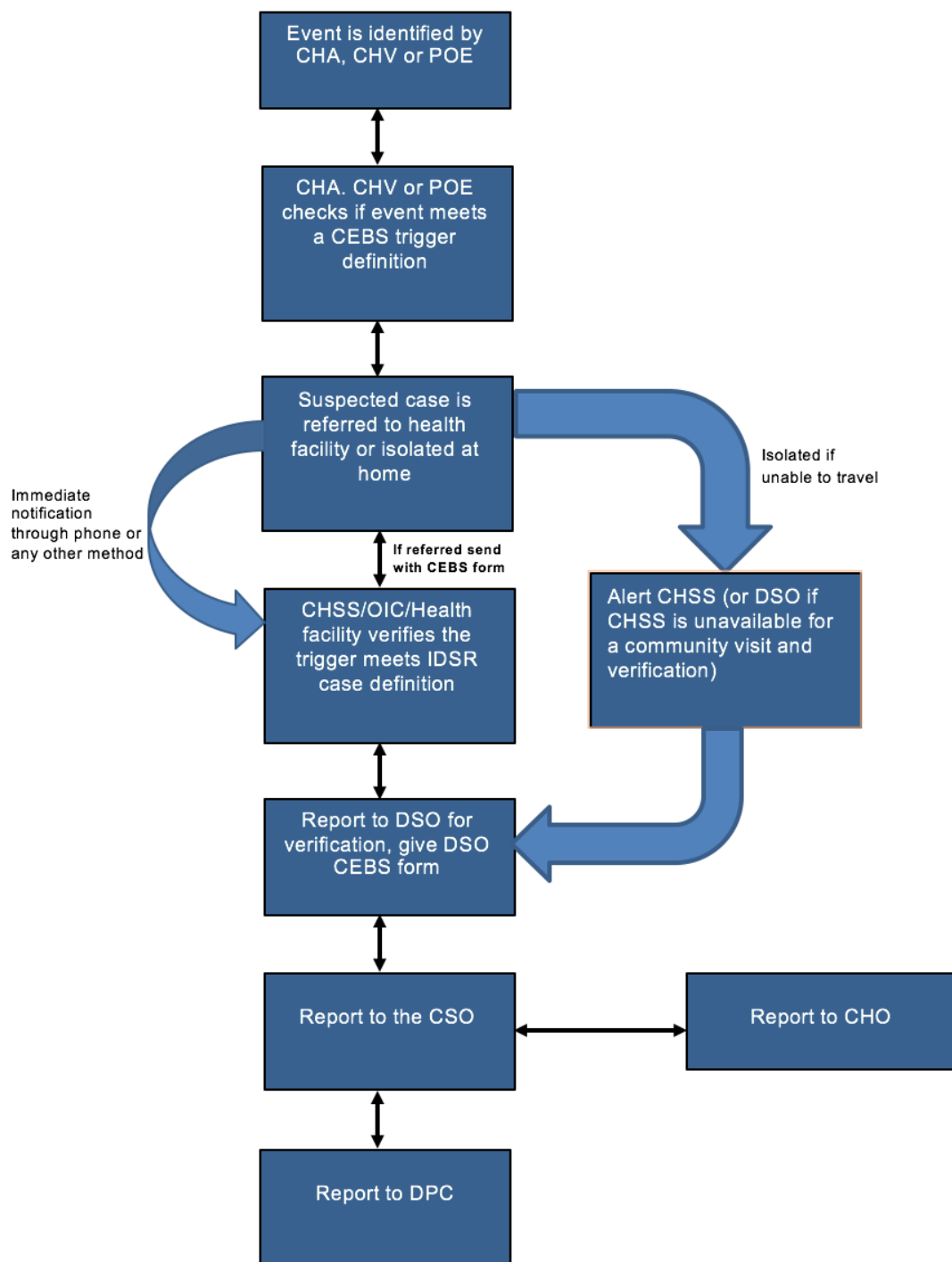
community needs further education on the recent trigger/alert response. If so, they may notify the appropriate CHVs/CHAs and/or local leaders (i.e., chiefs, elders, ward supervisors, etc.) that live/work in that area.

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.

CEBS REPORTING AND FEEDBACK STRUCTURE



Additional reference materials for CEBS can be found in the Community Event-Based Surveillance Manual

Annex 1C: 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)
<i>Fish Town Hospital</i>	<i>Across from CHT on main road</i>	<i>Dr. Fishtown</i>	<i>Tel: 077 755 5123 or send message to fishtown@gmail.com</i>

Annex 1D: 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 1F**)
- 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 1G**)
- 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 1E: Laboratory Functions by Health System Level

Level	Collect	Confirm	Report
Community or Healthcare Facilities	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Use standardized case definitions to initiate disease confirmation part of investigation • Handle specimens within approved guidelines 	<ul style="list-style-type: none"> • Record details of specimen collection and transport

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">County, Regional Referral Hospital Laboratory</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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
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<p>National Reference Laboratory (some laboratories may function as First Contact and as Referral Laboratories)</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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
<p>Global Reference Laboratories</p>	<ul style="list-style-type: none"> • Request additional specimens as required • Direct additional collection as needed based on outbreak investigation 	<ul style="list-style-type: none"> • Perform additional analysis on referred specimens or isolates as appropriate 	<ul style="list-style-type: none"> • 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 1F: 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 condition, or event	Disease,	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 (<i>Shigellosis</i>)		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 1G: Specimen for Laboratory Confirmation for Epidemic Prone Diseases in Liberia

Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport specimens to the lab	Results and Diagnostic-labs
<p>Acute flaccid paralysis (Suspected polio) REFERENCE: WHO global action plans for laboratory containment of wild polio viruses. WHO/V&B/99.32, Geneva, 1999</p>	Isolation of wild polio virus from stool	Stool 5-10g (approx. 1 teaspoonful) Note: If no specimen is collected, re-evaluate patient after 60 days to confirm clinical diagnosis of Polio	<ul style="list-style-type: none"> • Collect a specimen from every suspected AFP case; the best time to collect stool is within 14 days. Stool can however be collected up to 60 days from onset of paralysis • Collect the first specimen when the case is detected • Collect a second specimen on the same patient 24 to 48 hours later 	<ul style="list-style-type: none"> • Place stool in clean, leak-proof container and label clearly. • Immediately place in refrigerator or cold box not used for storing vaccines or other medicines. • Transport specimens so they will arrive at designated polio laboratory within 72 hours of collection • Transport specimen at 0-8°C or colder and transport specimen in a stool carrier with ice packs. • Transport in well-marked, leak proof container 	<ul style="list-style-type: none"> • Preliminary test results are usually available 14-28 days after receipt of specimen by the laboratory. • If wild polio virus is detected, the national programme will plan appropriate actions • AFP diagnostic services are not currently available in Liberia • Send specimen to the National National Drug Service for shipment to the external referral laboratory
<p>Cholera (severe Acute Watery Diarrhea) REFERENCE: “Laboratory Methods for the Diagnosis of Epidemic Dysentery and Cholera”. CDC/WHO, 1999 CDC, Atlanta, GA, USA</p>	Isolate <i>Vibrio cholerae</i> from stool culture and determine O1 serotype using polyvalent antisera for <i>V. cholerae</i> O1.	Rectal swab or watery stool	<ul style="list-style-type: none"> • Collect stool specimen 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: <ul style="list-style-type: none"> ○ 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. 	<ul style="list-style-type: none"> • 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 Cary-Blair transport medium. Cary-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 container. If colour changes (medium turns yellow) or shrinks (depressed meniscus), do not use the medium. • If Cary-Blair transport medium is not available and specimen will not reach the lab within 2 hours: <ul style="list-style-type: none"> ○ Store at 4°C to 8°C ○ Do not allow specimen to dry. Add small amount of Normal saline if necessary. ○ To ship, transport in well marked, leak-proof container ○ Transport container in cold box at 4- 8°C 	<ul style="list-style-type: none"> • Cholera tests may not be routinely performed in all laboratories. • Culture results usually take 2 to 4 days after specimen arrives at the laboratory. • The O139 serotype has not been reported in Africa. • Serological determination of Ogawa or Inaba type strains is not clinically required. It is also not required if polyvalent antisera results are clearly positive

Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport specimens to the lab	Results and Diagnostic-labs
<p>Acute Bloody Diarrhea (Shigellosis, Dysentery: <i>Shigella dysenteriae</i> type 1 (SD1) and other shigellae)</p> <p>Note: SD1 infections are epidemic-prone and associated with high levels of antibiotic resistance. SD1 is the most significant of the shigellae 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 <i>Entamoeba histolytica</i> should be tested</p> <p>REFERENCE: “Laboratory Methods for the Diagnosis of Epidemic Dysentery and Cholera”. CDC/WHO, 1999 CDC, Atlanta, GA, USA</p>	<p>Isolate <i>Shigella dysenteriae</i> type 1 (SD1) in culture to confirm Shigella outbreak.</p> <p>If SD1 is confirmed, perform antibiotic sensitivity tests with appropriate drugs.</p> <p>Microscopy on wet preparation prepared from stool for trophozoites</p>	<p>Stool or rectal swab.</p>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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 <i>Shigella dysenteriae</i> 1
<p>Human Rabies</p>	<p>Viral antigens or RNA detection with the direct fluorescent antibody (DFA) and PCR</p>	<p>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.</p>	<p>Three saliva samples taken at intervals of 3 to 6 hours, skin and hair follicles are the most sensitive specimens.</p>	<p>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.</p>	<ul style="list-style-type: none"> 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

