

Technical Guidelines for

# INTEGRATED DISEASE SURVEILLANCE AND RESPONSE IN THE AFRICAN REGION

2ND EDITION



2010



# **Technical Guidelines for Integrated Disease Surveillance and Response in the African Region**

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The second edition of the Integrated Disease Surveillance and Response (IDSR) Technical Guidelines was prepared by the Disease Prevention and Control Cluster with active participation and involvement of programmes dealing with disease surveillance at the WHO Regional Office for Africa (AFRO), Brazzaville, Congo as well as Centers for Disease Control and Prevention (CDC), Atlanta, USA.

The purpose of the revision was to update existing information, include other priority diseases, conditions and public health events and incorporate aspects of the International Health Regulations (IHR) that deal with disease surveillance.

In planning to update these guidelines, suggestions and advice for improving the recommendations were sought and gratefully received from the IDSR development teams who prepared the 1<sup>st</sup> edition. This revision builds on the technical expertise from more than 100 surveillance and disease experts at WHO, CDC and Ministries of Health in African countries who conceived and produced the 1<sup>st</sup> edition.

The revision process involved internal WHO consultation followed by a wider consultation that involved a series of meetings with various partners and Member States. In addition, an *ad hoc* IDSR task force was constituted to help with the revision process. The final draft was peer reviewed by the *ad hoc* task force as well as during a final partner consultative meeting held in August 2010.

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## Abbreviations

AFP	Acute flaccid paralysis
ARI	Acute respiratory infection
AEFI	Adverse events following immunization
AFRO	WHO Regional Office for Africa
BU	Buruli ulcer
CFR	Case fatality rate
CDC	Centers for Disease Control and Prevention
CCHF	Crimean-Congo hemorrhagic fever
DHF	Dengue haemorrhagic fever
DSS	Dengue shock syndrome
DRRT	District epidemic rapid response team
DHMT	District Health Management Team
EHF	Ebola haemorrhagic fever
EPR	Epidemic and Pandemic Alert and Response
EPI	Expanded Program on Immunizations
XDR-TB	Extensively drug resistant tuberculosis
Hib	<i>Haemophilus influenzae</i> type b
HAV	Hepatitis A Virus
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HDV	Hepatitis D Virus
HMIS	Health management information system
HSV	Herpes simplex virus
HEV	Hepatitis E Virus
HBP	High blood pressure
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
PIV	Human parainfluenza virus
IPC	Infection Prevention and Control
ILI	Influenza-like Illness
ITN	Insecticide treated nets
IDS	Integrated Disease Surveillance
IDSR	Integrated Disease Surveillance and Response

## Abbreviations

IMCI	Integrated Management of Childhood Illness
IHR	International Health Regulations
LBW	Low birth weight
LF	Lymphatic filariasis
MUAC	Middle upper arm circumference
MDR-TB	Multi drug resistant tuberculosis
Nm	Neisseria meningitides
NNT	Neo-natal tetanus
NCD	Non-communicable disease
PPE	Personal protective equipment
PoE	Point of Entry
PHEIC	Public health emergencies of international concern
PHEMC	Public health emergency management committees
PHENC	Public health event of national concern
RRT	Rapid response team
RVF	Rift Valley Fever
SARI	Severe Acute Respiratory Infection
SARS	Severe Acute Respiratory Syndrome
STI	Sexually transmitted infection
TB	Tuberculosis
USAID	United States Agency for International Development
VHF	Viral haemorrhagic fever
WNV	West Nile Virus
WHO	World Health Organization

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## Foreword to the second edition

More than ten years ago, the World Health Organization Regional Office for Africa (AFRO) and its Member States, along with their technical partners, adopted a strategy for developing and implementing comprehensive public health surveillance and response systems in African countries. The strategy was called Integrated Disease Surveillance (IDS). To highlight the essential link between surveillance and response, subsequent documents referred to Integrated Disease Surveillance and Response (or IDSR). The first edition of the IDSR Technical Guidelines (2002) was widely adopted and adapted throughout the African region. Progress towards coordinated, integrated surveillance systems has been mixed, but almost every country in the region and their partners has invested human and material resources in strengthening capacities for public health systems in order to detect, confirm and respond to public health threats in time to prevent unnecessary illness, death, and disability.

As a result, the second edition of the IDSR Technical Guidelines was developed in response to several factors relevant to the last decade. During the last ten years, many changes have occurred in Africa's health, social, economic, environmental and technical environment. Between 2000 and 2010, the emergence of new diseases, conditions and events resulted in the need to review the recommendations for evolving public health priorities for surveillance and response. For example, while the initial goal of IDSR was to address communicable diseases, many countries have begun to include non-communicable diseases in their IDSR program. Also, the emergence of pandemic influenza (avian and H1N1) emphasized the importance of community surveillance for linking detection to rapid confirmation and response. Disease-specific programs have refocused their objectives to address broader system strengthening objectives. As well, countries continue to work towards achievement of the Millennium Development Goals. The changes are not only in the disease landscape but also are seen in a broader context with events such as:

- Increased migration to cities with subsequent increases in traffic injuries, rates of non-communicable diseases, and health conditions related to crowded housing
- Wider access to wireless technologies such as cellular phones and internet
- Impact of climate change on shifting disease patterns
- Increased recognition of the need for better coordination between human and animal health surveillance
- Increased interest from donor and technical partners to support surveillance and disease-reduction strategies, and
- Heightened awareness of the importance of national core capacities for surveillance and response demonstrated by adoption of the International Health Regulations (2005).

In light of these changes over the last ten years, WHO-AFRO and its technical partners engaged in a review of the first edition of the Technical Guidelines and developed updated recommendations to address the current situation and needs. These recommendations are presented in this second edition of the IDSR Technical Guidelines.

### ***Current status of IDSR in countries***

In June of 2010, a self-assessment questionnaire was administered to the 46 Member States in the African Region to determine progress with implementing the IDSR strategy. The findings indicated that 43 out of the 45 responding countries were at different levels of IDSR implementation. All the countries had designated national surveillance structure and had identified IDSR priority diseases or conditions. In relation to emergency preparedness and response, only 24 of the 45 countries reported having an operations command and control center to coordinate and monitor outbreaks and other public health emergencies. Of the 4,386 districts present in the 45 countries, 3,801 (86%) were implementing IDSR strategy to some extent in the 12 months preceding the assessment. Several countries have already begun including surveillance for non-communicable diseases.

This assessment highlighted critical gaps in district level implementation of IDSR namely:

- Absence of IDSR dedicated data staff at district level in 30% of the countries surveyed
- Lack of epidemic management committees in over 80% of districts
- Absence of rapid response teams in over 50% of districts
- Lack of logistic and communication capacities in a significant numbers of districts in the 45 countries
- Lack of consistency in the use of IDSR core indicators in monitoring and evaluating performance at all levels

### ***Major actions for strengthening surveillance in the African region***

In the last decade, two major actions have demonstrated global and regional attention on improving disease surveillance systems in Africa. The first was the adoption of integrated disease surveillance and response (IDSR) in September 1998 when the 48<sup>th</sup> World Health Organization Regional Committee for Africa met in Harare, Zimbabwe and Member States adopted resolution AFR/RC48/R2 for improving the availability and use of data for public health action at all levels of national systems. The vision of this strategy was to improve the ability of all levels of the health system to detect, confirm, and respond to diseases and other public health events in order to reduce high levels of death, illness and disability in African communities.

The second major action was the adoption of the International Health Regulations (IHR) on 23 May 2005 by the Fifty-eighth World Health Assembly in Geneva, Switzerland through Resolution WHA58.3. The IHR entered into force on June 15, 2007. The Regulations are a

legally binding instrument designed to help protect all States from the international spread of disease without interfering with international traffic and trade. The IHR (2005) address the threat to international public health security and trade caused by emerging and re-emerging diseases including public health emergencies of international concern. Most importantly to these guidelines, the IHR (2005) call for strengthening national core capacities for surveillance and response throughout national health systems.

### *Current public health priorities*

Both communicable and non-communicable diseases remain among the leading causes of death, illness and disability in African communities. While much progress has been made in the last decade towards improving national and regional capacity for effective surveillance and response, communicable diseases such as cholera, viral hemorrhagic fevers, malaria, severe acute respiratory illness, diarrhoeal diseases, HIV/AIDS and tuberculosis remain high priorities for national public health programs. Additionally, non-communicable diseases such as hypertension and diabetes are emerging threats in the Africa Region. As well, conditions and events such as malnutrition and maternal deaths are critical targets for national public health programs. While these diseases present a threat to the well-being of African communities, there are well-known interventions that are available for detecting, controlling and preventing them. By strengthening the availability of surveillance information, supported by laboratory confirmation when indicated, these diseases, conditions and events can be detected and investigated in time to take action to limit their impact on the health of affected communities.

It is clear that much has been achieved in the last 10 years and we hope that this second edition of the IDSR Technical Guidelines gives evidence for the high level of commitment shared by WHO AFRO, the Member States, and their technical partners for stronger, better public health systems that can contribute to healthier African communities.



# INTRODUCTION

The following pages introduce the concepts of disease surveillance and integrated surveillance and response. How integrated disease surveillance works and the objectives of IDSR will also be discussed as well as how the International Health Regulations can be implemented through IDSR. Next, an explanation of how surveillance functions are described in these guidelines is given and how districts can use these guidelines, with support from WHO in the African region, strengthen surveillance and response. Finally, the reader is introduced to the priority diseases recommended for IDSR.

## What is disease surveillance?

Surveillance is the ongoing systematic collection, analysis, and interpretation of health data. It includes the timely dissemination of the resulting information to those who need them for action. Surveillance is also essential for planning, implementation, and evaluation of public health practice.

Several types of surveillance are used in national programs. The choice of method depends on the purpose of the surveillance action. In general, types of surveillance methods describe:

- A focused location for surveillance (such as health facility-based surveillance or community-based surveillance).
- A designated or representative health facility or reporting site for early warning of epidemic or pandemic events (sentinel surveillance).
- Surveillance conducted at laboratories for detecting events or trends not necessarily evident at other sites.
- Disease-specific surveillance involving activities aimed at targeted health data for a specific disease.

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

## What is Integrated Disease Surveillance and Response?

Disease control and prevention programs have been successful when resources were dedicated to detecting a targeted disease, obtaining laboratory confirmation of the disease, and using thresholds to initiate action at the district level. Accordingly, the World Health Organization (WHO) Regional Office for Africa (AFRO) proposed an Integrated Disease Surveillance and

Response (IDSR) approach for improving public health surveillance and response in the African Region linking community, health facility, district and national levels.

IDSR promotes rational use of resources by integrating and streamlining common surveillance activities. Surveillance activities for different diseases involve similar functions (detection, reporting, analysis and interpretation, feedback, action) and often use the same structures, processes and personnel. Additionally, IDSR takes into account the *One World-One Health* perspective *which* is a strategy that addresses events at the intersection of human, domestic animal, wildlife, and ecosystem health. For example, 75% of recently emerging and re-emerging diseases affecting human health are of animal origin (HIV/AIDS and avian influenza, for example).