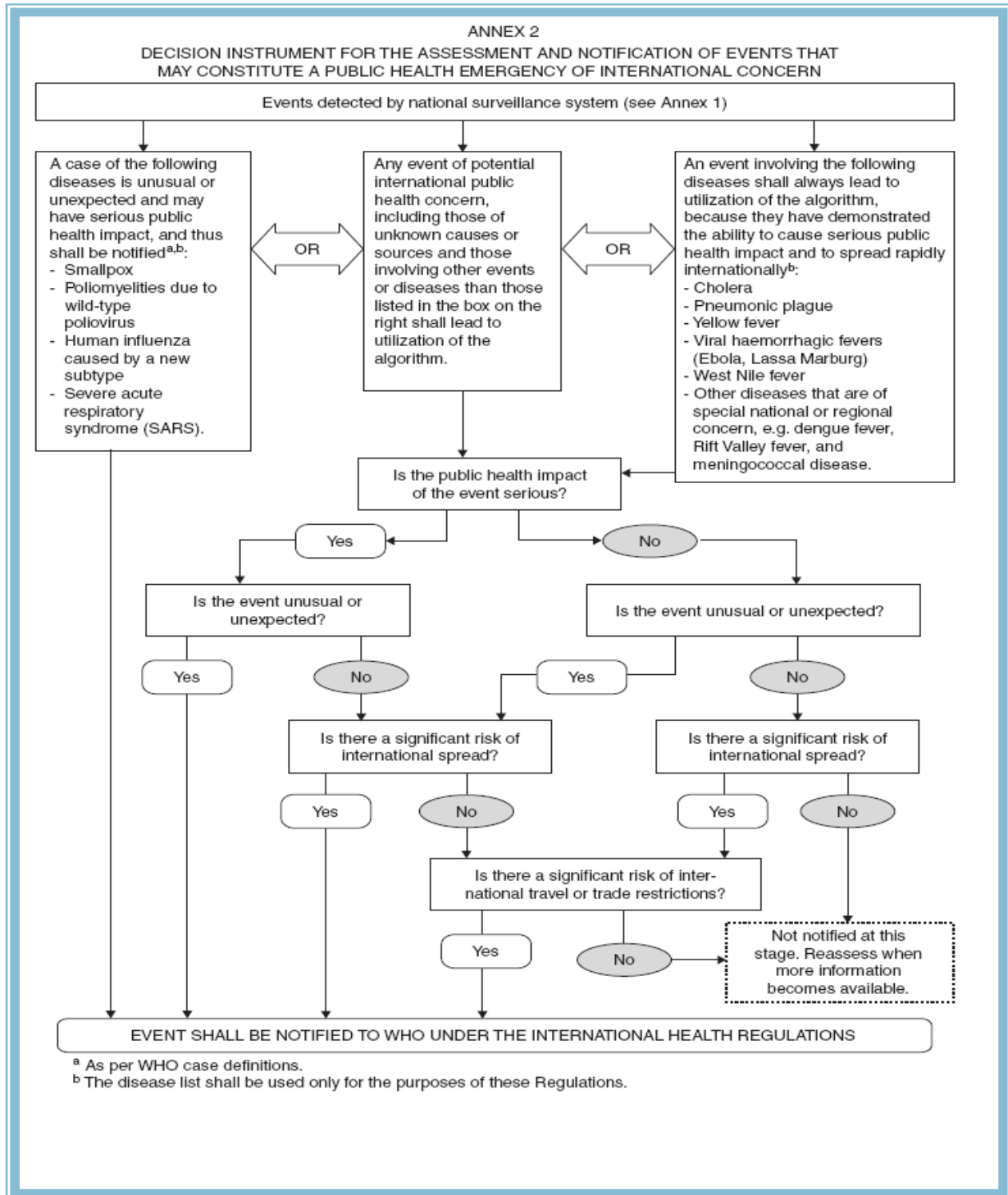
Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport specimens to the lab	Results and Diagnostic-labs
Lassa Fever	<ul style="list-style-type: none"> • Presence of LF antigen using RDT and ELISA • Presence of IgM and IgG antibodies Lassa (ELISA) • RT-PCR to detect presence of Lassa fever virus genetic material 	<ul style="list-style-type: none"> • For RDT Whole blood or serum • ELISA: Whole blood or serum • For PCR: Whole blood (venous) 	<p>Collect blood samples on suspected Lassa fever cases.</p>	<ul style="list-style-type: none"> • Handle and transport specimen from suspected Lassa fever patients with extreme caution. Wear protective clothing and use barrier precautions. • For ELISA or PCR: Refrigerate serum or whole blood 	<ul style="list-style-type: none"> • RT-PCR capacity to test for Lassa Fever is currently available at NRL
<p>Measles</p> <p>REFERENCE: WHO Guidelines for Epidemic Preparedness and Response to Measles Outbreaks WHO/CDS/CSR/ISR/99.1</p>	<p>Presence of IgM antibodies to measles virus in serum.</p>	<p>Serum</p>	<p>Collect blood samples on every suspected measles cases.</p> <p>Collect serum for antibody testing at first opportunity or first visit to the health facility.</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 4°C to 8°C 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

Suspected condition	disease or	Diagnostic test	Specimen	When to collect	How to prepare, store and transport specimens to the lab	Results and Diagnostic-labs
Meningitis REFERENCE: “Laboratory Methods for the Diagnosis of Meningitis Caused by Neisseria meningitis, Streptococcus pneumoniae and Haemophilus influenzae”. WHO document WHO/CDS/EDC/99.7 WHO, Geneva		Gram stain of CSF specimen and microscopic examination for: Gram negative diplococcus (<i>Neisseria meningitis</i>); Gram negative coccobacillary (<i>H Influenza</i>); OR Gram positive coccus (<i>S. Pneumoniae</i>) Culture and isolation of bacteria from CSF	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.	Collect specimens from 5 to 10 cases once the alert or action threshold (see “Meningitis” in Section 8) has been reached.	<ul style="list-style-type: none"> Prepare the patient and aseptically collect CSF into sterile bottles with tops. Immediately collect 1 ml of CSF into a sterile plain and fluoride bottles and transport to the lab immediately 	<ul style="list-style-type: none"> Isolation of <i>Neisseria meningitidis</i>, a fastidious organism, is expensive, and difficult. It requires excellent techniques for specimen collection and handling and expensive media and antisera. Initial specimens in an outbreak or for singly occurring isolates of <i>N. meningitis</i> 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-mortum 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.	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> EVD testing is carried out at <ul style="list-style-type: none"> National Reference Laboratory, Margibi, librlab@gmail.com Phebe Hospital Bong County Jackson F Doe Hospital Nimba ELWA III Laboratory, Montserrado Redemption Hospital, Montserrado 	

Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport specimens to the lab	Results and Diagnostic-labs
<p>Yellow fever</p> <p>REFERENCES:</p> <p>District guidelines for Yellow Fever Surveillance, WHO/GPVI/EPI/98.09</p> <p>Yellow Fever. 1998. WHO/EPI/Gen/98.11</p>	<p>ELISA for the presence of yellow fever IgM antibodies</p>	<p>Serum</p>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 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 	<ul style="list-style-type: none"> 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

ANNEX 2

Annex 2A: IHR (2005) Decision Instrument



Annex 2B: 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:

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]

- 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.

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 1C**.

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 completed 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 3

Annex 3A: 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 4).

TABLE 4: TYPES OF ANALYSIS, OBJECTIVES, TOOLS AND METHODS

Type of analysis	Objective	Tools	Method
Time	Detect abrupt or long-term changes in disease patterns or unusual event occurrence, how many occurred, and the period of time from exposure to onset of symptoms.	Record summary totals in a table or on a line graph or histogram .	Compare the number of case reports received for the current period with the number received in a previous period (e.g. weeks, months, seasons or years)
Place	Determine where cases are occurring (for example, to identify high risk area or locations of populations at risk for the disease)	Plot cases on a spot map of the district or area affected during an outbreak. Alternatively, a bar graph can be used.	Plot cases on a map and look for clusters or relationships between the location of the cases and the health event being investigated.
Person	Describe reasons for changes in disease occurrence, how it occurred, who is at greatest risk for the disease, and potential risk factors	Extract specific data about the population affected and summarize in a table . Alternative ways include pie chart and bar graph.	Depending on the disease, characterise 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 disease.

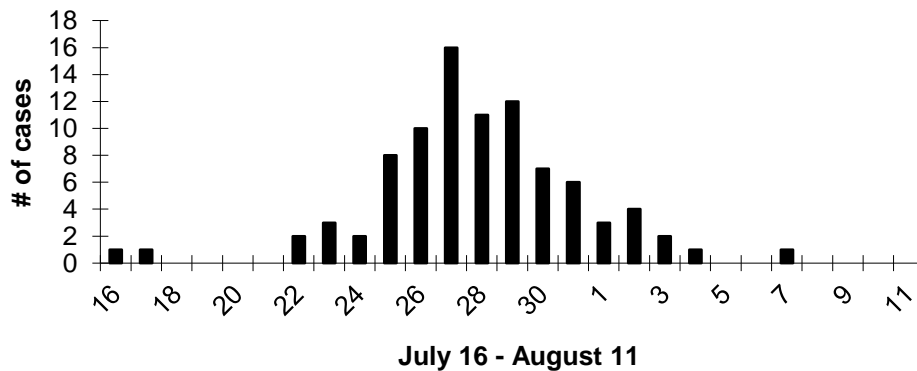
Analyze data by time

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.

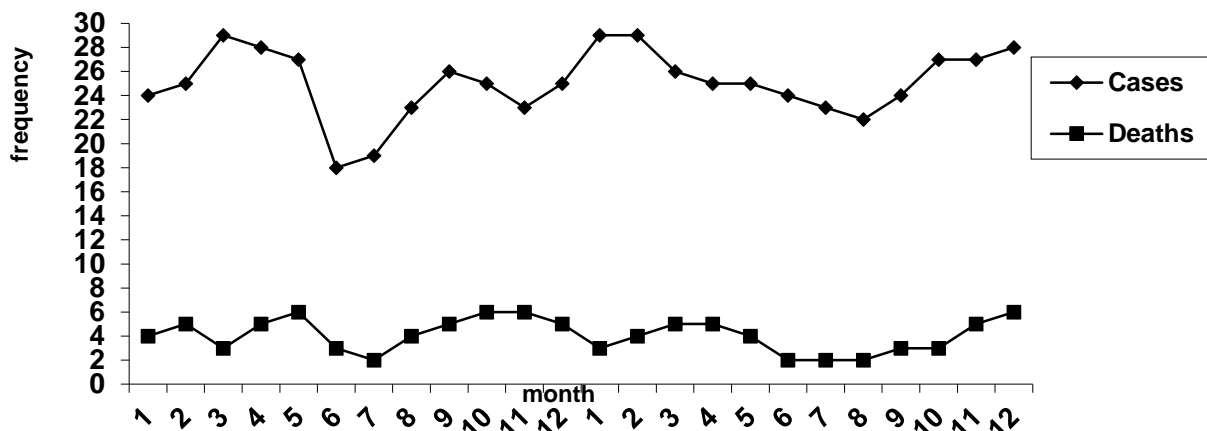
Data about time is usually shown on a graph. The number or rate of cases or deaths is placed on the vertical or y-axis. The time period being evaluated is placed along the horizontal or x-axis. Events that occurred that might affect the particular disease being analyzed can also be noted on the graph.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

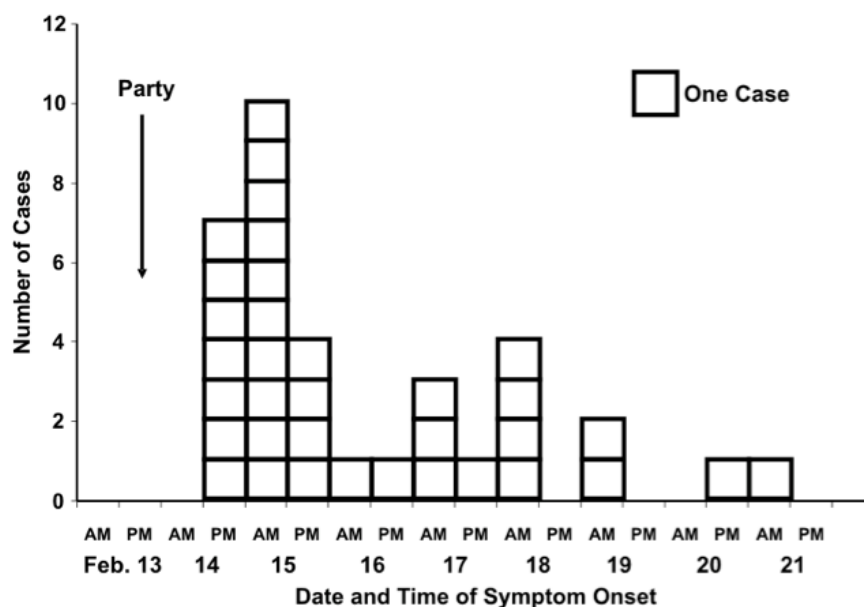


Number of cases of diarrhea with blood by month



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 Enteritidis 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

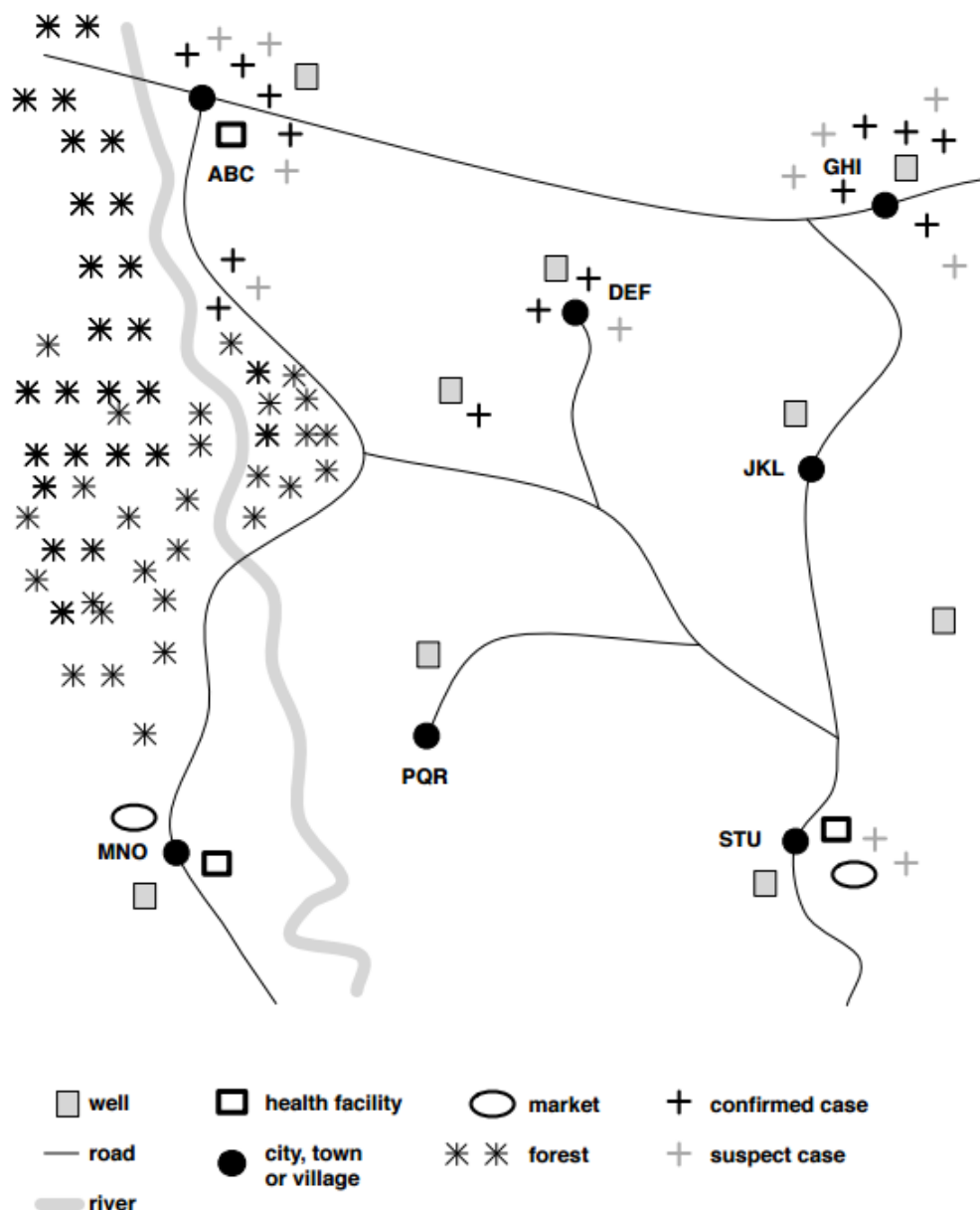
Analyzing data according to place gives information about where a disease is occurring. Establishing and regularly updating a spot map of cases for selected diseases can give ideas as to where, how, and why the disease is spreading. An analysis of place provides information that is used to:

- 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 children during last 12 months
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:

Age group	Number of reported 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

- 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.

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
- 0.8×100 . 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:

Age group	Number of reported cases	Number of deaths	Case fatality rate
0-4 years	40	4	10%

- 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%

5-14 years	9	1	11%
15 years and older	1	0	0%
Age unknown	28	0	0%
Total	78	5	6%

ANNEX 4

Annex 4A: How to Conduct a Register Review

Purpose

The purpose of a register review is to collect information on cases seen at the healthcare facility (in- and out-patients) during a specific period. Explain that the information will be used to determine what caused the outbreak or increase in number of cases. A review can occur at

- Any in- or out-patient facility with more than 5 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.

1. Meet with the healthcare facility staff and explain the purpose of the review

Explain to the healthcare facility's senior staff the purpose of the review. The information will assist the District Health Team (DHT) and healthcare 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.

2. Arrange to conduct the review

Arrange a time to conduct the review when staff that will assist with the review are present and available to help or to answer questions.

3. Identify sources of information

During the visit, depending on the priority disease or condition or events being investigated, check inpatient registers for the pediatric, infectious disease wards and the laboratory. 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 diagnosis. Make sure that the information needed for investigating any suspect case is available. At a minimum, the register should include:

- the patient's name, age, sex, occupation 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.
- Diagnosis and treatment of the condition/disease/ event
- Outcome of the case

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.

4. Do 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 national guidelines.

5. Line-list the suspected cases that are found

Record information about the suspected cases. This information will be used during case investigation activities. Refer to **Annex 11G** for Line list.

6. Provide feedback to the healthcare facility staff

Meet with the health facility supervisor, SFP or OIC 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.

7. Report any suspected cases to the next level

- Report the suspected cases as appropriate
- Investigate the case further to determine the factors that placed the patient at risk for the disease or condition
- Develop an appropriate response

ANNEX 5

Annex 5A: 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 has done, or will 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	Representative from EOCs
County Inspector	District Commissioner
County Immigration commander	District Health officer
County Health Officer	Community Health Development Director
Laboratory technician	County surveillance officer
Medical Director, County Hospital	County superintendent
County Education Officer	District environmental health Technician
County red cross County IPC focal point	County Agricultural coordinator
Representatives of Business community	

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 Table 5A below:

TABLE 5A ANNEX: IDSR MEMBERSHIP OF THE COUNTY EPR COMMITTEES

Sub committee	Members (Experts, Organizations)	Description of tasks
Coordination	<p><u>Overall Chair of County EPR committee (CHO)</u></p> <p>Members:</p> <ul style="list-style-type: none"> • 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 	<p>Coordinate all aspects of the response including:</p> <ul style="list-style-type: none"> • 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

Sub committee	Members (Experts, Organizations)	Description of tasks
Case management and infection prevention & control	<p><u>Chair:</u> Physician or physician assistant from the district or county referral hospital</p> <p><u>Members:</u></p> <ul style="list-style-type: none"> • Medical and clinical officers • IPC Officer • Nurse • Technical assistance from MOH • Partners supporting case management (e.g. MSF) • Funeral home staff 	<ul style="list-style-type: none"> • 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	<p><u>Chair:</u> County Surveillance Officer</p> <p><u>Co-chair:</u> County Laboratory Focal Person</p> <p><u>Members:</u></p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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

Sub committee	Members (Experts, Organizations)	Description of tasks
Social mobilization/ Public information	<p><u>Chair:</u> County Health Educator or Health Promotion staff</p> <p><u>Members:</u></p> <ul style="list-style-type: none"> • Health Educators from the county • Politicians • Technical Assistants from the Ministry of Health • Partners supporting communication e.g. UNICEF, URCS 	<ul style="list-style-type: none"> • 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	<p><u>Chair:</u> Psychosocial Coordinator</p> <p><u>Members:</u></p> <ul style="list-style-type: none"> • Counselors • Mental Health clinicians • Clinical Psychologists • Social workers • Technical assistance from the Ministry of Health • Partners supporting psychosocial services 	<ul style="list-style-type: none"> • 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	<p><u>Chair:</u> County Pharmacist/ Logistics Officer</p> <p><u>Members:</u></p> <ul style="list-style-type: none"> • Supplies/ Stores assistants • Pharmacists or dispensers • Technical assistance from the Ministry of Health • Partners supporting logistics management 	<ul style="list-style-type: none"> • 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

Sub committee	Members (Experts, Organizations)	Description of tasks
Water, Sanitation and Hygiene (WASH)	<p><u>Chair</u>: County Health Inspector</p> <p>Members:</p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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.
8. Vaccination campaign	<p><u>Chair</u>: Child survival, EPI focal point, or County Cold Chain Technician</p> <p>Members:</p> <ul style="list-style-type: none"> • MCH supervisor • County hospital medical doctor • Physician assistant • Certified midwives • Partners supporting vaccination e.g. WHO, UNICEF • Technical assistance from the Ministry of Health 	<ul style="list-style-type: none"> • 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 5B: List of Supplies for Responding to Outbreaks

Personal Protection Equipment			
Goggles	<input type="checkbox"/>	Rubber Boots (One Small, Large)	<input type="checkbox"/>
N95 mask	<input type="checkbox"/>	Gloves-disposable	<input type="checkbox"/>
Surgical mask	<input type="checkbox"/>	Alcohol hand rubs	<input type="checkbox"/>
Grown-disposable	<input type="checkbox"/>	Disinfecting solution	<input type="checkbox"/>
Apron disposable	<input type="checkbox"/>		
Waste management			
Biohazard bag	<input type="checkbox"/>	Plaster container –for needles, etc.	<input type="checkbox"/>
Blood collection			
Syringes +needles (5cc)	<input type="checkbox"/>	Tissue	<input type="checkbox"/>
Blood collection tubes (5-10 ml)	<input type="checkbox"/>	Viral Transport media	<input type="checkbox"/>
Serum tubes	<input type="checkbox"/>	Bacteria transport media	<input type="checkbox"/>
Vacutainer	<input type="checkbox"/>	Alcohol 70 + cotton	<input type="checkbox"/>
Sterile disposal transfer pipette	<input type="checkbox"/>		
Respiratory tract specimens			
Swab stick	<input type="checkbox"/>	Tongue depressor	<input type="checkbox"/>
Viral transportation medium	<input type="checkbox"/>	Scissor	<input type="checkbox"/>
Bacterial transportation medium	<input type="checkbox"/>	Small plastic container with lid (sputum)	<input type="checkbox"/>
Stool specimen			
Transport media	<input type="checkbox"/>	Cotton swab	<input type="checkbox"/>
Stool container	<input type="checkbox"/>	Carey-Blair Medium	<input type="checkbox"/>
Other samples:			
Sterilized plastic container & lid	<input type="checkbox"/>	Sterile containers for food or water	<input type="checkbox"/>
Transport and storage materials			
Rack for tubes	<input type="checkbox"/>	Case alert and Laboratory forms	<input type="checkbox"/>
Plastic bags with zip lock	<input type="checkbox"/>	Biohazard container	<input type="checkbox"/>
Marker	<input type="checkbox"/>	Ice packs	<input type="checkbox"/>
Others (If available)			
Questionnaires/forms/OIR manual	<input type="checkbox"/>	Paracetamol	<input type="checkbox"/>
List of important contacts	<input type="checkbox"/>	Antibiotics	<input type="checkbox"/>
Radio / mobile phones	<input type="checkbox"/>	ORS, soap	<input type="checkbox"/>
Rain coats	<input type="checkbox"/>	Camera (especially if acute rash syndrome)	<input type="checkbox"/>
Life jackets	<input type="checkbox"/>	Food (if required)	<input type="checkbox"/>
Bed nets, mosquito repellents	<input type="checkbox"/>	Education materials e.g. hand washing	<input type="checkbox"/>

ANNEX 6

Annex 6A: 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 9A** for treating cases during an outbreak. Prepare health workers to conduct these responses.

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:

- 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.
 - 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:

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.

- 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.