*One World-One Health* is an interdisciplinary, holistic and integrated approach to health problems. Diseases and other threats resulting from climate change, food safety, and chemical hazards constitute a complex set of challenging events involving human, animal and environmental health. The *One World-One Health* strategy promotes the integration and coordination within and across sectors for disease surveillance, outbreak investigation and response activities undertaken by professionals from various fields. It is a strategy that ensures the strengthening of each sector and enhances intersectoral linkages to facilitate efficient utilization of scarce resources, effective and prompt leveraging of various sectors capabilities for a better disease prevention and control.

We hope that these guidelines provide professionals from related sectors with a better understanding of the structure, functioning, methods and mechanisms that form the basis of disease surveillance including outbreak investigation and response from the human health perspective and lead to better intersectoral integration.

## **What takes place in an integrated system?**

- All surveillance activities are coordinated and streamlined. Rather than using scarce resources to maintain separate vertical 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. This is because 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, regional 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.

**Integration** refers to harmonizing different methods, software, data collection forms, standards and case definitions in order to prevent inconsistent information and maximize efforts among all disease prevention and control programmes and stakeholders. Where possible, countries use a common reporting form, a single data entry system for multiple diseases, and common communication channels. Training and supervision are integrated, a common feedback bulletin is used, and other resources such as computers and vehicles are shared. IDSR involves nearly full time 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 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, provincial and district multisectoral, 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 (please see Section 5.0 of these guidelines).

## **Objectives of Integrated Disease Surveillance and Response**

The specific objectives of IDSR are to:

- Strengthen the capacity of countries *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 forms, personnel and resources can be used more efficiently.
- *Improve the use of information* to detect changes in time in order to conduct a rapid response to suspect epidemics and outbreaks; monitor the impact of interventions: for example,

declining incidence, spread, case fatality, and to facilitate evidence-based response to public health events; health policy design; planning; and management

- *Improve the flow of surveillance information* between and within levels of the health system.
- *Strengthen laboratory capacity and involvement* in confirmation of pathogens and monitoring of drug sensitivity.
- *Increase involvement of clinicians* in the surveillance system.
- *Emphasize community participation* in detection and response to public health problems including event based surveillance and response in line with IHR
- *Trigger epidemiological investigations* in detection, investigation and reporting of public health problems, and in the implementation of effective public health interventions.

## **IDSR and IHR (2005)**

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

The scope of IHR has been expanded from cholera, plague and yellow fever to all public health emergencies of international concern. They include those caused by infectious diseases, chemical agents, radioactive materials and contaminated food. Since the goal of IDSR is to strengthen the overall national system for the surveillance of diseases particularly at district level and aims to ensure a continuous and timely provision and use of information for public health decision making, IDSR offers to the implementation of IHR:

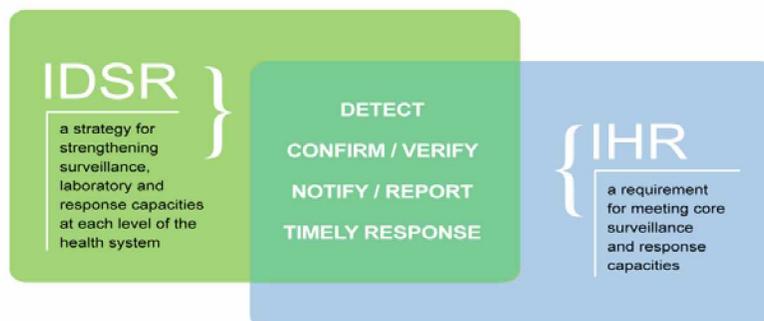
- An infrastructure and resources for surveillance, investigation, confirmation, reporting and response
- Experienced human resources
- Defined implementation process (sensitization, assessment, plan of action, implementation, monitoring and evaluation)
- Generic guides for assessment; Plan of action development; Technical guidelines; training materials; tools and Standard Operating Procedures that incorporate IHR components.

Thus, IDSR is a system with the potential to ensure a reliable supply of information to the national level in order to fulfill IHR requirements. The IHR provide an opportunity to address the threat to international public health security and trade caused by reemerging and emerging infectious diseases including public health emergencies of international concern (PHEIC). They also provide an excellent opportunity to strengthen surveillance and response systems, and to act as a potent driver for IDSR implementation.

Importantly, Member States in the African Region recommended that IHR (2005) should be implemented in the context of IDSR. IHR is a binding and legal instrument. It calls for strengthening of national capacity for surveillance and control, including sites such as points of entry (i.e. ports, airports and ground crossings); prevention, alert and response to international public health emergencies; global partnerships and international collaboration; and highlights rights, obligations, procedures and monitoring of progress. Since the IHR (2005) came into force, some progress has already been noted, namely that all member states have designated an IHR national focal point and are in different stages of implementing IHR.

IHR (2005) is not a separate surveillance system but requires a “sensitive and flexible surveillance system that meets international standards”. IHR (2005) affects cross-border collaboration for particular key events and can easily be achieved when IDSR works. 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 as described in the diagram below (detection, reporting, confirmation and verification, notification and reporting and timely response).

## Implementing IHR through IDSR



The IHR have practical implications for IDSR. In the IHR (2005), all public health conditions and events of international concern (PHEIC) should be detected, assessed and responded to timely, using an adapted response rather than preset measures. The IHR (2005) include the control of borders (ports, ground crossing Points of Entry) and containment at source of public health events. Because of the major role it plays for timely detection and verification of suspected public health emergencies, event-based surveillance is now part of IDSR and the IHR.

**Note:** The process of notifying WHO of events under the IHR calls upon the use of the “decision instrument” that involves the implementation of core IDSR functions: case definition, laboratory confirmation, data analysis, interpretation of the findings and reporting (please see Annex 2C in Section 2). A summary of the events required by the IHR for reporting is included in the following box:

***The three main categories of events that require to be notified under the IHR are:***

- Four conditions that must be notified to WHO: smallpox, poliomyelitis due to wild-type poliovirus, human influenza caused by a new subtype, and SARS (see next paragraph and algorithm in Annex in Section 2). This notification will normally be conducted at district level or above, as decided by national authorities. The four diseases are fully covered in these Technical Guidelines.
- Other diseases and events may require notification if they are considered to be events of potential international public health concern. This assessment will normally be conducted at district level or above as decided by national authorities (by using the IHR decision instrument in Annex of Section 2). The diseases referred to in this category by the IHR include the following: cholera, plague, yellow fever, VHF, other diseases that are of special national or regional concern e.g. dengue fever. These conditions are fully dealt with in these Technical Guidelines.
- “Any event of potential international public health concern including those of unknown cause or source, and those involving other events or diseases” than those listed in the above two bullet points (by using the IHR decision instrument in Annex of Section 2). A list of such events is provided in Section 2. These events are NOT specifically dealt with in these Technical Guidelines and more details can be obtained in environmental control literature<sup>1</sup>.

The development of event based surveillance calls upon community participation and the use of information technology products (e.g.; Promed, GIPHIN, IRIN, and WHO-EMS software). The relevant IDSR data collection forms designed for use at all levels are now customized to capture PHEIC (including diseases). IDSR calls for a surveillance coordination body at all levels of the health system. The national IHR focal point goes beyond the health sector, by including all hazards of concern in the national coordination body. Please refer to Annex B for detailed information about IHR (2005).

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<sup>1</sup> *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.*

## How are surveillance functions described in these guidelines?

These guidelines assume that all levels of the 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.** Use standard case definitions, identifying priority diseases, conditions and events.

**Step 2 - Report** suspected cases or conditions or events to the next level. If this is an epidemic prone disease or a potential Public Health Emergency of International Concern (PHEIC), or a disease targeted for elimination or eradication, respond immediately by investigating the case or event and submit a detailed report. For events to be notified under IHR use the decision instrument (Annex 2 of IHR) to identify any potential PHEIC.

**Step 3 - Analyze and interpret findings.** Compile the data, and analyze it for trends. Compare information with previous periods and summarize the results.

**Step 4 - Investigate and confirm suspected cases, outbreaks or events.** Take action to ensure that the case, outbreak or event is confirmed including laboratory confirmation wherever it is feasible. Gather evidence about what may have caused the outbreak or event and use it to select appropriate control and prevention strategies.

**Step 5 – Prepare.** Take steps in advance of outbreaks or public health events so that teams may respond quickly and essential supplies and equipment are available for immediate action.

**Step 6 Respond.** Coordinate and mobilize resources and personnel to implement the appropriate public health response.

**Step 7 - Provide feedback.** Encourage future cooperation by communicating with levels that provided data, reported outbreaks, cases and events about the investigation outcome and success of response efforts.

**Step 8 - Evaluate and improve the system.** Assess the effectiveness of the surveillance and response systems, in terms of timeliness, quality of information, preparedness, thresholds, case management and overall performance. Take action to correct problems and make improvements.

There is a *role for each surveillance function at each level* of the health system.<sup>2</sup> The levels are defined as follows:

**Community:** Represented by basic village-level services such as trained birth attendants, community or village health agents, or similar care providers, village leaders (religious, traditional or political) or school teachers, veterinaries or health extension workers, pharmacists, and traditional healers.

**Health facility:** Defined by each country. For surveillance purposes, all institutions (public, private, NGOs or others governmental) with outpatient and/or in-patient facilities are defined as a “health facility.”

**District, region, or province:** The intermediate administrative unit generally serves a population of between 100,000 and 300,000 people. Countries may have two intermediate levels, for example, the district and the region or province.

**National level:** In many countries this is the central level where policies are set and resources are allocated. In relation to surveillance, this level reports on priority diseases and uses the decision instrument in Section 2 to report events of public health concern to WHO.

In an integrated system, some laboratory services are available at each level described above. A description of laboratory functions by level is in Section 1.0.

## **How can districts strengthen surveillance and response?**

Most countries have assessed their surveillance systems using a standard tool developed by WHO-AFRO (checklist provided in Annex 1 at the end of this section).

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

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<sup>2</sup> These guidelines focus on improving surveillance for public facilities. In districts or regions where reporting from public facilities is of good quality, integrate private and non-governmental organizations into the system.

Practical uses of the matrix include:

- Ensuring that all necessary functions and capacities have been identified
- Establishing accountability to provide a basis for assigning functions to appropriate levels and determining what capacities should be present
- Developing activities and training for human resource development
- Managing and monitoring programs
- Planning for surveillance and laboratory personnel, supplies and materials.

Moreover, the matrix illustrates several key assumptions about surveillance systems. If one or more of the elements at each level is not present or is being performed poorly, the risk of failure increases for achieving surveillance and control objectives. 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.

The functions of detection, analysis, investigation, response, feedback and evaluation are interdependent and should always be linked.

***The matrix on the next two pages defines the surveillance functions and how they are achieved at each level of the health system including the role of WHO in relation to IDSR core functions.***

# IDSR CORE FUNCTIONS AND ACTIVITIES BY HEALTH SYSTEM LEVEL

	Identify	Report	Analyze and Interpret	Investigate and Confirm
<b>Community</b>	<ul style="list-style-type: none"> <li>Use simple case definitions to identify priority diseases, events, conditions or other hazards in the community</li> </ul>	<ul style="list-style-type: none"> <li>Report essential information on priority diseases, events, conditions, or hazards to health facility and appropriate authorities</li> </ul>	<ul style="list-style-type: none"> <li>Involve local leaders in observing, describing and interpreting disease patterns, events and trends in the community</li> <li>Undertake verbal autopsies on causes of deaths</li> </ul>	<ul style="list-style-type: none"> <li>Support event investigation activities</li> </ul>
<b>Health Facility</b>	<ul style="list-style-type: none"> <li>Use standard case definitions to detect, confirm and record priority diseases or conditions</li> <li>Collect and transport specimens for laboratory confirmation</li> <li>Use local laboratory capacity to confirm cases or to initiate confirmation of cases if possible</li> </ul>	<ul style="list-style-type: none"> <li>Report case-based information for immediately notifiable diseases</li> <li>Report summary data to next level</li> <li>Report laboratory results from screening of sentinel populations</li> <li>Report laboratory results to next level</li> </ul>	<ul style="list-style-type: none"> <li>Prepare and periodically update graphs, tables, and charts to describe time, person and place for reported diseases and conditions</li> <li>From the analysis, report immediately any disease or condition that:                             <ol style="list-style-type: none"> <li>exceeds an action threshold</li> <li>occurs in locations where it was previously absent</li> <li>presents unusual trends or patterns.</li> </ol> </li> <li>Interpret results. Initiate possible public health actions with local authorities</li> </ul>	<ul style="list-style-type: none"> <li>Take part in investigation of reported outbreaks</li> <li>Collect, package, store and transport specimens for laboratory confirmation</li> </ul>
<b>District, State, Province</b>	<ul style="list-style-type: none"> <li>Collect surveillance data from reporting sites including designated points of entry on time and review the quality</li> <li>Ensure reliable supply of data collection and reporting tools are available at reporting sites</li> <li>Collect and transport specimens for laboratory confirmation</li> <li>Use local laboratory capacity to confirm cases if possible</li> </ul>	<ul style="list-style-type: none"> <li>Make sure health facilities know and use standard case definitions for reporting priority diseases and conditions</li> <li>Make sure health facility staff know when and how to report priority diseases and conditions.</li> <li>Report data on time to the next level</li> <li>Report laboratory results to next level</li> <li>Periodically conduct risk assessment for priority diseases, events, conditions or hazards</li> </ul>	<ul style="list-style-type: none"> <li>Define denominators and ensure their accuracy</li> <li>Aggregate data from health facility reports</li> <li>Analyze data by time, place and person</li> <li>Periodically update graphs, tables, and charts to describe reported diseases, events and conditions</li> <li>Calculate rates and thresholds</li> <li>Compare current data with previous periods</li> <li>Make conclusions about trends, thresholds and analysis results</li> <li>Describe risk factors for priority diseases or conditions</li> </ul>	<ul style="list-style-type: none"> <li>Arrange and lead investigation of reported diseases or outbreaks</li> <li>Assist health facility in safe collection, packaging, storage and transport of laboratory specimens for confirmatory testing</li> <li>Receive and interpret laboratory results</li> <li>Decide if the reported outbreak is confirmed</li> <li>Report the confirmed outbreak to the next level</li> <li>Distribute specimen collection kits for special surveillance activities</li> </ul>
<b>National</b>	<ul style="list-style-type: none"> <li>Define, update and ensure compliance with national policy and guidelines</li> <li>Set policies and procedures for the national laboratory networks including quality assurance systems</li> <li>Use national laboratories for confirmatory and specialized testing if necessary</li> <li>Collect and transport specimens for additional analysis at WHO Collaborating Centres as necessary</li> </ul>	<ul style="list-style-type: none"> <li>Report the immediately notifiable diseases and events to the appropriate authorities on time</li> <li>Report other priority diseases and events on time</li> <li>Include all relevant laboratories in the reporting network</li> <li>Use IHR Decision Instrument (Annex 2) to determine risks for priority diseases, events, conditions or hazards</li> <li>Inform WHO as indicated by IHR (2005)</li> </ul>	<ul style="list-style-type: none"> <li>Set policies and procedures for analyzing and interpreting data</li> <li>Analyze and interpret data from a national perspective</li> <li>Regularly convene a meeting of the technical coordinating committee to review the analyzed and interpreted data before wider dissemination</li> <li>Carry out special analyses to forecast magnitude and trends of priority disease events</li> </ul>	<ul style="list-style-type: none"> <li>Ensure guidelines and standard operating procedures for outbreak investigations are available at all sites</li> <li>Coordinate and collaborate with international authorities as needed during investigations</li> <li>Alert and support laboratory participation</li> <li>Provide logistic support: supplies, equipment, reagents, specimen transport media, health promotion budget</li> <li>Share information with regional and international networks about confirmed outbreak</li> <li>Use the decision instrument to decide whether the outbreak is a potential PHEIC</li> <li>Process specimens from investigation and send timely results as required to each level</li> <li>Request additional specimens as needed</li> <li>Take part in epidemic response team</li> </ul>
<b>National WHO Representative, WHO Regional Office</b>	<ul style="list-style-type: none"> <li>Develop and disseminate generic guidelines for surveillance</li> <li>Document and share IDSR best practices</li> <li>Provide technical support to the national level for detection and confirmation of priority diseases, conditions and events</li> <li>Inform countries about problems that may cross borders</li> <li>Coordinate international reference laboratory network support including centres of excellence</li> </ul>	<ul style="list-style-type: none"> <li>Collect and compile reports of outbreaks and international notifiable diseases and events</li> <li>Produce annual regional profiles or situation reports by priority diseases, conditions and events</li> </ul>	<ul style="list-style-type: none"> <li>Develop and disseminate standard guidelines for analysis of data for each priority disease</li> <li>Provide technical support to national level to improve capacity for analysis</li> </ul>	<ul style="list-style-type: none"> <li>Provide support to countries for investigation or assessment upon request</li> <li>Provide support for the coordination of laboratory participation during investigations</li> <li>Provide support for risk assessment using IHR decision instrument</li> </ul>

# IDSR CORE FUNCTIONS AND ACTIVITIES BY HEALTH SYSTEM LEVEL

	PREPARE	Respond	Communicate (Feedback)	Evaluate
<b>Community</b>	<ul style="list-style-type: none"> <li>•Participate in disaster or emergency preparedness and management committees</li> <li>•Participate in risk mapping of potential hazards</li> <li>•Conduct community based surveillance</li> <li>•Manage eventual contingency emergency stock</li> <li>•Participate in training including simulation exercise</li> </ul>	<ul style="list-style-type: none"> <li>•Assist local authorities in selecting response activities</li> <li>•Ensure community seeks care immediately in case of emergency and danger signs of disease, events and conditions</li> <li>•Participate in response activities including home based care</li> <li>•Mobilize resources appropriate for the activity</li> <li>•Carry out community health education for behavior change</li> </ul>	<ul style="list-style-type: none"> <li>•Give feedback to community members about reported cases, events and prevention activities</li> </ul>	<ul style="list-style-type: none"> <li>•Verify if public health interventions took place as planned</li> <li>•Verify the community response to the public health action</li> </ul>
<b>Health Facility</b>	<ul style="list-style-type: none"> <li>•Participate in disaster or emergency preparedness and management committees</li> <li>•Participate in Rapid Response training</li> <li>•Conduct risk mapping of potential hazards</li> <li>•Conduct training of community</li> <li>•Participate in simulation exercises</li> </ul>	<ul style="list-style-type: none"> <li>•Manage cases and contacts according to standard case management guidelines</li> <li>•Take relevant additional control measures</li> </ul>	<ul style="list-style-type: none"> <li>•Communicate with community members about outcome of reported cases and prevention activities</li> </ul>	<ul style="list-style-type: none"> <li>•Assess community participation</li> <li>•Conduct self assessment on the surveillance and response activities</li> <li>•Monitor and evaluate programme targets and indicators for measuring quality of the surveillance system</li> <li>•Monitor and evaluate programme timeliness and completeness of reporting from health facilities in the district</li> <li>•Monitor and evaluate timeliness of response to outbreaks</li> <li>•Monitor and evaluate prevention activities and modify them as needed</li> </ul>
<b>District, State, Province</b>	<ul style="list-style-type: none"> <li>•Participate in disaster or emergency preparedness and management committees</li> <li>•Conduct training and simulation exercises for staff</li> <li>•Conduct risk mapping of potential hazards</li> <li>•Support and conduct health facility-based surveillance</li> <li>•Develop and manage contingency plans</li> <li>•Organize and support Rapid Response Team</li> <li>•Document response activities</li> </ul>	<ul style="list-style-type: none"> <li>•Select and implement appropriate public health response (for example, depending on the disease, plan to strengthen case management, conduct immunization activity, improve control and prevention activities)</li> <li>•Convene epidemic response committee and plan response</li> <li>•Conduct training for emergency activities</li> <li>•Plan timely community information and education activities</li> <li>•Alert nearby areas and districts about the confirmed outbreak</li> </ul>	<ul style="list-style-type: none"> <li>•Alert nearby areas and districts about outbreaks</li> <li>•Give health facilities regular, periodic feedback about routine control and prevention activities</li> <li>•Give feedback on surveillance and data quality findings</li> </ul>	<ul style="list-style-type: none"> <li>•Monitor and evaluate programme targets and indicators for measuring quality of the surveillance system</li> <li>•Conduct regular supervisory visits</li> </ul>
<b>National</b>	<ul style="list-style-type: none"> <li>•Set policies, procedures and training strategies for reporting priority diseases, conditions and events at each level.</li> <li>•Adapt and distribute risk mapping guidelines</li> <li>•Adapt and distribute guidelines for disaster or emergency preparedness plans</li> <li>•Develop messages for community education</li> <li>•Develop and manage contingency plans</li> <li>•Organize and support national Rapid Response Teams</li> <li>•Develop and organize simulation exercises</li> <li>•Establish and maintain a national public health emergency command and operations center</li> </ul>	<ul style="list-style-type: none"> <li>•Set policies and procedures for responding to cases and outbreaks of priority diseases and conditions</li> <li>•Support epidemic response and preparedness activities including deployment of rapid response teams</li> <li>•Report and disseminate results of outbreak response in bulletins, media, press releases and briefings</li> </ul>	<ul style="list-style-type: none"> <li>•Develop and periodically distribute regional bulletin for epidemiology and public health</li> <li>•Give districts regular, periodic feedback about routine control and prevention activities</li> <li>•Release information quickly in a transparent manner and listen to the affected community</li> <li>•Document provision of appropriate and timely feedback</li> </ul>	<ul style="list-style-type: none"> <li>•Monitor IDSR and laboratory core indicators regularly</li> <li>•Conduct outbreak investigation after action review</li> <li>•Support annual monitoring of IHR core capacities</li> <li>•Conduct IDSR regular review meetings</li> <li>•Conduct regular supervisory visits</li> </ul>
<b>National WHO Representative, WHO Regional Office</b>	<ul style="list-style-type: none"> <li>•Mobilize resources for training, logistics and supervision</li> <li>•Develop, update or revise guidelines for disaster or risk management</li> <li>•Maintain and update a roster of experts for rapid response teams</li> <li>•Develop, update or revise training for IDSR and IHR implementation</li> <li>•Maintain a public health emergency command and operations center</li> </ul>	<ul style="list-style-type: none"> <li>•Coordinate and support response activities (Strategic Health Operations Centre, technical experts, virtual rapid response teams, guidelines, SCOs, etc.)</li> <li>•Mobilize resources and facilitate partnerships</li> </ul>	<ul style="list-style-type: none"> <li>•Provide feedback to collaboration with national and regional levels</li> <li>•Disseminate risk communication guidelines</li> <li>•Share information with partners and stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>•Use reports from countries to assess IDSR systems and advocate for improvements</li> <li>•Develop, update or revise guidelines and tools for IDSR/IHR monitoring and evaluation</li> <li>•Promote, guide and support operational research</li> </ul>

## **How does WHO in the African Region support efforts to strengthen IDSR?**

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

- The development of comprehensive technical guidelines for each level
- A framework for adapting guidelines to each level within each country
- Training of human resources involved in surveillance and response system
- Advocacy for resources and resource mobilization
- Coordinating the monitoring, detection and control of diseases, epidemics and public health emergencies across countries
- Sharing public health information

## **What is contained in these guidelines?**

These guidelines have been revised from the previous edition in order to incorporate priority emerging and re-emerging communicable and non-communicable disease threats. The revised guidelines also aim to address how to implement the IHR 2005 requirements and capacities for surveillance and response. These guidelines should be adapted to reflect national priorities, policies and public health structures.