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:

On a regular basis, meet with the community spokesperson to give:

- 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.
- 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 6A** 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 situation	During outbreak of diarrheal disease
Home use	20 liters per day	50 litres
Health care setting	40 to 60 liters per day	50 litres in wards 100 litres 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:

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:

- 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.
 - 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 6B: 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: <ul style="list-style-type: none"> • excreta • cadavers • spills of infectious body fluids 	To make a 1:100 solution for disinfecting: <ul style="list-style-type: none"> • 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 6C: 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 (**Annex 6C** and **6D**).
 - 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. 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>
10. Conduct brief feedback sessions at the end of each day with vaccination teams and make necessary mid-course corrections

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

Annex 6D: 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.

$$\frac{\text{Size of target population}}{\text{Number of recommended doses}} \times \frac{1.20}{\text{wastage}} = \frac{\text{Number of doses to order including wastage}}$$

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.

$$\frac{\text{Number of doses including wastage}}{\text{Reserve factor}} \times 1.25 = \text{Total number of estimated doses}$$

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).

$$\frac{\text{Total number of estimated doses}}{\text{Doses per vial}} = \text{Total number of vials required}$$

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).

$$\frac{\text{Diluent required per vial}}{\text{Diluent required per vial}} \times \frac{\text{Total number of vials}}{\text{Total number of vials}} = \frac{\text{Total diluent to order}}{\text{Total diluent to order}}$$

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 6E: 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)	<p>Immediate: Encourage person to seek care at local health facility.</p> <p>Long-Term: Urge the community to get immunized with the polio vaccine.</p>
Running stomach. Any person passing three (3) or more water pu-pu within one day.	Cholera (severe Acute watery diarrhea)	<p>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.</p> <p>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).</p>
Diarrhea with blood (pu-pu with blood) Any person passing bloody pu-pu or slimy (slippery) pu-pu with stomach pain	Acute bloody diarrhea (<i>Shigellosis</i>)	<p>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.</p> <p>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).</p>
Dog or other animal bite	Human Rabies	<p>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).</p> <p>Call livestock or wildlife officer to catch or isolate animal.</p> <p>Long-term: advocate and support animal vaccination.</p>

ANNEX 7

Annex 7A: 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	Mobilising 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 7B: Sample Public Health Bulletin

Integrated Disease Surveillance and Response Bulletin



Republic of Liberia



INTEGRATED DISEASE SURVEILLANCE AND RESPONSE BULLETIN

Week-9

Feb 29 – March 6, 2016

Data Source: CSOs from 15 Counties

Highlights during the reporting week

- ⊕ Fifteen out of eighteen samples sent to the laboratory this week were confirmed positive for measles.
 - Of these, six were from Bushord Island district (Montserrado), three cases each were from Mamba Kaba and Kakata districts (Margibi), two from district #4 and one was from Buchanan districts (Grand Bassa). Two tested negative and one was equivocal.
- ⊕ Three cases of suspected Lassa fever from Nimba and Bong County were confirmed positive. An outbreak investigation is ongoing and neighboring counties have been informed.
- ⊕ A total of five maternal deaths were reported from Montserrado, Nimba and Grand Cape Mount counties.
- ⊕ A total of eight neo-natal deaths were reported from Bong, Montserrado, Nimba, Lofa and Grand Bassa counties.
- ⊕ Four AFP cases were reported from Bomi, Lofa and RiverGee counties.

Reporting Coverage

- ⊕ 98% (716/724) of expected health facilities reported from 91 health districts across 15 counties.

Table 1: Reporting coverage (completeness) and timeliness of reporting from counties, week 9

County	No. of expected report from health facility	No. of reports received	Completeness (%)	On time
Bomi	22	22	100.0	Yes
Bong	42	42	100.0	Yes
Grand Cape Mount	31	31	100.0	Yes
Gbarpolu	14	14	100.0	Yes
Grand Bassa	30	30	100.0	Yes
Grand Gedeh	24	24	100.0	Yes
Grand Kru	19	18	94.7	Yes
Lofa	59	59	100.0	Yes

Annex 7C: 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:

Location:

To:

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 region 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 7D: Simplified Suspect Case Definitions

Name of IDSR Event or disease

CEBS Community Trigger

Acute Flaccid Paralysis (Cripple sickness/Poliomyelitis)



Any person with weakness in the legs and arms or not able to walk

Acute Watery diarrhea (Cholera)



Running stomach. Any person passing three (3) or more water pu-pu within one day.

Acute bloody diarrhea (Shigellosis)



Diarrhea with blood (pu-pu with blood)
Any person passing bloody pu-pu or slimy (slippery) pu-pu with stomach pain

(Human) Rabies



Any person who is bitten by a dog or other animal

Measles



Any person with hot skin (fever) and spot-spot (rash) and/or red eyes

Viral Hemorrhagic Fevers



Any person who has fever and two or more other symptoms (headaches; vomiting; runny stomach; weak in the body, yellow eyes), or who died after serious sickness with fever and bleeding.

Meningitis



Any person with hot skin (fever) and stiff neck.

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.

Neonatal tetanus



Jerking Sickness,
Baby who is normal at birth, then after two days is not able to suck starts jerking

Neonatal Death



Young baby death
Baby who dies at birth or within 28 days (four weeks) after birth

Unexplained Cluster of events or disease

Unexplained death

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.
Any death in human or group of animals that you don't know why it happened

ANNEX 8

Annex 8A: 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								

Indicator	Purpose	Reporting Levels	Disaggregation levels	Numerator	Denominator	Source of information	Target	Frequency of Data Collection
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
Proportion of counties with functional RRTs having conducted outbreak simulation or response in the past 6 months	Assesses the functionality and readiness of RRTs in all counties	County		Number of counties with functional RRTs having conducted outbreak simulation or response in the past 6 months	Total number of counties	Supervisory reports	100%	Semi-annually
Reporting Indicators								

Indicator	Purpose	Reporting Levels	Disaggregation levels	Numerator	Denominator	Source of information	Target	Frequency of Data Collection
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 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

Indicator	Purpose	Reporting Levels	Disaggregation levels	Numerator	Denominator	Source of information	Target	Frequency of Data Collection
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

Indicator	Purpose	Reporting Levels	Disaggregation levels	Numerator	Denominator	Source of information	Target	Frequency of Data Collection
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-lists, and trend analyses	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 targeted for elimination and eradication and for any diseases selected for case-based surveillance	85%	Quarterly
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

Indicator	Purpose	Reporting Levels	Disaggregation levels	Numerator	Denominator	Source of information	Target	Frequency of Data Collection
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 8B: 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 8C-F) 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Compare the laboratory records for priority diseases with the number of cases seen in the clinic for the same period of time
Reporting	<ul style="list-style-type: none"> • 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 analyse data	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.

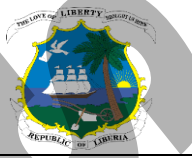

Annex 8C: Checklist for Supervising Surveillance and Response Activities at the Community Level

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 Level				
COUNTY:		COMMUNITY NAME		
DISTRICT:		MOBILE NUMBER:		
CHA/CHV Respondent:		EMAIL ADDRESS:		
POSITION:		START TIME:		
DATE:		END TIME:		
SN	Category	Query	Response	Comments
1		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	Case Detection, Investigation, and Reporting	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		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	Data Analysis and Use	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		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	Supervision and Feedback	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 8D: 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 in collaboration with the World Health Organization		 World Health Organization	
Monthly Checklist for IDSR at the Health Facility Level					
COUNTY:				HEALTH FACILITY (Name and Priority)	
DISTRICT:				MOBILE NUMBER:	
NAME:				EMAIL ADDRESS:	
POSITION:				START TIME:	
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		Community Event Based surveillance reporting forms			

2.5		Case investigation forms for priority diseases AFP		
2.6		Case investigation forms for NNT		
2.7		Case investigation forms for EVD		
2.8		Case investigation forms for maternal and neonatal death		
2.9		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 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		National therapeutic guidelines		

5.2		IPC protocols (are these easily located and identified?)		
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	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		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	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		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	Community Event Based Surveillance	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 or Health Facility Stamp				

Annex 8E: 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.

SN		Category	Query	Response	Comments
 Ministry of Health in collaboration with the World Health Organization 					
Monthly Checklist for IDSR at the District Level					
COUNTY:			MOBILE NUMBER:		
DISTRICT:			EMAIL ADDRESS:		
NAME:			START TIME:		
POSITION:			END TIME:		
DATE:					
1.0 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					
1.1		Administration	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		
2.0 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		Data Collection Tools	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 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		Analysis and Reporting	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 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	Investigation and Confirmation of Cases	Has the district notified all suspected outbreaks of epidemic prone diseases within the last three months to the county within 24-48 hours of surpassing epidemic threshold? If not, how many?		
4.5		Is there lab results/confirmation for suspected cases? Specify number of suspected cases with lab results.		
4.6		Does the district have copies of SOPS for specimen collection, packaging, and storage for priority diseases?		
4.7		Mechanism for specimen collection and handling for priority disease, including SOPS		
4.8		Are there any challenges in specimen transportation? If yes, please describe in the comments.		
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 8F: 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 in collaboration with the World Health Organization		 World Health Organization	
Monthly Checklist for IDSR at the county Level					
COUNTY:			MOBILE NUMBER:		
Name of respondent(s)			EMAIL ADDRESS:		
Position of respondent			START TIME:		
Date of supervision			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		Availability of IDSR county specific implementation plan including partner mapping for surveillance			
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			
2.9		Case specific reporting forms for AFP			
3	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 episummary 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	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 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	Investigation and Confirmation of Cases	Were all suspected outbreaks of epidemic prone diseases notified to the county within 48 hours of surpassing epidemic threshold within the last month? If not, how many?		
4.5		Is there lab results/confirmation for suspected cases? Specify number of suspected cases with lab results		
4.6		Does the CSO have copies of SOPS for specimen collection, packaging, and storage for priority diseases?		
5		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		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		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		Check the availability of the following and select Yes or No form the drop down menu- for counties with PoE		
8.1	Cross border surveillances	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		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 community event 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 9

Annex 9A: Acute Bloody Diarrhea (*Shigella*)

Background	<p><i>Shigella dysenteriae</i> type 1 (SD1) is the most common cause of enteric infections and is transmitted from person-to-person through fecal-oral spread.</p> <ul style="list-style-type: none"> • Large scale outbreaks may be caused by <i>Shigella dysenteriae</i> 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 (for example, refugee and famine populations). • SD1 is frequently resistant to multiple antibiotics including trimethoprim-sulfamethoxazole. • Enterohemorrhagic and enteroinvasive <i>E. coli</i> and other bacteria or parasites such as <i>Entamoeba histolytica</i> may also cause bloody diarrhea
Surveillance goal	<ul style="list-style-type: none"> • 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	<p><u>Suspected case:</u> A person with diarrhea with visible blood in stool.</p> <p><u>Confirmed case:</u> Suspected case with stool culture positive for <i>Shigella dysenteriae</i> type 1.</p>
Respond to alert threshold	<p>≥ 5 cases in one location in 1 week or double the weekly average</p> <ul style="list-style-type: none"> • 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.
Respond to action threshold	<p>If a suspected outbreak is confirmed:</p> <ul style="list-style-type: none"> • Search for additional cases in locality of confirmed cases. • Strengthen case management and treatment. • Mobilize community to enable rapid case detection and treatment. • Identify high risk populations using person, place, and time data. • Reduce sporadic and outbreak-related cases by promoting hand-washing with soap or ash and water after defecating and before handling food. <p>Strengthening access to safe water supply and storage, and use of latrines and safe disposal of human waste.</p>
Analyze and interpret data	<p><u>Time:</u> Graph monthly trends in cases and deaths. Construct an epidemic curve for outbreak cases.</p> <p><u>Place:</u> Plot location of case households.</p>

	<p><u>Person</u>: 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.</p>
<p>Laboratory confirmation</p>	<p>Diagnostic test Isolate <i>Shigella dysenteriae</i> type 1 (SD1) in culture to confirm <i>shigella</i> outbreak. If SD1 is confirmed, perform antibiotic sensitivity tests with appropriate drugs.</p> <p><u>Specimen</u>: Stool or rectal swab.</p> <p>When to collect the specimen:</p> <ul style="list-style-type: none"> • For each new area affected by the outbreak, a laboratory confirmation should be 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. <p>If stool cannot be collected, obtain a rectal swab sample with a clean, cotton swab.</p> <p>How to prepare, store, and transport the specimen</p> <ul style="list-style-type: none"> • 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 <i>Shigella</i> after 24 hours. • If storage is required, hold specimens at 4°C to 8°C, and do not freeze. <p>Results</p> <ul style="list-style-type: none"> • Culture results are usually available 2 to 4 days after receipt by the laboratory. • SD1 isolates should be characterized by antibiotic susceptibility. <p>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.</p>
<p>References</p>	<ul style="list-style-type: none"> • Guidelines for the control of epidemics due to <i>Shigella dysenteriae</i> 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