The guidelines are intended for use as:

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

## **Who are the guidelines for?**

The information and recommendations in this manual are intended for use by the following:

- Disease surveillance managers and officers
- IHR National Focal Points
- Health Authority at Point of Entry (PoE)
- Hospital managers, clinicians and infection control officers
- Veterinary and wildlife health officers
- Environmental health officers and sanitarians

- District health management teams
- Nursing officers
- Health facility managers
- Medical and nursing educators
- Communication officers
- Logisticians
- Laboratory personnel
- Community leaders
- Other public health experts
- Other health partners including NGOs

## What are the priority diseases for IDSR?

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

- ***Required internationally under IHR*** (for example, smallpox, poliomyelitis due to wild-type poliovirus, human influenza caused by a new subtype, SARS);
- ***Diseases with highly epidemic potential*** to cause serious public health impact due to their ability to spread rapidly internationally (for example, cholera, plague, yellow fever, viral haemorrhagic fever);
- ***Principal causes of morbidity and mortality*** in the African Region (for example, malaria, pneumonia, diarrhoeal diseases, tuberculosis, HIV/AIDS, maternal deaths and injuries)
- ***Non-communicable priorities in the region*** (high blood pressure, diabetes mellitus, mental health and malnutrition)
- Effective control and prevention ***interventions are available*** for addressing the public health problems they pose (for example onchocerciasis, trypanosomiasis);
- ***Intervention programs supported by WHO*** for prevention and control, eradication or elimination of the diseases exists. For example, the Expanded Program on Immunizations (EPI), the Integrated Management of Childhood Illness (IMCI).

The list of priority diseases may vary from country to country depending on the local epidemiological situation, needs and health system. Countries are encouraged to keep the list to the minimum possible to ensure that adequate resources are available to carry out a response and the list is manageable by the system. Table 1 below shows the priority list of diseases and conditions under IDSR.

Table 1: Priority diseases, conditions and events for Integrated Disease Surveillance and Response - 2010		
Epidemic prone diseases	Diseases targeted for eradication or elimination	Other major diseases, events or conditions of public health importance
<p>Acute haemorrhagic fever syndrome*</p> <p>Anthrax</p> <p>Chikungunya</p> <p>Cholera</p> <p>Dengue</p> <p>Diarrhoea with blood (<i>Shigella</i>)</p> <p>Measles</p> <p>Meningococcal meningitis</p> <p>Plague</p> <p>SARI**</p> <p>Typhoid fever</p> <p>Yellow fever</p> <p>*Ebola, Marburg, Rift Valley, Lassa, Crimean Congo, West Nile Fever</p> <p>**National programmes may wish to add Influenza-like illnesses to their priority disease list</p>	<p>Buruli ulcer</p> <p>Dracunculiasis</p> <p>Leprosy</p> <p>Lymphatic filariasis</p> <p>Neonatal tetanus</p> <p>Noma</p> <p>Onchocerciasis</p> <p>Poliomyelitis<sup>1</sup></p> <p><sup>1</sup>Disease specified by IHR (2005) for immediate notification</p>	<p>Acute viral hepatitis</p> <p>Adverse events following immunization (AEFI)</p> <p>Diabetes mellitus</p> <p>Diarrhoea with dehydration less than 5 years of age</p> <p>HIV/AIDS (new cases)</p> <p>Hypertension</p> <p>Injuries (Road traffic Accidents)</p> <p>Malaria</p> <p>Malnutrition in children under 5 years of age</p> <p>Maternal deaths</p> <p>Mental health (Epilepsy)</p> <p>Rabies</p> <p>Severe pneumonia less than 5 years of age</p> <p>STIs</p> <p>Trachoma</p> <p>Trypanosomiasis</p> <p>Tuberculosis</p>
	<b>Diseases or events of international concern</b>	
	<p>Human influenza due to a new subtype<sup>1</sup></p> <p>SARS<sup>1</sup></p> <p>Smallpox<sup>1</sup></p> <p>Any public health event of international or national concern (infectious, zoonotic, food borne, chemical, radio nuclear, or due to unknown condition.</p> <p><sup>1</sup>Disease specified by IHR (2005) for immediate notification</p>	

**Note:** It is important to remember that countries may select from this list according to national priorities and the epidemiologic situation. Disease-specific summary pages are available in Section 9.0 of this guide.

## **Annexes to Introduction**

- ANNEX A** Tool to conduct assessment of surveillance and response at the district level
- ANNEX B** Potential events of international health concern requiring reporting to WHO under the International Health Regulations (2005)
- ANNEX C** Required surveillance and response core capacities as described in the IHR (2005)



## **ANNEX A Prepare to conduct surveillance and response at the district level**

Most countries have used an assessment tool developed by WHO/AFRO to assess their national surveillance, epidemic preparedness and response systems and to identify where improvements are needed. The assessment provides results that can be used to solve problems with resources, the quality and timeliness of surveillance data, and how the information is used. The national strategic plan could also be used as reference while preparing a district specific action plan.

The integrated disease surveillance and response (IDSR) is not proposing establishment of a new system, but is providing guidance on how to prepare to conduct surveillance and response activities. However, if the district has the resources and skills to conduct an assessment of the district to document the situation of surveillance and response activities within the district or wishes to update the district profile, it may use the checklist below after adapting it to the local context. This tool could help to identify where districts can identify activities to improve their performance and capacity for disease surveillance and response.

### **Case and event identification:**

1. Determine availability and knowledge of standard case definitions for reporting suspected priority diseases and conditions including events of public health concern.
2. Define the **sources of information** about health events in the district, including points of contact the community has with health services. For example, list the following sources on a list of district reporting sites
  - a. Health facilities and hospitals
  - b. Point of Entry
  - c. Community health workers
  - d. Birth attendants
  - e. Traditional healers
  - f. Rural community leaders who have knowledge of health events in the community (for example, the village elders, traditional healer, school teacher, leaders of faith-based communities, etc.)
  - g. Public health officers
  - h. Private sector practitioners
  - i. Public safety officers such as fire, rescue or police departments
  - j. Animal health and veterinary structures and services
  - k. Industry, food safety and environmental health laboratories
  - l. Mass media, web sites and health news search applications
  - m. Others including NGOs

3. Identify surveillance focal points for each source of information. Identify and specify the opportunities for community involvement in surveillance of health events.

## Reporting

4. Specify the priority events, diseases and conditions for surveillance within the district and those directed by national policy. List diseases that are:
  - a. Epidemic-prone
  - b. Diseases targeted for eradication and elimination
  - c. Other diseases of public health importance including non-communicable diseases
5. For each priority event, disease or condition, review the minimum data element that health facilities and other sources should report. State when it should be reported, to whom and how. State the information that should be reported from in-patient sources and outpatient sources. For example, a minimum requirement would be to report all cases and deaths for the selected diseases and conditions
  - a. State the diseases or conditions that require immediate reporting and communicate the list to health facilities in the district.
  - b. Define the means for reporting data to the district (by phone, by form, by voice). If there is electronic reporting, do all facilities have access to computers and modems?
  - c. Define how often the required data should be reported.
6. Define the data management tools available in the district and how they should be used in an integrated system
  - a. Case-based surveillance reporting forms
  - b. Lab-specimen-based surveillance reporting forms
  - c. Line lists for use in outbreaks
  - d. Tables for recording summary totals
    - i. Routine weekly reporting forms
    - ii. Routine monthly reporting forms
    - iii. Routine quarterly reporting forms
    - iv. Graphs for time analysis of data
    - v. Maps for place analysis of data
    - vi. Charts for person analysis of data
7. Periodically update the availability of relevant supplies at each reporting site for conducting surveillance. (Note: If a reporting site has the capacity for electronic reporting, there should be an electronic format that is compatible with the methods used

at the district, region and national levels. (If electronic reporting is not available, ensure that the focal points who are required to manage data have a reliable supply of data collection forms, paper, coloured pencils, graph paper, and log books).

## **Data analysis**

8. Define the data management requirement for each reporting site. For example, develop and disseminate the procedures including deadlines so that reporting sites know that they must report each reporting period (e.g., month).
  - a. Tally, compile and report summary totals
  - b. Check data quality and eventually clean them
  - c. Analyze data: produce weekly/monthly/Quarterly/Annual summaries in tables, graphs or maps
  - d. Provide some interpretation to the next higher level
  - e. Submit data to the next level (SMS, e-mail, fax/case-based forms, and line-list).
  - f. File and secure back-up copies of the data
  - g. Provide feedback to the community and to all relevant Reporting Sites
9. Decide if current forms address the priorities of integrated disease surveillance and response. For example, do current forms provide the information necessary for detecting problems and signalling a response to the priority integrated disease surveillance diseases?
10. Gather and present relevant data about your district that can be used to advocate for additional resources for improving surveillance and response activities. (Example: Health workers are able to document an increase in malaria cases; they know that an effective response is available with insecticide-treated bed nets. The district surveillance officer used data to show the expected reduction in malaria cases if some of the community's bed net cost could be supported by local businesses).

## **Investigation and confirmation of suspected cases, outbreaks or events:**

11. Describe the laboratory referral network for confirming priority diseases and conditions in the district. For example, list the following:
  - a. Public, private or NGO district facilities with reliable laboratory services for confirming priority diseases.
  - b. Prevention, control or special surveillance activities in the district with laboratory access (for example, any HIV sentinel surveillance sites in the district).

## **Preparation for response and Response to outbreaks and other public health events**

12. Update the policies of the district rapid epidemic response team so that assessing preparedness is a routine agenda item of the team. Specify and disseminate schedules for:
  - a. Meeting to routinely assess preparedness for response and discuss current problems or activities
  - b. Outbreak response meetings
13. For each priority event, disease or condition selected, state the available public response activity.
14. For each disease or condition that the district can respond to, specify the target, alert threshold or analysis results that would trigger an action.

## **Communication and Feedback**

15. Define methods for informing and supporting health workers in the implementation of integrated disease surveillance. For example:
  - a. List the current opportunities for training health workers in surveillance, response or data management in the district.
  - b. Coordinate training opportunities between disease programs that take advantage of overlapping skills between programs such as supervision, report writing, budgeting, data analysis, and using data to set priorities.
  - c. Define the training needs for each category of health workers for either initial training in surveillance and response skills or refresher training in how to integrate surveillance activities.
16. Describe how communication about surveillance and response takes place between the district and the surveillance focal points. Include methods such as monthly meetings, newsletters, telephone calls and so on. Update the description periodically.
17. Review and update feedback procedures and methods between the district, health facilities and community as well as between the district and higher levels. Specify the feedback methods and update as necessary:
  - a. Bulletins summarizing data reported by health facilities to the district
  - b. Periodic meetings to discuss public health problems and recent activities
  - c. Supervisory visits

18. Describe the communication links between the community and health facilities with the epidemic management committee that can be activated during an outbreak and for routine activities.

### **Evaluation and improvement of the surveillance system**

19. Decide if additional indicators will be evaluated and plan how to monitor and evaluate timeliness and completeness of reporting.
20. State three or more objectives you would like to achieve for improving surveillance in your district over the next year.

## **ANNEX B 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 programmes 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
- 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:

1. Environmental health emergencies like:
  - Natural events
  - Technological Incidents
  - Complex emergencies
  - Deliberate events
2. Chemical risks in food:
  - Acute and Chronic dietary exposure (environmental or intentional pollution)
3. Zoonoses:
  - Emerging zoonoses
  - Neglected zoonoses

## *Topics for surveillance on specific risks*

### **1. Infectious disease hazards**

Known, new and unknown infectious disease threats

### **2. 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.

### **3. Food safety events**

Food and waterborne diarrhoeal 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.

### **4. Chemical events**

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

### **5. Radiological and nuclear events**

A radio-nuclear emergency at a nuclear facility may be caused by accidental spills or the result of a deliberate act. It may also be detected as the result of clinical examination, when patients with radiation injuries are admitted to 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 C 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 recognise the following three levels of the health care system.

- Community or primary public health response level
- Intermediate public health response levels
- National level

### **Local community or primary public health level response**

At the local community level and/or primary public health response level, the capacities are:

- a) To detect events involving disease or death above expected levels for the particular time and place in all areas within the country.
- b) 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.

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

(c) To implement preliminary control measures immediately.

## **Intermediate public health response levels**

The intermediate public health level response core capacities requirement will need to be adapted to the context of each country. Many countries have more than one intermediate level (sub district; district/county and province/region/state) while other smaller countries may have only one level (district or county level).

The core capacity requirements and functions of the health system may differ from country to country. For example, while in large federal states the functions of intermediate levels may be close to the core capacity requirements described under “National level”, in smaller states with only one level, the functions of the intermediate level may be close to the community level and/or primary public health response level.

The core capacity requirements at intermediate levels are the following.

- a) to confirm the status of reported events and to support or implement additional control measures; and
- b) 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:

- a) Assessment of all reports of urgent events within 48 hours; and
- b) 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:

- a) determine rapidly the control measures required to prevent domestic and international spread;

- b) provide support through specialized staff, laboratory analysis of samples (domestically or through collaborating centres) and logistical assistance (e.g. equipment, supplies and transport);
- c) provide on-site assistance as required to supplement local investigations;
- d) provide a direct operational link with senior health and other officials to approve rapidly and implement containment and control measures;
- e) provide direct liaison with other relevant government ministries;
- f) 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;
- g) 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
- h) 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.

## Section 1

### Identify cases of priority diseases, conditions and events

This section describes how to:

- Use standard case definitions for reporting suspected priority diseases and conditions including events of public health concern
- Update district procedures for surveillance and response
- Update description and listing of catchment areas, including distribution of collection forms, reporting tools and guidelines
- Use the laboratory network and procedures to improve capacity for surveillance and response, including the ability to confirm suspected outbreaks



## 1.0 Identify cases of priority diseases, conditions, and events

Health staff conduct surveillance activities at all levels of the health system so they can detect public health problems of concern to their community. Surveillance priorities may be communicable and non-communicable diseases, conditions or events that include national or local priorities such as acute outbreaks, maternal deaths or events associated with human health. An essential function of a public health surveillance system is to be vigilant in its capacity to detect not only known public health threats with established case definitions and formal reporting channels but also events or hazards that are not specifically included in the formal reporting system. These may be events such as clusters of disease patterns or rumours of unexplained deaths.

In fact, these diseases, conditions, and events may come to the attention of the health system in several ways.

For example:

- A person falls ill and seeks treatment from a health facility.
- Community members report unusual events or occurrences at local level For example, a community member reports a cluster of deaths or unusual disease pattern to the health facility. A pharmacy reports a sharp increase in the number of purchases of a particular medication or treatment. Perhaps a school might report unusual absences due to similar signs and symptoms such as an influenza-like illness (ILI).
- Health staff who conduct routine record reviews to find cases for a specific disease observe that cases of another priority disease have not been reported. For example, an officer who normally reviews the clinic register for cases of acute flaccid paralysis (AFP), also sees that a case cholera has also recently been recorded in the clinic register. There are also cases in the register due to non-communicable causes such as high blood pressure and diabetes mellitus.
- Radio, television or newspapers report a rumour of rare or unexplained events in the area with potential exposure for humans.
- Vital events records show an increase in maternal deaths.
- An individual health facility reports a single adult death due to bloody diarrhoea. During analysis of the routine reports from all the facilities in the area, the district

officer notices that other health facilities in the catchment area have also reported adult deaths due to bloody diarrhoea.

## **1.1 Use 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 throughout a national system allows the public health surveillance system to track priority diseases or conditions and use thresholds or signals for public health action. When health facilities and districts use different case definitions, tracking the trend of a disease, condition or event is difficult. Urgent action such as investigating the cause of the change in the trend is not possible. Health workers who analyze the data using one definition will not know if the trends from another catchment area are due to similar or different causes.

Using standard case definitions is also important in implementing the International Health Regulations (2005). Even at district level, health staff should be aware of case definitions of diseases or events that may afflict not only the local community but also have the potential for spread across geographic boundaries.

The process of notifying WHO of events under the IHR involves the use of the “Decision instrument” that benefits from IDSR’s use of standard case definitions as well as confirmation, data analysis, interpretation of the findings and reporting. The IHR Decision Instrument is included as Annex 2C in Section 2.

### **1.1.1 Distribute standard case definitions to health facilities**

Make sure that health facility personnel know and have available standard case definitions (including those for reporting unusual events, disease patterns, or unexplained deaths) specified by the national level. Some countries have prepared

and disseminated case definitions for diseases under surveillance in the form of a poster or as a small pocket-sized booklet. These tools reinforce the use of standard definitions for detecting and reporting priority diseases, conditions and events.

*Proposed case definitions based on established disease-specific programs are in Annex 1A and also available in Section 9 of these guidelines.*

### **1.1.2 Distribute key signs or symptoms for use in case definitions at community level**

Provide information to health staff, traditional healers, birth attendants and community leaders on how to recognize and report priority diseases, conditions or events to the health facility. A list of case definitions for use at the community level is in Annex 1B of this section.

At the same time, emphasize the need to refer people with the suspected disease or condition for treatment. Also, provide information to the community on priority diseases, using posters, newsletters and announcements during meetings.

Effective feedback to community reports encourages the community to participate in the surveillance and response activities.

## **1.2 Update district procedures for surveillance and response at the national level**

Use available assessment and evaluation results to plan improvements for surveillance and response activities in your area. Each year, national level or provincial health officials should evaluate the performance of the surveillance response system. Use the results to adjust plans accordingly to address the next issues in the prioritized list.

### **1.2.1 Update the description of the catchment area**

At least annually, update information about the catchment area and include results from a risk assessment. Risk mapping is a tool for identifying and presenting particular risks to the community's health and well-being. This information is used to determine prevention actions to take towards reducing those risks and preventing illnesses and death. Examples of potential risks include sources of

contaminated water, lack of urgent transportation to a referral facility for women in childbirth, or potential hazards such as inadequate safety precautions in mining or occupational sites.

To update the catchment area description, make sure you have current information about:

- The size of key target populations in the district such as 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, and so on.
- Major public health activities in the area including public, private, and non-governmental organization (NGO) immunization activities, clean water projects, family planning clinics, feeding centers for undernourished children, information related to risk factors for non-communicable diseases and so on. Create a regular forum with district health stakeholders to discuss surveillance and response activities related to priority health events within the community. This could be done through a monthly or quarterly meeting. Take the opportunity to provide feedback about surveillance data reported from their institutions.

### **1.2.2 Update the list of reporting sites in the district**

Identify all of the health facilities, Points of Entry (PoE) and any other location in the district required to report surveillance data or events to the district level. Create relationships with private and NGO sites in the district and involve them in surveillance activities. Record (and update as needed) health facility and Points of Entry (PoE) locations and names of staff who are responsible for surveillance activities. A sample worksheet for listing the reporting sites and contact focal person at each site is in Annex 1C of this section.

### **1.2.3 Distribute updated data collection forms, reporting tools and technical guidelines**

As you conduct updates of the catchment area description, check to see 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 health facilities and other reporting sites.

### **1.3 Improve local laboratory capacity for surveillance and response**

There are several diseases or conditions with signs and symptoms that are the same or similar as other diseases or conditions. For example, a child with fever and rash over the entire body might be diagnosed with measles, even though there could be several causes for the child's clinical presentation.

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

- Accurately diagnose illness in an individual patient, and
- Verify the cause (or aetiology) of a suspected outbreak.

Laboratory specimens should arrive in the laboratory in good condition so that processing of the specimen provides reliable results. Specimens should be collected, stored and handled according to disease specification. Minimize delays between collection of the specimen and processing in the laboratory.

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

- Specimen is collected inappropriately, for example, a blood specimen has haemolysed.
- Delay in transportation and processing may result in bacterial overgrowth in the collected specimen such as urine and CSF .
- Use of wrong transport or storage media may cause reduced viability of the suspected organism.

The disease specific reference tables in Section 9 list recommended laboratory procedures for confirming priority diseases and conditions including:

- The diagnostic test for confirming the disease or condition
- The specimen to be collected
- When to collect the specimen
- How to prepare, store and transport it

- When to expect the results
- Sources for additional information.

Implementing public health measures even before laboratory confirmation has been received complete may be necessary.

### **1.3.1 Designate laboratories for inclusion in the network**

Annex 1D of this section contains a description of the laboratory functions by level of the health system.

At health facility, district and provincial levels, the focus is on safe collection, handling, transportation and processing of specimens. The local surveillance or laboratory focal person should establish or strengthen routine communication with identified laboratories that receive specimens from your health facility or district. The purpose of this routine contact is to strengthen procedures between the health facilities in the district that will be sending specimens, and the laboratory that will be receiving them. Ensure that the procedures for specimen collection, transportation, confirming the disease or condition and reporting the results are clear and can be reliably carried out.