Annex 9B: Acute Flaccid Paralysis (Poliomyelitis)

Background	<p>Poliovirus (genus Enterovirus) serotypes 1, 2, and 3 are transmitted from person-to-person via fecal-oral spread.</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 per year per 100 000 population aged less than 15 years.
Standard case definition	<p><u>Suspected case:</u> 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.</p> <p><u>Confirmed case:</u> A suspected case with virus isolation in stool.</p>
Respond to alert threshold	<p>If a single case is suspected:</p> <ul style="list-style-type: none"> • Report the suspected case immediately according to national level policy. • Conduct a case-based investigation. Include a vaccination history for the patient. • Collect two stool specimens. Collect the first one when the case is investigated. Collect the second one from the same patient 24 to 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	<p>If a case is confirmed:</p> <p>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:</p>

	<ul style="list-style-type: none"> • 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, and 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	<p><u>Time:</u> 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.</p> <p><u>Place:</u> Plot location of case households. Investigate the circumstances of poliovirus transmission in each case thoroughly. Examine the possibility of other potential areas of transmission.</p> <p><u>Person:</u> Count monthly routine and outbreak-related cases. Analyze age distribution. Assess risk factors for low vaccine coverage.</p>
Laboratory confirmation	<p><u>Diagnostic test:</u> Isolation of polio virus from stool</p> <p>Specimen: Stool</p> <p>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.</p> <p>When to collect the specimen</p> <ul style="list-style-type: none"> • 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. <p>How to prepare, store, and transport the specimen</p> <ul style="list-style-type: none"> • Place stool in clean, leak-proof container and label clearly. • Immediately store a refrigerated temperature or cold box (4-8^o 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. <p>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.</p>
References	<ul style="list-style-type: none"> • 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

	<ul style="list-style-type: none">• Supplement to the Manual for the virological investigation of Polio. WHO/EPI 2007 <p><u>Further technical documents:</u> http://www.polioeradication.org/Resourcelibrary/Resourcesforpolioeradicators/Technicalguidelines.aspx http://www.polioeradication.org/Portals/0/Document/Resources/PolioEradicators/1c.QuickFixesforSIA20100914.pdf</p>
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Annex 9C: Cholera (Severe AWD)

Background	<p>Acute illness with profuse watery diarrhea caused by <i>Vibrio cholerae</i> 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.</p> <ul style="list-style-type: none"> • 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. <p>See Annex 11S for the cholera variable list.</p>
Surveillance goal	<ul style="list-style-type: none"> • 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	<p><u>Suspected case:</u></p> <ul style="list-style-type: none"> • 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 <p><u>Confirmed case:</u> A suspected case in which <i>Vibrio cholerae</i> O1 or O139 has been isolated in the stool.</p>
Respond to alert threshold	<p>If a single case is suspected:</p> <ul style="list-style-type: none"> • 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.

	<ul style="list-style-type: none"> 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	<p><u>If a suspected case is confirmed:</u></p> <ul style="list-style-type: none"> Establish treatment centre 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	<p><u>Time:</u> Graph weekly cases and deaths and construct an epidemic curve during outbreaks. Report case-based information immediately and summary information monthly for routine surveillance.</p> <p><u>Place:</u> Plot the location of case households.</p> <p><u>Person:</u> 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.</p>
Laboratory confirmation	<p>Diagnostic test</p> <ul style="list-style-type: none"> Isolate <i>V. cholerae</i> from stool culture and determine O1 serotype using polyvalent antisera for <i>V. cholerae</i> O1. <p><u>Specimen</u> Liquid stool or rectal swab</p> <p>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:</p> <ul style="list-style-type: none"> Onset within last 5 days, and Before antibiotics treatment has started <p>Do not delay treatment of dehydrated patients. Specimens may be collected after rehydration (ORS or IV therapy) has begun.</p> <p>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 <i>V. cholerae</i>.</p> <p>How to prepare, store, and transport the specimen</p> <ul style="list-style-type: none"> 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

	<p>in properly sealed container. If color changes (media turns yellow) or shrinks (indents), do not use the media.</p> <ul style="list-style-type: none"> • 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 4°C to 8°C <p>Results</p> <ul style="list-style-type: none"> • 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 container. If colour 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.
References	<ul style="list-style-type: none"> • 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

Annex 9D: Guinea Worm (*Dracunculiasis*)

Background	<p><i>Dracunculiasis</i> 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.</p> <ul style="list-style-type: none"> • 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 <i>Dracunculiasis</i> 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 <i>Dracunculiasis</i> transmission in 2007. However, the disease remains present in the region.
Surveillance goals	<ul style="list-style-type: none"> • 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	<p><u>Suspected case</u>: A person presenting with a skin lesion with itching or blister, living in a Guinea worm endemic area.</p> <p><u>Confirmed case</u>: 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.</p>
Alert threshold	<p>If a single case is suspected:</p> <ul style="list-style-type: none"> • 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	<p><u>Time</u>: Graph cases monthly.</p> <p><u>Place</u>: Plot distribution of households and work sites for cases from which cases have been reported.</p> <p><u>Person</u>: Count monthly cases, and analyze age distribution. Report monthly to next levels.</p>
Laboratory confirmation	<p>Routine laboratory confirmation for surveillance is not required.</p> <ul style="list-style-type: none"> • Diagnosis is made by visual recognition of the adult worm protruding from a skin lesion or by microscopic identification of larvae.

	<ul style="list-style-type: none"> • Laboratory tests to investigate <i>Dracunculiasis</i> are limited because the larvae of <i>D. medinensis</i> 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.
Reference	<ul style="list-style-type: none"> • <i>Dracunculiasis</i> 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

Annex 9E: Human Influenza Caused by a New Subtype

Background	<p>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.</p> <p>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.</p> <p>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.</p> <p>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</p> <p>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.</p> <p>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.</p>
Surveillance goals	<ul style="list-style-type: none"> • 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	<p>Suspected H5N1 case: Any person presenting with unexplained acute lower respiratory illness with fever (>38 °C) and cough, shortness of breath or difficulty breathing AND one or more of the following exposures within the 7 days prior to symptom onset:</p>

	<ul style="list-style-type: none"> • 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. <p>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.</p> <p><u>Suspected pandemic (H1N1) 2009 virus infection:</u> 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.</p> <p><u>Confirmed pandemic (H1N1) 2009 virus infection:</u> 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.</p>
Alert threshold	<p>Respond to a suspected case of human influenza caused by a new subtype or to an unusual event of severe acute respiratory infection:</p> <ul style="list-style-type: none"> • 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	<p>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:</p> <ul style="list-style-type: none"> • 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.

	<ul style="list-style-type: none"> • 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	<p><u>Time</u>: Graph weekly cases and deaths, construct an epidemic curve</p> <p><u>Place</u>: Plot location of case households and work sites using precise mapping.</p> <p><u>Person</u>: 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/exposures & exposure.</p>
Laboratory confirmation	<p>Diagnostic test</p> <p>Identification of human influenza virus infections by:</p> <ul style="list-style-type: none"> • 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) <p>Specimen</p> <ul style="list-style-type: none"> • A variety of specimens are suitable for the diagnosis: • Throat swab • Nasopharyngeal swab • Nasal swab • Nasopharyngeal aspirate • Intubated patients: tracheal swab or bronchial lavage fluid • Blood <p>Specimens should be collected in the following order of priority:</p> <ul style="list-style-type: none"> • Throat swab/Nasopharyngeal aspirate • Acute serum • Convalescent serum <p>When to collect the specimen</p> <ul style="list-style-type: none"> • 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. <p>How to prepare, store, and transport the specimen:</p> <ul style="list-style-type: none"> • 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.

	<ul style="list-style-type: none"> • 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. <p>Results</p> <ul style="list-style-type: none"> • 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.
References	<ul style="list-style-type: none"> • 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

Annex 9F: Human Rabies

<p>Background</p>	<p>Rabies is a zoonotic disease (a disease that is transmitted to humans from animals) that is caused by a virus.</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> ○ Promote public awareness of rabies through health education and advocacy campaigns, pet owners associations and community health assistants.
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	<ul style="list-style-type: none"> ○ Vaccinate local dogs and cats to prevent outbreaks. Target immunization campaign for domestic or wild animals in high-risk areas ○ Control stray animals through spaying and neutering ○ With MOH and MOA maintain active surveillance of rabies in animals
Surveillance goal	<p>The Liberian MOH and Ministry of Agriculture collaborate to prevent and control Rabies. Joint activities are being undertaken aimed to:</p> <ul style="list-style-type: none"> • 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	<p><u>Suspected</u>: 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.</p> <p><u>Probable</u>: A suspected case with history of contact with a suspected rabid animal.</p> <p><u>Confirmed</u>: A suspected case that is laboratory confirmed</p>
Alert threshold and public health action	<p><u>For a single case</u>:</p> <ul style="list-style-type: none"> • 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	<p><u>Time</u>: Plot cases weekly.</p> <p><u>Place</u>: Plot the location of case households and animal exposures.</p> <p><u>Person</u>: Analyze distribution of cases by age, exposing animal, and circumstances of infection. Assess risk factors to improve control of cases</p>
Laboratory confirmation	<p><u>Diagnostic test</u></p> <ul style="list-style-type: none"> • Detection of rabies viral antigens with direct fluorescent antibody (DFA) and PCR in clinical specimens, preferably brain tissue (collected post mortem) • 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 <p><u>Specimen</u> 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.</p>

	<p>Post mortem specimens: Brain and corneal tissue</p> <p><u>When to collect the specimen</u></p> <ul style="list-style-type: none"> • 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. <p><u>How to prepare, store, and transport the specimen</u></p> <ul style="list-style-type: none"> • 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. <p><u>Results</u></p> <ul style="list-style-type: none"> • 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
<p>References</p>	<ul style="list-style-type: none"> • 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

Annex 9G: Lassa Fever

Background	<p>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.</p> <ul style="list-style-type: none"> • The animal reservoir of the Lassa virus is a rodent of the genus <i>Mastomys</i>. <i>Mastomys</i> infected with Lassa virus do not become ill but shed the virus in their excreta (urine and faeces) 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, <i>Shigellosis</i>, 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). <p>See Annex 11N for the VHF General Investigation Form.</p>
Surveillance goal	<ul style="list-style-type: none"> • 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 definitions	<p>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</p> <p><u>Confirmed case of Lassa Fever</u>: A suspected case that is laboratory confirmed (positive IgM antibody, PCR or virus isolation) or epidemiological linkage to a confirmed case.</p>
Respond to alert threshold	<p>If a single case is suspected:</p> <ul style="list-style-type: none"> • 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	<p>If a single case is confirmed:</p> <ul style="list-style-type: none"> • 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 centre.
Analyze and interpret data	<p><u>Person</u>: Implement immediate case-based reporting of cases and deaths. Analyze age and sex distribution. Assess risk factors and plan disease control interventions accordingly.</p> <p><u>Time</u>: Graph cases and deaths daily/weekly. Construct an epidemic curve during the outbreak.</p> <p><u>Place</u>: Map locations of cases' households.</p>
Laboratory confirmation	<p>Diagnostic test</p> <ul style="list-style-type: none"> • 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 Lassa virus antigen. <p>Specimen</p> <ul style="list-style-type: none"> • 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 <p>When to collect the specimen</p> <ul style="list-style-type: none"> • 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. <p>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.</p> <p>For ELISA or PCR:</p> <ul style="list-style-type: none"> • Refrigerate serum or clot (4-8°C) • Package in triple packaging to prevent breakage and leaks • Transport in well-marked container (4-8°C) <p>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 1F includes a list of reference laboratories that confirm priority diseases and conditions.</p>
References	<p>Lassa Fever Fact Sheet. March 2016. WHO. http://www.who.int/mediacentre/factsheets/fs179/en/</p>