To support sub-national or district level laboratories within the network, the national level health system will establish a memorandum of understanding (MOU) with laboratories outside the area or network that have the capacity for specific diagnostic procedures not available locally. The national level should also support the laboratory through advocacy with higher levels in accessing the necessary supplies to collect, handle, store, and ship specimens safely through the network.

### **1.3.2 Identify laboratories in the network**

The surveillance focal person at each level of the health system should maintain an updated list of the laboratories that have the capacity to perform required laboratory testing. A sample worksheet for listing national laboratories for confirming priority diseases and conditions is in Annex 1E of this section. Provide information to all health facilities about the methods for transporting specimens including how to prepare, handle, ship and store the specimens. Make sure to disseminate information about packing and shipping infectious material as directed by national policy.

### **1.3.3 Inform laboratories about procedures for confirming priority diseases and conditions**

Once a district laboratory focal person has been identified, the district level focal point should make sure that laboratory confirmation procedures established at the national level are known and followed in the district. The designated staff should:

- Ensure that specimen collection and transport materials are pre-positioned (reliably available) at district laboratory level. Rapid laboratory diagnostic tests or serological tests available for detection of priority diseases and hazards (for example chemicals) should be available for timely use.
- Support the health facility in collecting the appropriate specimen for confirming the suspected case.
- Coordinate with the laboratory, as needed, to identify the correct specimen for collection and any special concerns or procedures.
- Collect and package the specimen safely or assist the health facility in collecting the specimen.
- Ensure the safe and reliable transport of the specimen from the health facility to the designated laboratory.
- Receive the laboratory results from the laboratory and report them promptly to the health facility and national levels. Also report results to the clinician for patient care.
- Take action with the health facility based on the laboratory report.

### **1.3.4 Establish laboratory quality control**

Coordinate with provincial or national laboratory authorities to establish activities for ensuring quality results from laboratories in the catchment area. Laboratory quality control and quality assurance are important for building confidence in the results obtained.



## **Annexes to Section 1**

- ANNEX 1A** WHO/AFRO standard case definitions for reporting suspected priority diseases, conditions and events from the health facility to the district
- ANNEX 1B** Key signs and symptoms for case definitions for use at the community level
- ANNEX 1C** List of district reporting sites
- ANNEX 1D** Laboratory functions by health system level
- ANNEX 1E** List of national laboratories for confirming priority diseases, conditions, and events



## ANNEX 1A WHO/AFRO standard case definitions for reporting suspected priority diseases conditions and events from the health facility to the district

WHO-AFRO proposes that health facilities use the following examples of standard case definitions for reporting suspected cases of priority diseases and conditions to the district level. Please refer to the disease-specific guidelines in Section 9 for additional information about surveillance for priority diseases and conditions.

Priority Diseases and Conditions	
Disease/Condition	Standard case definition for suspected cases
<b>Acute haemorrhagic fever syndrome</b>	<p><b>Suspected case:</b> Acute onset of fever of less than 3 weeks duration in a severely ill patient AND any 2 of the following; haemorrhagic or purpuric rash; epistaxis (nose bleed); haematemesis (blood in vomit); haemoptysis (blood in sputum); blood in stool; other haemorrhagic symptoms <u>and</u> no known predisposing factors for haemorrhagic manifestations.</p> <p><b>Confirmed case:</b> A suspected case with laboratory confirmation or epidemiologic link to confirmed cases or outbreak.</p> <p><i>Note: During an outbreak, case definitions may be changed to correspond to the local event.</i></p>
<b>Acute viral hepatitis</b>	<p><b>Suspected case:</b> Any person with acute illness typically including acute jaundice, dark urine, anorexia, malaise, extreme fatigue, and right upper quadrant tenderness. (Note: infected children are often asymptomatic.)</p> <p><b>Confirmed case:</b> A suspected case that is laboratory confirmed</p>
<b>Adverse events following immunization (AEFI)</b>	A medical incident that takes place after immunization, causes concern and is believed to be caused by the immunization
<b>Anthrax</b>	<p><b>Suspected case:</b> Any person with acute onset characterized by several clinical forms which are:</p> <p>(a) <b>Cutaneous form:</b> Any person with skin lesion evolving over 1 to 6 days from a papular through a vesicular stage, to a depressed black eschar invariably accompanied by oedema that may be mild to extensive</p>

<p><b>Anthrax, continued</b></p>	<p>(b) <b>Gastro-intestinal:</b> Any person with abdominal distress characterized by nausea, vomiting, anorexia and followed by fever</p> <p>(c) <b>Pulmonary (inhalation):</b> any person with brief prodrome resembling acute viral respiratory illness, followed by rapid onset of hypoxia, dyspnoea and high temperature, with X-ray evidence of mediastinal widening</p> <p>(d) <b>Meningeal:</b> Any person with acute onset of high fever possibly with convulsions, loss of consciousness, meningeal signs and symptoms; commonly noted in all systemic infections, but may present without any other clinical symptoms of anthrax.</p> <p><b>AND</b> has an epidemiological link to confirmed or suspected animal cases or contaminated animal products</p> <p><b>Confirmed case:</b></p> <p>A confirmed case of anthrax in a human can be defined as a clinically compatible case of cutaneous, inhalational or gastrointestinal illness that is laboratory-confirmed by:</p> <p>(a) isolation of <i>B. anthracis</i> from an affected tissue or site; or</p> <p>(b) Other laboratory evidence of <i>B. anthracis</i> infection based on at least two supportive laboratory tests.</p> <p><b>Note:</b> <i>It may not be possible to demonstrate B. anthracis in clinical specimens if the patient has been treated with antimicrobial agents.</i></p>
<p><b>Buruli ulcer (<i>Mycobacterium ulcerans</i> disease)</b></p>	<p><b>Suspected case:</b> A person presenting a painless skin nodule, plaque or ulcer, living or having visited a BU endemic area</p> <p><b>Confirmed case:</b> A suspected case confirmed by at least one laboratory test (ZN for AFB, PCR, culture or histology)</p>
<p><b>Chikungunya</b></p>	<p><b>Suspected case:</b> Any person with acute onset of fever &gt;38.5°C and severe arthralgia/arthritis not explained by other medical conditions.</p> <p><b>Confirmed case:</b> A suspected case with laboratory confirmation.</p>
<p><b>Cholera</b></p>	<p><b>Suspected case:</b> In a patient age 5 years or more, severe dehydration or death from acute watery diarrhoea.</p> <ul style="list-style-type: none"> <li>• If there is a cholera epidemic, a suspected case is any person age 5 years or more with acute watery diarrhoea, with or without vomiting.</li> </ul> <p><b>Confirmed case:</b> A suspected case in which <i>Vibrio cholerae</i> O1 or O139 has been isolated in the stool.</p>

<p><b>Dengue Fever</b></p>	<p><b>Dengue Fever Suspected case:</b> Any person with acute febrile illness of 2-7 days duration with 2 or more of the following: headache, retro-orbital pain, myalgia, arthralgia, rash, haemorrhagic manifestations, leucopenia.</p> <p><b>Dengue Fever Confirmed case:</b> A suspected case with laboratory confirmation (positive IgM antibody, rise in IgG antibody titres, positive PCR or viral isolation).</p> <p><b>Dengue Haemorrhagic Fever:</b> A probable or confirmed case of dengue with bleeding tendencies as evidenced by one or more of the following: positive tourniquet test; petechiae, ecchymoses or purpura; bleeding: mucosa, gastrointestinal tract, injection sites or other; haematemesis or melaena; <u>and</u> thrombocytopenia (100 000 cells or less per mm<sup>3</sup>) <u>and</u> evidence of plasma leakage due to increased vascular permeability, manifested by one or more of the following: 20% rise in average haematocrit for age and sex, 20% drop in haematocrit following volume replacement therapy compared to baseline, signs of plasma leakage (pleural effusion, ascites, hypo-proteinaemia).</p> <p><b>Dengue Shock Syndrome:</b> All the above criteria, <u>plus</u> evidence of circulatory failure manifested by rapid and weak pulse, and narrow pulse pressure (<math>\leq</math> 20 mm Hg) or hypotension for age, cold, clammy skin and altered mental status.</p>
<p><b>Diabetes</b></p>	<p><b>Suspected new case:</b> Any person presenting with the following symptoms:</p> <ul style="list-style-type: none"> <li>• Increased thirst</li> <li>• Increased hunger</li> <li>• Frequent urination</li> </ul> <p><b>Confirmed new case:</b> Any person with a fasting venous plasma glucose measurement of <math>\geq</math> 7 mmol/L (126 mg/dl) or capillary glucose <math>\geq</math> 6.1 mmol/L (110 mg/dl)</p> <p>Or</p> <p>Any person with a non-fasting venous plasma glucose measurement of <math>\geq</math> 11.1mmol/L (200 mg/dl) or capillary glucose <math>\geq</math> 11,1 mmol/L (200 mg/dl)</p> <p><i>*Report only the first lab-confirmed diagnosis of the patient</i></p>
<p><b>Diarrhoea with blood (dysentery)</b></p>	<p><b>Suspected case:</b> A person with diarrhoea with visible blood in stool.</p> <p><b>Confirmed case:</b> Suspected case with stool culture positive for <i>Shigella dysenteriae</i> type 1.</p>
<p><b>Dracunculiasis</b></p>	<p><b>Suspected case:</b> A person presenting a skin lesion with itching or blister living in endemic area of Guinea worm.</p> <p><b>Confirmed case:</b> At the last phase of the programme, confirmation of last cases by knowledgeable health staff is required. Follow national guidelines for definition of confirmed case.</p>

<p><b>Ebola or Marburg viral hemorrhagic Fevers</b></p>	<p><b>Suspected case:</b> Illness with onset of fever and no response to usual causes of fever in the area, and at least one of the following signs: bloody diarrhoea, bleeding from gums, bleeding into skin (purpura), bleeding into eyes and urine.</p> <p><b>Confirmed case:</b> A suspected case with laboratory confirmation (positive IgM antibody, positive PCR or viral isolation), or epidemiologic link to confirmed cases or outbreak.</p> <p><b>Note:</b> <i>During an outbreak, these case definitions may be changed to correspond to the local event.</i></p>
<p><b>Foodborne Illnesses</b></p>	<p><b>Suspected case:</b> 2 or more people present with similar symptoms who consumed common food or drink</p> <p><b>Confirmed case:</b> A laboratory confirmed case of a specific agent with a link to a common food or drink source.</p> <p><b>Note:</b> <i>A foodborne illness is defined according to the specific agent causing the disease (for example, cholera, hepatitis A, salmonellosis, shigellosis).</i></p>
<p><b>Human influenza caused by a new subtype</b></p>	<p><b>Suspected H5N1 case:</b> Any person presenting with unexplained acute lower respiratory illness with fever (&gt;38 °C) and cough, shortness of breath or difficulty breathing</p> <p><b>AND</b> one or more of the following exposures within the 7 days prior to symptom onset:</p> <ul style="list-style-type: none"> <li><b>a)</b> 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;</li> <li><b>b)</b> 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 faeces in an area where H5N1 infections in animals or humans have been suspected or confirmed in the last month;</li> <li><b>c)</b> 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;</li> <li><b>d)</b> Close contact with a confirmed H5N1 infected animal other than poultry or wild birds;</li> <li><b>e)</b> Handling samples (animal or human) suspected of containing H5N1 virus in a laboratory or other setting.</li> </ul> <p><b>Confirmed H5N1 case:</b> A person meeting the criteria for a suspected case <b>AND</b> positive laboratory results from a laboratory whose H5N1 test results are <u>accepted by WHO as confirmatory</u>.</p>