Annex 9H: Maternal Death

Background	<p>Maternal Death refers to death during pregnancy, childbirth or termination of pregnancy, and deaths up to 6 weeks (42 days) after childbirth.</p> <ul style="list-style-type: none"> • 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 labour. 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 childbirth. 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, anaemia, and obstructed labour. • 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. <p>See Annex 11Q for the maternal variable list.</p>
Surveillance goal	<p>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)</p>
Surveillance Objective	<ul style="list-style-type: none"> • 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	<p>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.</p>

Respond to alert threshold	<p>An alert threshold response is a single case:</p> <ul style="list-style-type: none"> • 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	<p>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.</p> <ul style="list-style-type: none"> • 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	<p><u>Time</u>: Graph cases to construct an epidemic curve throughout the year in order to identify trends.</p> <p><u>Place</u>: Plot the location of cases and analyze the distribution.</p> <p><u>Person</u>: Analyze the distribution of cases by age and other demographic factors.</p>
Laboratory confirmation	<p>Routine laboratory confirmation for surveillance is not required.</p>
Reference	<ul style="list-style-type: none"> • 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/

Annex 9I: Measles

Background	<p>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.</p> <ul style="list-style-type: none"> • 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	<p>Detect outbreaks of fever with rash illness promptly:</p> <ul style="list-style-type: none"> • 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	<p><u>Suspected case</u>: 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.</p> <p><u>Confirmed case</u>: A suspected case with laboratory confirmation (positive IgM antibody) or epidemiological link to confirmed cases in an outbreak.</p>
Respond to alert threshold	<p>One suspected cases in a geographical location:</p> <ul style="list-style-type: none"> • 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	<p>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:</p> <ul style="list-style-type: none"> • 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	<p><u>Time</u>: Graph weekly cases and deaths. Construct epidemic curve for outbreak cases.</p> <p><u>Place</u>: Plot location of case households.</p> <p><u>Person</u>: Count total cases and analyze by age group and immunization status.</p>

Laboratory confirmation	<p><u>Diagnostic test:</u> Presence of IgM antibodies to measles virus in serum.</p> <p>Specimen: Serum</p> <p>When to collect the specimen</p> <ul style="list-style-type: none"> • 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. <p>How to prepare, store, and transport the specimen</p> <ul style="list-style-type: none"> • 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. <p>Results</p> <ul style="list-style-type: none"> • 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.
Reference	<ul style="list-style-type: none"> • 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

Annex 9J: Meningitis

Background	<p><i>Neisseria meningitidis</i>, <i>Haemophilus influenzae</i> type b (Hib), and <i>Streptococcus pneumoniae</i> constitute the majority of all cases of bacterial meningitis and 90% of bacterial meningitis in children.</p> <ul style="list-style-type: none"> • 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 <i>Neisseria meningitidis</i> serogroup A. Serogroup C is now the more common cause of epidemics in the meningitis belt. In 2002 an epidemic due to <i>N. meningitidis</i> serogroup W135 occurred in Burkina and in 2006 <i>N. meningitidis</i> 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 goals	<ul style="list-style-type: none"> • 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	<p>Suspected 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.</p>

	<p>Confirmed case: A suspected case confirmed by isolation of <i>N. meningitidis</i>, <i>H. influenza</i>, or <i>S. pneumoniae</i> from CSF or blood.</p>
Respond to alert threshold	<p>Alert threshold:</p> <ul style="list-style-type: none"> • 2 suspected cases in a district per week <p>Response:</p> <ul style="list-style-type: none"> • 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	<p>Action threshold:</p> <ul style="list-style-type: none"> • 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 suspected 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. <p>Response:</p> <ul style="list-style-type: none"> • 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	<p>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.</p> <p>Place: In epidemics (not in endemic situations), plot location of case households and estimate distance to the nearest health facility.</p> <p>Person: Count total sporadic and outbreak cases. Analyse age distribution.</p>
Laboratory confirmation	<p>Diagnostic test</p> <ul style="list-style-type: none"> • Microscopic examination of CSF for Gram negative diplococci • Culture and isolation of meningitis, H. influenza, or S. pneumoniae from CSF or blood <p>Specimen: Cerebral spinal fluid (CSF)</p> <p>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.</p> <p>When to collect the specimen</p>

	<ul style="list-style-type: none"> • Collect specimens from 5 to 10 cases once the alert or epidemic has been reached. <p>How to prepare, store, and transport the specimen</p> <ul style="list-style-type: none"> • 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. <p>When capacity for bacteriology is available and bacteraemia is suspected or CSF culture is not available, collect blood into culture tubes.</p>
References	<ul style="list-style-type: none"> • 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 <i>Neisseria meningitidis</i>, <i>Streptococcus pneumoniae</i> and Haemophilus influenza. WHO document WHO/CDS/EDC/99.7 WHO, Geneva

Annex 9K: Neonatal Death

Background	<p>The death of a baby that occurs at birth or within 28 days of life</p> <ul style="list-style-type: none"> • 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. <p>See Annex 11R for the neonatal death variable list.</p>
Surveillance goal	<p>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.</p>
Surveillance objective	<ul style="list-style-type: none"> • 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	<p>The death of a baby at birth or within the first 28 days of life.</p>
Recommended public health action	<p>Action threshold:</p> <ul style="list-style-type: none"> • A case of neonatal death is a trigger for action at all levels (communities, health facilities, districts, counties, and national). <p>Response:</p> <ul style="list-style-type: none"> • 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.

	<ul style="list-style-type: none"> • 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	<p><u>Time</u>: Graph cases to construct an epidemic curve throughout the year in order to identify trends.</p> <p><u>Place</u>: Plot the location of cases and analyze the distribution.</p> <p><u>Person</u>: Line list all deaths. Analyze the distribution of cases by age (hours or days from birth) and other demographic factors.</p>
Laboratory confirmation	Routine laboratory confirmation for surveillance is not required.
Reference	<ul style="list-style-type: none"> • <u>Newborn Health – WHO</u> 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/

Annex 9L: Neonatal Tetanus

Background	<p>A neuromuscular toxin-mediated illness caused by the anaerobic spore-forming soil bacterium <i>Clostridium tetani</i>. The disease is transmitted when spores enter open wounds (injections, cutting the umbilical cord) or breaks in the skin.</p> <ul style="list-style-type: none"> • 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 <p>See Annex 11P for the neonatal tetanus investigation form.</p>
Surveillance goal	<ul style="list-style-type: none"> • 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	<p><u>Suspected case</u>: 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.</p> <p><u>Confirmed case</u>: Cases are confirmed through clinical investigation using the AFRO standard investigation form in Annex 11P. No laboratory confirmation recommended.</p>
Respond to alert threshold	<p>If a single case is suspected:</p> <ul style="list-style-type: none"> • 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	<p>If a case is confirmed through investigation:</p> <ul style="list-style-type: none"> • 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	<p><u>Time</u>: Graph cases and deaths monthly. Target should reflect elimination target for each district.</p> <p><u>Place</u>: Plot location of case households and location of birth attendants.</p> <p><u>Person</u>: Count monthly cases and deaths. Analyze each case of NNT by cord care practices.</p>
Laboratory confirmation	Laboratory confirmation is not required.

Reference	<ul style="list-style-type: none">• 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
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Annex 9M: Severe Acute Respiratory Syndrome (SARS)

Background	<p>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.</p> <ul style="list-style-type: none"> 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 2).
Surveillance goals	Early detection and investigation of individuals with clinically apparent SARS-CoV.
Standard case definition	<p><u>Suspected case of SARS</u> is an individual with:</p> <ul style="list-style-type: none"> 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 <p><u>Confirmed case of SARS</u>: An individual who tests positive for SARS-CoV infection by the WHO recommended testing procedures</p>
Alert threshold	<p>SARS ALERT</p> <ul style="list-style-type: none"> 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. <p>Respond to suspected case</p> <ul style="list-style-type: none"> Report case-based information immediately to the appropriate levels.

	<ul style="list-style-type: none"> • 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 alerts as appropriate, including facilitating access to laboratory services)
Analyze and interpret data	<p><u>Time</u>: Graph cases and deaths daily/weekly/monthly. Construct an epidemic curve during the outbreak.</p> <p><u>Place</u>: Plot locations of case households and work sites using precise mapping.</p> <p><u>Person</u>: 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.</p>
Laboratory confirmation	<p>Diagnostic test</p> <p>Confirmed positive PCR for SARS virus:</p> <ul style="list-style-type: none"> • At least 2 different clinical specimens (eg nasopharyngeal and stool) OR • The same clinical specimen collected on 2 or more days during the course of the illness (eg 2 or more nasopharyngeal aspirates) OR • 2 different assays or repeat PCR using the original clinical sample on each occasion of testing <p>Seronconversion by ELISA or IFA:</p> <ul style="list-style-type: none"> • 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. <p>Virus isolation:</p> <ul style="list-style-type: none"> • Isolation in cell culture of SARS-Cov from any specimen; plus PCR confirmation using a validated method <p>Specimen</p> <p>Nasopharyngeal wash/aspirate specimen of choice for respiratory viruses.</p> <ul style="list-style-type: none"> • Nasopharyngeal swabs or oropharyngeal swabs • Stool • Serum <p>When to collect:</p> <ul style="list-style-type: none"> • 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. <p>How to prepare, store, and transport</p>

	<ul style="list-style-type: none"> • 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 tilted 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	<p>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.</p>
Reference	<ul style="list-style-type: none"> • 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.

Annex 9N: Smallpox (*Variola*)

Background	<ul style="list-style-type: none">• Smallpox is an acute contagious disease caused by <i>Variola</i> 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: <i>Variola</i> major and <i>Variola</i> minor. The disease followed a milder course in <i>Variola</i> minor, which had a case-fatality rate of less than 1 per cent. The fatality rate of <i>Variola</i> 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. <p><u>The incubation period</u> of smallpox is usually 12–14 days (range 7–17) during which there is no evidence of viral shedding. During this period, the person looks and feels healthy and cannot infect others.</p> <ul style="list-style-type: none">• 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. <p><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.</p> <p>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.</p>
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	<p>In the absence of immunity induced by vaccination, humans appear to be universally susceptible to infection with the smallpox virus.</p> <p>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.</p>
Surveillance goal	To detect and immediately respond to any suspected case of smallpox.
Standard case definition	<p><u>Suspected case</u>: An illness with acute onset of fever > 38.3oC (101oF) followed by a rash characterized by vesicles or firm pustules in the same stage of development without other apparent cause.</p> <p><u>Probable case</u>: A case that meets the clinical case definition, is not laboratory confirmed, but has an epidemiological link to a confirmed or probable case.</p> <p><u>Confirmed case</u>: A clinically compatible case that is laboratory confirmed.</p>
Respond to alert threshold	<p>If a single case is suspected:</p> <ul style="list-style-type: none"> • 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	<p>If a single case is confirmed:</p> <ul style="list-style-type: none"> • 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	<p><u>Time</u>: Graph cases and deaths daily/weekly/monthly. Construct an epidemic curve.</p> <p><u>Place</u>: Map location of case households.</p> <p><u>Person</u>: 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.</p>
Laboratory confirmation	<p>Diagnostic test</p> <ul style="list-style-type: none"> • Isolation of smallpox (<i>Variola</i>) virus from a clinical specimen OR • Polymerase chain reaction (PCR) assay identification of <i>Variola</i> DNA in a clinical specimen Note: Level C or D laboratories only. <p>Specimen</p> <p>Preferred specimens for diagnosis of acute illness during rash phase:</p> <ul style="list-style-type: none"> • Biopsy specimens • Scabs • Vesicular flu • Lesion skin (roof)

	<ul style="list-style-type: none"> • Pustule material <p>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.</p> <p>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.</p> <p>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.</p> <p><u>Biopsy specimens:</u> 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.</p> <p><u>Scabs:</u> Aseptically place scrapings/material into a sterile, leakproof, freezable container. Storage -20 °C to - 70 °C. Transport ~6h at 4 °C.</p> <p><u>Vesicular fluid:</u> 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.</p> <p>Note: approval must be obtained prior to the shipment of potential smallpox patient clinical specimens to a Reference laboratory.</p>
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
Reference	WHO Fact Sheet, Smallpox. http://www.who.int/mediacentre/factsheets/smallpox

Annex 90: Viral Hemorrhagic Fever (including Ebola Virus Disease and Marburg Virus Disease)

Background	<p>The Ebola and Marburg viruses are both RNA viruses in the family of filoviruses.</p> <ul style="list-style-type: none"> • 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 travellers. • 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. <p>See Annex 11N for the VHF General Investigation Form.</p>
Surveillance goals	<ul style="list-style-type: none"> • 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	<p>Routine setting</p> <p><u>Suspected case:</u> 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.</p> <p><u>Confirmed case:</u> A suspected case with laboratory confirmation (Positive IgM antibody, positive PCR from blood), or epidemiologic link to confirmed cases or outbreak.</p> <p>For outbreak setting case definition may be changed to correspond to event.</p> <p>Outbreak setting (more sensitive case definition)</p> <p>Suspected case:</p> <ul style="list-style-type: none"> • 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; <p>OR</p> <ul style="list-style-type: none"> • Any person with acute fever and inexplicable bleeding; <p>OR</p> <ul style="list-style-type: none"> • Any sudden, inexplicable death; <p>OR</p> <ul style="list-style-type: none"> • Clinical suspicion of VHF <p>OR</p> <ul style="list-style-type: none"> • 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) <p>Note: During epidemics, most infected patients do not show hemorrhagic symptoms, therefore, the case definition for suspected or confirmed case does not include it.</p> <p>Probable case: A suspected case (alive or dead) evaluated by a clinician or surveillance team having an epidemiological link with a confirmed case.</p> <p><u>Confirmed case:</u> A suspected case with laboratory confirmation (positive IgM antibody, positive PCR or viral isolation).</p>
Respond to alert threshold	<p>If a single case is suspected:</p> <ul style="list-style-type: none"> • 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)

	<ul style="list-style-type: none"> • Begin or enhance death reporting and surveillance.
Respond to action threshold	<p>If a single case is confirmed:</p> <ul style="list-style-type: none"> • 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.) <p>Request additional help from other levels as needed. National level will notify WHO per International Health Regulations.</p>
Analyze and interpret data	<p><u>Person</u>: 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.</p> <p><u>Time</u>: Graph cases and deaths daily/weekly. Construct an epidemic curve during the outbreak.</p> <p><u>Place</u>: Map locations of cases’ households and their movements during incubation period.</p>
Laboratory confirmation	<p>Diagnostic services for EVD and MVD are not routinely available in all laboratories. See Annex 1F which includes a list of reference laboratories that confirm priority diseases. Test results usually take 2 days after the specimen arrives at the laboratory.</p> <p>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.</p>

	<p>Specimen</p> <p>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.</p> <p>When to collect Collect specimen from all suspected cases, alive or dead, as soon as the case is suspected.</p> <p>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 4 for Infection Prevention and Control procedures.</p> <p>For PCR: Whole blood into an EDTA purple top tube Post-mortem oral swab placed into viral transport medium</p> <p>For ELISA: Blood sample into red top tube for serum</p> <p>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</p>
Case Management	<ul style="list-style-type: none"> • <u>Suspect cases</u> 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.
Reference	<ul style="list-style-type: none"> • 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/

	<ul style="list-style-type: none">• 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
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Annex 9P: Yellow Fever

Background	<ul style="list-style-type: none"> • Acute viral hemorrhagic disease caused by a flavivirus transmitted in urban settings in a human-mosquito-human transmission cycle via the domestic species of <i>Aedes</i> 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 immunisation. 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, hepatitis A-E, Epstein-Barr virus, West Nile virus), or bacterial diseases (such as leptospirosis, rickettsial diseases, gastrointestinal 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. <p>See Annex 11G for the IDSR line list during an outbreak.</p>
Surveillance goal	<ul style="list-style-type: none"> • 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	<p><u>Suspected case</u>: Any person with acute onset of fever, with jaundice appearing within 14 days of onset of the first symptoms.</p> <p><u>Probable case</u>: A suspected case AND one of the following:</p> <ul style="list-style-type: none"> • 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 <p><u>Confirmed case</u>: A probable case and absence of yellow fever immunization within 30 days before onset of illness; and one of the following:</p> <ul style="list-style-type: none"> • Detection of YF-specific* IgM

	<ul style="list-style-type: none"> • 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 <p>OR one of the following:</p> <ul style="list-style-type: none"> • 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 <p>*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.</p>
Respond to alert threshold	<p>If a single case is suspected:</p> <ul style="list-style-type: none"> • 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	<p>In addition to alert threshold response If a single case is confirmed:</p> <ul style="list-style-type: none"> • 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	<p><u>Time</u>: Generate Weekly Graphs of cases and deaths. During outbreaks, construct epidemic curves (to monitor daily then weekly trends).</p> <p><u>Place</u>: Plot location of case households and occupation with precise mapping.</p> <p><u>Person</u>: Report immediate case-based information for cases and deaths. Report summary totals weekly.</p> <p>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.</p>

<p>Laboratory Confirmation</p>	<p>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</p> <p>Specimen Serum in the acute and convalescent phases of the illness; In the event of death, postmortem liver specimen.</p> <p>When to collect the specimen</p> <ul style="list-style-type: none"> • 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. <p>How to prepare, store, and transport the specimen</p> <ul style="list-style-type: none"> • 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 <p>Results Laboratory results should be received within 7 days of reception of the specimen in the laboratory.</p>
<p>Reference</p>	<ul style="list-style-type: none"> • 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 Africa. Brazzaville, Congo, from 13 to 15 October 2011 • http://www.who.int/csr/disease/yellowfev/case-definition/en/

Annex 9Q: Unexplained Cluster of Health Events or Deaths

Background	<p>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.</p> <p>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 Section 2 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?</p> <p>The report that there is a possible outbreak or unusual event may come from different sources including:</p> <ul style="list-style-type: none"> • 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 <p>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 alerts will define the likelihood that they will be reported and vigilance continues.</p> <p>A literature review into the important obstacles for reporting Public Health Events of International concern found the following:</p> <ul style="list-style-type: none"> • 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 endeavour. • 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. <p>Strategies to enhance completeness of notifiable disease reporting and IHR events include the following:</p> <ul style="list-style-type: none"> • 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
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	<ul style="list-style-type: none"> 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. <p><u>How reported information is handled:</u> 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.</p> <p>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).</p> <p>See Annex 11G for the IDSR line list during an outbreak. Forms may be developed for specific investigations.</p>
Surveillance goal	<ul style="list-style-type: none"> 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	<p><u>These events are not well detailed or standardized at this time.</u> In the IHR 2005 two events were chosen to help guide the surveillance functionality and allow early detection and response.</p> <ul style="list-style-type: none"> Unexplained deaths Clusters of illness <p><u>Community Alert Triggers</u> 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.</p> <p>Examples include:</p>

	<ul style="list-style-type: none"> • <u>any outbreak or cluster</u>: A group of people are sick (or die) with similar symptoms in one place (community, school, or health facility) at the same time • <u>any unusual death or cluster of deaths</u>: 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 <p><u>Health Facilities</u> 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”.</p> <p>Any infectious or infectious-like syndrome considered unusual by the clinician based on:</p> <ul style="list-style-type: none"> • 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 <p>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)”.</p>
Respond to alert threshold	<p>If a single unexplained death or cluster of deaths or illness is suspected:</p> <ul style="list-style-type: none"> • 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	<p><u>If a case is validated by DHO/CHO</u>: 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.</p> <ul style="list-style-type: none"> • 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	<p><u>Time</u>: Track onset of illness or symptoms and time (date) of death.</p>

	<p><u>Place</u>: 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</p> <p><u>Person</u>: Count cases and track demographic factors. Analyze age distribution, occupational association and recent exposures. Assess risk factors.</p>
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.
References	<ul style="list-style-type: none"> • 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: 978 929 023 2476 (NLM Classification: WA 105)

ANNEX 10

Annex 10A: 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 Disease Prevention and Control (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

Annex 10B: 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

Annex 10C: 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 11: IDSR REPORTING AND CASE INVESTIGATION FORMS

The following annexes are examples of program specific forms. Some forms are for documenting initial findings while others are designed for in-depth investigation.

Annex 11A Instructions on unique IDs

Immediate Reporting Forms

Annex 11B Liberia IDSR Case Alert and Lab Submission Form

Annex 11C Community Trigger & Referral Form

Weekly Reporting Forms:

Annex 11D Weekly Report Form for County

Annex 11E Weekly Report Form for District

Annex 11F Weekly Report Form for Health Facility

Case Investigation:

Annex 11G IDSR Outbreak Line List

Annex 11H Contact Listing Form

Annex 11J Contact Follow Up Form

Annex 11K Acute Flaccid Paralysis (AFP) Case Investigation Form

Annex 11L Acute Flaccid Paralysis (AFP) Follow Up Exam Form

Annex 11M EVD Outbreak Case Investigation Form

Annex 11N Viral Hemorrhagic Fever Case Investigation Form

Annex 11P Maternal Death Variable List

Annex 11Q Neonatal Death Variable List

Annex 11R Neonatal Tetanus Case Investigation Form

Annex 11S Cholera Investigation Variable List

Annex 11A: 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 “001”. For every additional case, increase the count. This count never restarts at 001. 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 11B: 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
sn	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.
ReportingDate	Date the IDSR Case Alert Form was filled out, or date the case information was first collected
IDSRID	The unique identification for the case as explained in the beginning of Annex 11A . The IDSR-ID should be assigned as [Three letter county code]-[Health facility code]-[Case ID]
PatientRecordID	The medical register number, health record number, or patient record ID at the health facility
EpiWeek	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.
ReportingHealthFacility	The name of the reporting health facility. If the case was detected in the community, enter the name of the nearest health facility
ReportingDistrict	Name of the district reporting the case
ReportingCounty	Name of county reporting the case
Disease	Name of the suspect disease at time of report
TravelHistory	Has the patient traveled internationally in the past month?
CEBSTrigger	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"
PatientFirstName	First name of the patient, include middle name if available
PatientLastName	Last name or surname of the patient
PatientSex	Sex of the patient (male or female)
PatientAge	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.
AgeType	Specify if the age of the patient was written in years, months, or days
DateofBirth	Date of birth of the patient, if known
CountyofResidence	The county where the patient currently lives
DistrictofResidence	The district where the patient currently lives
CommunityofResidence	The name of the village or town where the patient currently lives
LocatingInformation	Any other information useful for locating for the patient, such as the name of the mother etc
DateofOnset	The date at which the symptoms started. In the case of maternal or neonatal death, write the date of death here

DateSeen	The date which the patient was seen by a clinician at the health facility
InOutPatient	Was the patient inpatient or outpatient at the time of report?
Outcome	Write whether the patient is currently alive or dead
Classification	The final classification of the case (e.g., Confirmed, Epi-linked, Probable, Suspect, Discarded)
ReportingPersonName	The name of the person who reported the case
PersonCollectingSpecimenName	The name of the person who collected the specimen
VaccinationStatus	When reporting a vaccine preventable condition, was the patient vaccinated to the disease of report?
NumDoses	When reporting a vaccine preventable condition, write the number of doses of vaccine the patient received for the disease of report
DateofLastVaccination	When reporting a vaccine preventable condition, write the date of the last vaccination for the disease of report
DateSpecimenCollected	Date when the specimen was collected from the patient
DateSpecimenSent	Date when the specimen was sent to the laboratory
SpecimenType	Write the type of specimen (blood, stool, CSF, oral swab, throat swab, rectal swab)
Comments	Any other comments on the case
CauseofDeath	The cause of death if reporting a death event
LaboratoryName	The name of the laboratory reported case results
DateSpecimenReceived	Date when the lab received the specimen
SpecimenCondition	The specimen condition when it was received at the lab
DateTested	The date the specimen was tested
TypeofTestPerformed	The type of laboratory tests performed of the specimens
FinalResults	The final lab results (e.g.,: positive, negative, indeterminate)
DateResultReported	Date the lab results were reported
SpecimenID	The specimen ID for the specimen
LabComments	Comments provided by the laboratory on the specimen testing
FinalDiseaseStatus	The final disease reported for this case
FinalClassification	The final epidemiological classification for this case
FinalOutcome	The final outcome (dead/alive) for this case
DateofFinalClassification	The date at which the final classification was made

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:

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):

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

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 9**. 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.
 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 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:

Record the name of the laboratory analyst and who reported the results in the lab, send the lab results to the designated recipients.