<p><b>Human influenza caused by a new subtype, continued</b></p>	<p><b>Suspected pandemic (H1N1) 2009 virus infection:</b> An individual presenting with influenza-like-illness (sudden onset of fever &gt; 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><b>Confirmed pandemic (H1N1) 2009 virus infection:</b> 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>
<p><b>Hypertension</b></p>	<p><b>Suspected new case at first visit:</b> Any individual presenting with a resting blood pressure measurement (based on the average of 3 readings) at or above 140 mm Hg for systolic pressure, or greater than or equal to 90 mm Hg for diastolic pressure.</p> <p><b>Confirmed case:</b> Any individual presenting on at least two occasions with a resting blood pressure measurement (based on the average of 3 readings) at or above 140 mm Hg for systolic pressure, or greater than or equal to 90 mm Hg for diastolic pressure.</p>
<p><b>Influenza-like Illness (ILI)</b></p>	<p><b>Influenza-like Illness:</b> A person, child or adult with:</p> <ul style="list-style-type: none"> <li>• Sudden onset of fever &gt; 38 °C AND</li> <li>• Cough or sore throat in the absence of other diagnoses</li> </ul> <p><b>A confirmed case of influenza</b> is a case that meets the clinical case definition and is laboratory confirmed (laboratory results must be positive for influenza virus).</p>
<p><b>Lassa and Crimean-Congo Haemorrhagic Fevers (CCHF)</b></p>	<p><b>Suspected case of CCHF:</b> Illness with sudden onset of fever, malaise, weakness, irritability, headache, severe pain in limbs and loins and marked anorexia. Early development of flush on face and chest and conjunctival infection, haemorrhagic enanthem of soft palate, uvula and pharynx, and often fine petechial rash spreading from the chest and abdomen to the rest of the body, sometimes with large purpuric areas.</p> <p><b>Confirmed case of CCHF:</b> A suspected case with laboratory confirmation (positive IgM antibody, PCR, viral isolation or IgG seroconversion by ELISA or IFA) or epidemiologic link to confirmed cases or outbreak.</p> <p><b>Suspected case of Lassa Fever:</b> Illness with gradual onset with one or more of the following: malaise, fever, headache, sore throat, cough, nausea, vomiting, diarrhoea, myalgia, chest pain hearing loss and a history of contact with excreta of rodents or with a case of Lassa Fever</p> <p><b>Confirmed case of Lassa Fever:</b> A suspected case that is laboratory confirmed (positive IgM antibody, PCR or virus isolation) or epidemiologically linked to a laboratory confirmed case.</p>

<p><b>Leprosy</b></p>	<p><b>Suspected case:</b> A person showing one of three cardinal signs of leprosy: hypo-pigmented or reddish skin lesion, loss or decrease of sensations in skin patch, enlargement or peripheral nerve.</p> <p><b>Confirmed case:</b> A person showing at least two cardinal signs of leprosy and who has not completed a full course of treatment with Multi Drug Therapy (MDT).</p>
<p><b>Lymphatic Filariasis</b></p>	<p><b>Suspected case:</b> Resident of an endemic area with a clinical sign of hydrocoele or lymphoedema for which other causes of these findings have been excluded.</p> <p><b>Confirmed case:</b> A person with positive laboratory diagnosis of microfilaremia in blood smear, filarial antigenaemia or positive ultrasound test.</p>
<p><b>Malaria</b></p>	<p><b>Uncomplicated malaria:</b> Any person with fever or history of fever within 24 hours; without signs of severe disease (vital organ dysfunction) is diagnosed clinically as malaria.</p> <p><b>Confirmed uncomplicated malaria:</b> Any person with fever or history of fever within 24 hours; and with laboratory confirmation of diagnosis by malaria blood film or other diagnostic test for malaria parasites.</p> <p><b>Unconfirmed severe malaria</b></p> <p>Any patient hospitalised with severe febrile disease with accompanying vital organ dysfunction diagnosed clinically.</p> <p><b>Confirmed severe malaria</b></p> <p>Any patient hospitalized with <i>P. falciparum</i> asexual parasitaemia as confirmed by laboratory tests with accompanying symptoms and signs of severe disease (vital organ dysfunction) diagnosed through laboratory.</p>
<p><b>Malnutrition</b></p>	<p><b>Low birth weight newborns:</b> Any new born with a birth weight less than 2500 grams (or 5.5 lbs)</p> <p><b>Malnutrition in children:</b></p> <ul style="list-style-type: none"> <li>• Children under five who are underweight (indicator: weight for age &lt; -2 ZScore)</li> <li>• Children 6 to 59 months with MUAC &lt; 11.5 cm (high risk of mortality)</li> <li>• Bilateral pitting oedema</li> </ul> <p><b>Malnutrition in pregnant women:</b> Pregnant women given birth to low birth weight babies (birth weight &lt; 2.5 Kg) (poor nutritional and health status of the women, can predict which population groups may benefit from improved antenatal care of women and neonatal care for infants).</p>

<b>Maternal Deaths</b>	The death of a woman while pregnant or within 42 days of the delivery or termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.
<b>Measles</b>	<p><b>Suspected case:</b> 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><b>Confirmed case:</b> A suspected case with laboratory confirmation (positive IgM antibody) or epidemiological link to confirmed cases in an outbreak.</p>
<b>Meningococcal Meningitis</b>	<p><b>Suspected case:</b> Any person with sudden onset of fever (&gt;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><b>Confirmed case:</b> A suspected case confirmed by isolation of <i>N. meningitidis</i> from CSF or blood.</p>
<b>Neonatal tetanus</b>	<p><b>Suspected case:</b> 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><b>Confirmed case:</b> No laboratory confirmation recommended.</p>
<b>New AIDS Cases</b>	WHO/AFRO recommends that countries use either Bangui or Abidjan HIV/AIDS case definitions. A positive ELISA for confirming HIV and a rapid test for confirming the positive results are sufficient for an epidemiologic case definition for HIV Infection.
<b>Noma</b>	<p><b>Suspected new case:</b> Any child with a mouth ulcer and other warning signs such as; malnutrition, poor hygiene, recent illness from; measles, persistent diarrhoea, or malaria should be regarded as a potential noma case.</p> <p><b>Confirmed new case:</b> Any person with a gangrenous disease which starts as gingival ulceration and spreads rapidly through the tissues of the mouth and face, destroying the soft and hard tissues.</p>
<b>Onchocerciasis</b>	<p><b>Suspected case:</b> In an endemic area, any person with fibrous nodules in subcutaneous tissues.</p> <p><b>Confirmed case:</b> A suspected case that is laboratory confirmed by presence of one or more of the following: microfilariae in skin snips, adult worms in excised nodules, or typical ocular manifestations (such as slit-lamp observations of microfilariae in the cornea, the anterior chamber, or the vitreous body).</p>

<p><b>Plague</b></p>	<p><b>Suspected case:</b> Any person with sudden onset of fever, chills, headache, severe malaise, prostration and very painful swelling of lymph nodes, or cough with blood stained sputum, chest pain, and difficulty in breathing.</p> <p><b>Confirmed case:</b> Suspected case confirmed by isolation of <i>Yersinia pestis</i> from blood or aspiration of buboes, or epidemiologic link to confirmed cases or outbreak.</p>
<p><b>Poliomyelitis (Acute flaccid paralysis)</b></p>	<p><b>Suspected case:</b> 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><b>Confirmed case:</b> A suspected case with virus isolation in stool.</p>
<p><b>Rabies</b></p>	<p><b>Suspected:</b> 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><b>Confirmed:</b> A suspected case that is laboratory confirmed</p>
<p><b>Rift Valley Fever (RVF)</b></p>	<p><b>Suspected case:</b></p> <p><b>Early disease :</b></p> <ul style="list-style-type: none"> <li>• Acute febrile illness (axillary temperature &gt;37.5 °C or oral temperature of &gt;38.0°C) of more than 48 hours duration that does not respond to antibiotic or antimalarial therapy, and is associated with: <ul style="list-style-type: none"> <li>○ Direct contact with sick or dead animal or its products <b>AND / OR:</b></li> <li>○ Recent travel (during last week) to, or living in an area where, after heavy rains, livestock die or abort, and where RVF virus activity is suspected/confirmed <b>AND / OR:</b></li> <li>○ Abrupt onset of any 1 or more of the following: exhaustion, backache, muscle pains, headache (often severe), discomfort when exposed to light, and nausea/vomiting <b>AND / OR:</b></li> <li>○ Nausea/vomiting, diarrhoea OR abdominal pain with 1 or more of the following: <ul style="list-style-type: none"> <li>▪ Severe pallor (or Hb &lt; 8 gm/dL)</li> <li>▪ Low platelets (thrombocytopenia) as evidence by presence of small skin and mucous membrane haemorrhages (petechiae) (or platelet count &lt; 100x10<sup>9</sup> / dL)</li> <li>▪ Evidence of kidney failure (edema, reduced urine output) (or creatinine &gt; 150 mol/L) <b>AND / OR:</b></li> <li>▪ Evidence of bleeding into skin, bleeding from puncture wounds, from mucous membranes or nose, from gastrointestinal tract and unnatural bleeding from vagina <b>AND / OR:</b></li> <li>▪ Clinical jaundice (3-fold increase above normal of transaminases)</li> </ul> </li> </ul> </li> </ul>