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 3** in **Section 1** 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



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: / /	IDSR-ID: - -	Patient Record ID:
Day Month Year	County Code Facility Code	Case ID

DISEASE REPORTING

Reporting Health Facility:	Reporting District:	Reporting County:
Disease or condition of alert* (select one): <input type="checkbox"/> Acute Bloody Diarrhea (Shigellosis) <input type="checkbox"/> Meningitis <input type="checkbox"/> Member of Unexplained Cluster of Death <input type="checkbox"/> Cholera (AWD) <input type="checkbox"/> VHF (EVD) <input type="checkbox"/> Member of Unexplained Cluster of Disease <input type="checkbox"/> Human Rabies <input type="checkbox"/> Yellow Fever <input type="checkbox"/> Other: _____ <input type="checkbox"/> Lassa Fever <input type="checkbox"/> Maternal Death <i>Specify:</i> _____ <input type="checkbox"/> Measles <input type="checkbox"/> Neonatal Death _____		
*Report Acute Flacid Paralysis (AFP) and Neonatal Tetanus on disease specific forms		
Crossed International Border in last 1 month: <input type="checkbox"/> Yes <input type="checkbox"/> No Case detected at community level: <input type="checkbox"/> Yes <input type="checkbox"/> No		

PATIENT DEMOGRAPHICS

Patient First Name:	Patient Last Name:	Patient Sex:	Patient Age:
		<input type="checkbox"/> Male <input type="checkbox"/> Female	<input type="checkbox"/> Years <input type="checkbox"/> Months <input type="checkbox"/> Days
Date of Birth: / /	County of Residence:	District of Residence:	
Day Month Year			
Community of Residence:	Locating Information*:		
*If applicable, include head of household, phone number, and name of mother if young			

CLINICAL INFORMATION

Date of onset*: / /	Date seen: / /	In/out-Patient: <input type="checkbox"/> Inpatient <input type="checkbox"/> Outpatient	Outcome: <input type="checkbox"/> Alive <input type="checkbox"/> Dead	Classification: <input type="checkbox"/> Probable <input type="checkbox"/> Suspected
Day Month Year	Day Month Year			
Reporting Person Name:	Phone Number:	Comments*:		
Person Collecting Specimen Name:	Phone Number:	Only for disease of this alert: Vaccination History: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown # Doses: <input type="text"/> Date of Last Vaccination: / / Day Month Year		
Date of Specimen Collection: / /	Date Specimen sent to Lab: / /	Specimen Type*:		
Day Month Year	Day Month Year	*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: / /	Specimen Condition: <input type="checkbox"/> Adequate <input type="checkbox"/> Inadequate
	Day Month Year	
Date Specimen Tested: / /	Type of Tests Performed:	Specimen ID:
Day Month Year		
Final Lab Results:	Date Results reported: / /	
	Day Month Year	

Annex 11C: Community Trigger & 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 through 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**
- | | |
|--|---|
| <input type="radio"/> 1 Acute flaccid paralysis (Polio) | <input type="radio"/> 7 Meningitis (Stiff neck) |
| <input type="radio"/> 2 Acute watery diarrhea / Cholera (Runny stomach) | <input type="radio"/> 8 Maternal Death (Big belly death) |
| <input type="radio"/> 3 Bloody Diarrhea (pu-pu with blood) | <input type="radio"/> 9 Neonatal Tetanus (Jerking sickness) |
| <input type="radio"/> 4 Human Rabies (Dog/any other animal bite) | <input type="radio"/> 10 Neonatal Death (Young baby death) |
| <input type="radio"/> 5 Measles | <input type="radio"/> 11 Unknown health problems grouped together |
| <input type="radio"/> 6 Viral Hemorrhagic Fever (Ebola, Lassa Fever, & Yellow Fever) | <input type="radio"/> 12 Any death in human or group of animals that you don't know why it happened |
| <input type="radio"/> Other (write in): _____ | |

- Core Referral**
- | | | |
|---|------------------------------------|--|
| <input type="radio"/> Family Planning | <input type="radio"/> Child Health | <input type="radio"/> Maternal & Infant Health |
| <input type="radio"/> Child Vaccination | <input type="radio"/> Tuberculosis | <input type="radio"/> Leprosy |
| <input type="radio"/> Mental Health | <input type="radio"/> HIV | <input type="radio"/> 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 11D, 11E, 11F: 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 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.
- 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.

Annex 11G: 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 of Report: _____

Date investigation started: _____

IDSR ID <small>County-HealthFacility-CaseID</small>	Name	Health Facility	Village/Town	Sex <small>M/F</small>	Age <small>In yrs. mths if <1yr</small>	Date of onset of illness <small>(dd/mm/yy)</small>	Date seen at HealthFacility <small>(dd/mm/yy)</small>	Inpatient or Outpatient <small>I/O</small>	Number of Vaccinations <small>Only for disease of investigation</small>	Current Status <small>Alive/Dead</small>	Test Results	Other (write in as needed)

*Specimen collection information and classification such as Epi-linked may be important to collect based on disease of investigation

Annex 11H: 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 followup.

Annex 11J: Contact Followup 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 Followup 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: _____ Sex: M F Age: _____ 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 throat 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: ___/___/___ Date of hospitalisation: ___/___/___
dd/mm/yy dd/mm/yy

Completed by: _____ Position/Title: _____ Date: ___/___/___ (dd/mm/yy)

Annex 11K: 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 Sex: M=Male
(If DOB Unknown) F=Female
 Date of Birth (DOB) ____/____/____

NOTIFICATION/INVESTIGATION:

Notified by: _____ Date of Notification ____/____/____ Date of Investigation: ____/____/____

HOSPITALIZATION

Hospitalized: 1=Y Date of admission to hospital (if applicable): ____/____/____
 2=N
 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? Asymmetric? Site of Paralysis
1=Y, 2=N, 99=Unknown 1=Y, 2=N, 99=Unknown LA RA
 LL RL

AFTER INVESTIGATION, WAS THIS A TRUE AFP?

1=Y *If not, do not fill out the rest of the form and record 6 under final classification*
 2=N

IMMUNIZATION HISTORY

Total Number of Polio vaccine doses OPV Dose at Birth ____/____/____ 2nd ____/____/____ 4th ____/____/____
Exclude doses at birth 99=Unknown 1st ____/____/____ 3rd ____/____/____ 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 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 V1 V2 V3 (R) NPENT NEV

1=Y, 2=N Type 1,2,3 1=Y, 2=N 1=Positive 2=Negative

FOLLOW-UP EXAMINATION

____/____/____ Date of Follow-up exam Residual Paralysis? LA RA 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 LL RL

FINAL CLASSIFICATION

1=Confirmed Polio 7=cVDPV Sero-type (1, 2, 3)
 2=Compatible 8=aVDPV
 3=Discarded 9=iVDPV
 6=Not an AFP case

INVESTIGATOR: Name _____ Title _____

Unit: _____ Address _____ Tel: _____

Annex 11L: 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

District: _____ Region/Province: _____ Nearest Health Facility: _____
Address: _____ Village: _____ Ville : _____
Father/Mother: _____
Patient Name: _____ Age : ____ years ____ months Sex: M=Male
(If DOB unknown) 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 11M: 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 11A** 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

REQUIRED FIELDS

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

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 <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk	Joint pain <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk
Vomiting/nausea <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk	Headache <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk
Diarrhea <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk	Cough <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk
Intense fatigue/weakness <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk	Difficulty breathing <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk
Anorexia/loss of appetite <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk	Difficulty swallowing <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk
Abdominal pain <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk	Hiccups <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk
Chest pain <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk	Unexplained bleeding <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk
Muscle pain <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk	<i>If yes, list areas of body</i> _____

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
	/ /			<input type="checkbox"/> Alive <input type="checkbox"/> Dead	/ /
	/ /			<input type="checkbox"/> Alive <input type="checkbox"/> 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 _____

Annex 11N: Viral Hemorrhagic Fever Case Investigation Form

The VHF case investigation is used to investigate Yellow Fever, Lassa Fever, Marburg, 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:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK	Skin Rash	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK
Vomiting/Nausea	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK	Bleeding from injection sites	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK
Anorexia/Loss of Appetite	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK	Bleeding gums	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK
Diarrhea	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK	Bleeding into eyes (red eyes)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK
Intense Fatigue	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK	Black or bloody stool	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK
Abdominal Pain	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK	Blood in vomits	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK
Muscle or Joint Pain	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK	Bleeding from nose	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK
Difficulty swallowing	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK	Bleeding from vagina	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK
Difficulty breathing	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> DNK	Hiccoughs	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> 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 _____ IDSR-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 11P: 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 **Epid Number:** _____ - _____ - _____ - _____ Received _____
 Only (completed by county team) County _____ County _____ Year Onset _____ Case Number _____ 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:** ____/____/____ **Date Case Investigated:** ____/____/____
 .dd mm yyyy .dd mm yyyy

MOTHER'S VACCINATION HISTORY

Please use the following key, 1=Y, 2=N, 9=U, where applicable.

Question	Answer	1 st ____/____/____	4 th ____/____/____
Mother vaccinated with TT?			
Have card?		2 nd ____/____/____	5 th ____/____/____
Number of doses:		3 rd ____/____/____	If >5, last dose ____/____/____
Vaccination status of mother prior to delivery? **		**1 = up-to-date, 2 = not up-to-date, 9 = unknown	

BIRTH OF INFANT

Date of birth: ____/____/____ *Please use the following key, 1=Y, 2=N, 99=U, where applicable.*
 dd mm yyyy

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

Seen in OPD?

Admitted?

Answer 1=Y, 2=N, 99=U

COMMENTS:

RESPONSE

Please use the following key, 1=Y, 2=N, 99=U, where applicable.

Questions
 Mother given protective dose of TT within 3 months of report?
 Supplemental immunization within same locality as the case?

Answer

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 11Q: 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
Patient Information	
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 11A)
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; Oxytocin; Anti-seizure drugs; Oxygen; Anti-malarial; Other medical treatment; Surgery; Manual removal of placenta; Manual intra uterin aspiration; Curettage, laporotomy, hysterctomy, intrsumental delivery (Forceps;Vacuum), Caesarian section, anetshesia (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 11R: 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
Questions / Variables	
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)	
Age (in days) of the deceased	The county code, health facility code, and case ID that make the IDSR ID
Time of death	The age in days of the deceased newborn
	The time of death of the newborn (specify, during delivery, early neonatal period (1 st 7 days) late neonatal period 8-28 days)
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 health 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 deceased to receive any medical care or surgical interventions?	Write how long it took for the deceased 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 11S: 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	
<i>Vibrio cholera</i> 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