<p><b>Rift Valley Fever, continued</b></p>	<p><b>Late stages of diseases or complications (2-3 weeks after onset)</b></p> <ul style="list-style-type: none"> <li>• Patients who have experienced, in the preceding month a flu-like illness, with clinical criteria, who additionally develop the following:</li> <li>• CNS manifestations which resemble meningo-encephalitis</li> <li>• <b>AND/OR</b></li> <li>• Unexplained visual loss</li> <li>• <b>OR</b></li> <li>• Unexplained death following sudden onset of acute flu-like illness with haemorrhage, meningo-ecephalitis, or visual loss during the preceding month.</li> </ul> <p><b>Confirmed case:</b> Any patient who, after clinical screening, is positive for anti-RVF IgM ELISA antibodies (typically appear from fourth to sixth day after onset of symptoms) or tests positive on Reverse Transcriptase Polymerase Chain Reaction (RT-PCR).</p>
<p><b>Severe Acute Respiratory Infections (SARIs)</b></p>	<p><b>Severe acute respiratory infection (persons ≥ 5 years old):</b> Any severely ill person presenting with manifestations of acute lower respiratory infection with:</p> <ul style="list-style-type: none"> <li>• Sudden onset of fever (&gt;38°C) AND</li> <li>• Cough or sore throat AND</li> <li>• Shortness of breath, or difficulty breathing</li> <li>• With or without Clinical or radiographic findings of pneumonia</li> </ul> <p><b>OR</b></p> <p>Any person who died of an unexplained respiratory illness.</p>
<p><b>Severe Acute Respiratory Syndrome (SARS)</b></p>	<p><b>Suspected case of SARS:</b> An individual with:</p> <ol style="list-style-type: none"> <li>1. A history of fever, or documented fever ≥ 38 °C <b>AND</b></li> <li>2. One or more symptoms of lower respiratory tract illness (cough, difficulty breathing, shortness of breath) <b>AND</b></li> <li>3. 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 <b>AND</b></li> <li>4. No alternative diagnosis can fully explain the illness.</li> </ol> <p><b>Confirmed case of SARS:</b> An individual who tests positive for SARS-CoV infection by the WHO recommended testing procedures.</p>
<p><b>Severe Pneumonia in Children under 5</b></p>	<p><b>Clinical case definition (IMCI) for pneumonia:</b></p> <p>A child presenting with cough or difficult breathing and:</p> <ul style="list-style-type: none"> <li>• 50 or more breaths per minute for infant age 2 months up to 1 year</li> <li>• 40 or more breaths per minute for young child 1 year up to 5 years</li> </ul>

<p><b>Severe Pneumonia in Children under 5, continued</b></p>	<p><b>Note:</b> A young infant age 0 up to 2 months with cough and fast breathing is classified in IMCI as “serious bacterial infection” and is referred for further evaluation.</p> <p><b>Clinical case definition (IMCI) for severe pneumonia:</b></p> <p>A child presenting with cough or difficult breathing and any general danger sign, or chest indrawing or stridor in a calm child. General danger signs for children 2 months to 5 years are: unable to drink or breast feed, vomits everything, convulsions, lethargy, or unconsciousness.</p> <p><b>Confirmed case:</b> Radiographic or laboratory confirmation of pneumonia may not be feasible in most districts.</p>
<p><b>Sexually transmitted infections</b></p>	<p><b>Genital ulcer syndrome (non-vesicular):</b></p> <p><b>Suspected case:</b> Any male with an ulcer on the penis, scrotum, or rectum, with or without inguinal adenopathy, or any female with ulcer on labia, vagina, or rectum, with or without inguinal adenopathy.</p> <p><b>Confirmed case:</b> Any suspected case confirmed by a laboratory method.</p> <p><b>Urethral discharge syndrome:</b></p> <p><b>Suspected case:</b> Any male with urethral discharge with or without dysuria.</p> <p><b>Confirmed case:</b> <i>Urethral discharge syndrome:</i> A suspected case confirmed by a laboratory method (for example Gram stain showing intracellular Gram-negative diplococci).</p>
<p><b>Smallpox (Variola)</b></p>	<p><b>Suspected case:</b> An illness with acute onset of fever <math>\geq 38.3^{\circ}\text{C}</math> (<math>101^{\circ}\text{F}</math>) followed by a rash characterized by vesicles or firm pustules in the same stage of development without other apparent cause.</p> <p><b>Probable case:</b> 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><b>Confirmed case:</b> A clinically compatible case that is laboratory confirmed.</p>
<p><b>Trachoma</b></p>	<p><b>Suspected case:</b> Any patient with red sticky eyes who complains of pain and itchiness of the eyes.</p> <p><b>Confirmed case:</b> Any patient with red sticky eyes who complains of pain and itchiness of the eyes where examination of the eyes confirms one of the stages of Trachoma infection according to the <b>WHO Simplified Trachoma Grading System</b>.</p>

<p><b>Trypanosomiasis</b></p>	<p><b>Suspected case:</b></p> <p><b>Early stage:</b> a painful chancre originating as a papule and then evolving into a nodule at the primary fly bite site. There may be fever, intense headache, insomnia, painless lymphadenopathy, anaemia, local oedema and rash.</p> <p><b>Late stage:</b> cachexia, somnolence, and central nervous system signs.</p> <p><b>Confirmed case:</b> A suspected case confirmed by card agglutination trypanosomal test (CATT) or by isolation of trypanosomes in blood lymph nodes or cerebrospinal fluid.</p>
<p><b>Tuberculosis</b></p>	<p><b>Suspected case:</b> Any person with a cough of 3 weeks or more.</p> <p><b>Confirmed case:</b></p> <p><b>Smear-positive pulmonary TB:</b> a) a suspected patient with at least 2 sputum specimens positive for acid-fast bacilli (AFB), or b) one sputum specimen positive for AFB by microscopy and radiographic abnormalities consistent with active PTB as determined by the treating medical officer, or c) one positive sputum smear by microscopy and one sputum specimen positive on culture for AFB.</p> <p><b>Smear negative PTB:</b> a patient who fulfils all the following criteria: a) two sets taken at least 2 weeks apart of at least two sputum specimens negative for AFB on microscopy, radiographic abnormalities consistent with PTB and a lack of clinical response despite one week of a broad spectrum antibiotic, a decision by a physician to treat with a full course of anti-TB chemotherapy, or b) a patient who fulfils all the following criteria: severely ill, at least two sputum specimens negative for AFB by microscopy, radiographic abnormalities consistent with extensive pulmonary TB (interstitial and miliary), a decision by a physician to treat with a full course of anti-TB chemotherapy, or c) a patient whose initial sputum smears were negative, who had sputum sent for culture initially, and whose subsequent sputum culture result is positive.</p>
<p><b>Typhoid Fever</b></p>	<p><b>Suspected case:</b> Any person with gradual onset of persistent fever <math>\geq 38^{\circ}\text{C}</math> of 3 or more days duration with no other identified cause and additional symptoms that may include malaise, headache, abdominal pain, constipation or diarrhea, joint pain, chills or cough. Intestinal perforation and neurologic disturbances are known complications of untreated typhoid fever.</p> <p><b>Confirmed case:</b> Suspected case confirmed by isolation of <i>Salmonella typhi</i> from blood, bone marrow, bowel fluid or stool.</p>
<p><b>West Nile Fever</b></p>	<p><b>Suspected case:</b> A hospitalized case of encephalitis due to unknown cause</p> <p><b>Confirmed case:</b> Confirmation of West Nile Fever is through laboratory diagnostics to identify WNV-specific IgM</p>

<p>Yellow fever</p>	<p><b><u>Suspected case:</u></b>  Any person with acute onset of fever, with jaundice appearing within 14 days of onset of the first symptoms.</p> <p><b><u>Probable case:</u></b>  A suspected case</p> <p style="text-align: center;"><b>AND</b></p> <p>One of the following</p> <ul style="list-style-type: none"> <li>• Epidemiological link to a confirmed case or an outbreak</li> <li>• Positive post-mortem liver histopathology</li> </ul> <p><b><u>Confirmed case:</u></b>  A probable case</p> <p style="text-align: center;"><b>AND</b></p> <p>One of the following</p> <ul style="list-style-type: none"> <li>• Detection of YF-<b><u>specific</u></b>* IgM</li> <li>• Detection of four-fold increase in YF IgM and/or IgG antibody titres between acute and convalescent serum samples</li> <li>• Detection of YFV-<b><u>specific</u></b>* neutralizing antibodies</li> </ul> <p><i>*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.</i></p> <p style="text-align: center;"><b>OR</b></p> <p>One of the following</p> <ul style="list-style-type: none"> <li>• Detection of YF virus genome in blood or other organs by PCR</li> <li>• Detection of yellow fever antigen in blood, liver or other organs by immunoassays</li> </ul> <p>Isolation of the yellow fever virus</p>
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## ANNEX 1B Key signs and symptoms for case definitions for use at community level

Inform community leaders, community health workers, traditional healers, birth attendants, and health workers who conduct outreach activities in hard-to-reach areas about the priority diseases and conditions under surveillance in your area. Use key signs and symptoms of case definitions such as the following to help the community to recognize when they should refer a person with these signs for treatment and notify the health facility.

Examples of how key signs and symptoms of case definitions may be described at the community level	
<b>Acute flaccid paralysis</b>	Any child with a sudden onset of acute paralytic disease
<b>Acute watery diarrhoea</b>	Any person with 3 or more loose stools within the last 24 hours and a danger sign *or dehydration.  <i>(*Danger signs include lethargy, unconsciousness, vomits everything, convulsions, and in children less than 5, unable to drink or breast-feed)</i>
<b>Adverse event following immunization (AEFI)</b>	Any unusual event that follows immunization that is thought to be caused by the vaccine
<b>Cholera</b>	Any person 5 years of age or more with lots of watery diarrhoea
<b>Diarrhoea in children less than 5 years of age</b>	Any child who has three or more loose or watery stools in the past 24 hours with or without dehydration
<b>Diarrhoea with blood (Shigella)</b>	Any person with diarrhoea and visible blood in the stool
<b>Dracunculiasis</b>	Any person exhibiting or having a history of a skin lesion with the emergence of a worm
<b>Hepatitis</b>	Any person with fever and yellowing in the white part of the eyes or yellowing of the skin within two weeks of onset of first symptoms
<b>Influenza-like illness (ILI)</b>	Any person with fever and cough or sore throat or nasal discharge
<b>Leprosy</b>	Any person with light or reddish skin lesions with definite loss of sensation
<b>Malaria</b>	Any person with fever in a malaria endemic area.  Any under five child who has an illness with high fever and a danger sign*  <i>(*Danger signs include lethargy, unconsciousness, vomits everything, convulsions, and in children less than 5, unable to drink or breast-feed)</i>
<b>Measles</b>	Any person with fever and rash
<b>Meningococcal meningitis</b>	Any person with fever and neck stiffness

<b>Examples of how key signs and symptoms of case definitions may be described at the community level</b>	
<b>Neonatal tetanus</b>	Any newborn who is normal at birth, and then after 2 days, becomes stiff and unable to suck or feed or has convulsions.
<b>Onchocerciasis</b>	Any person in an endemic area with fibrous nodules under the skin
<b>Plague</b>	Any person with painful swelling under the arms or in the groin area. In an area known to have plague, any person with cough, chest pain and fever.
<b>Pneumonia</b>	Any child less than 5 years of age with cough and fast breathing or difficulty in breathing.
<b>Rabies</b>	Any person with a sense of apprehension, headache, fever, malaise and indefinite sensory changes often referred to the site of a preceding animal bite. Excitability and hydrophobia are frequent symptoms
<b>Sexually transmitted infections (STIs)</b>	Any person male or female who has an urethral/vaginal discharge or genital ulcer
<b>Tuberculosis</b>	Any person with cough for 3 weeks or more
<b>Typhoid fever</b>	Any person with a prolonged fever during the previous 3 weeks or more
<b>Viral hemorrhagic fevers</b>	Any person who has an unexplained illness with fever and bleeding or who died after an unexplained severe illness with fever and bleeding

## ANNEX 1C List of district reporting sites

Record information for contacting the health workers who provide information to the district related to surveillance and outbreak, events detection. Include, for example, community health workers, 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 or facsimile number (or other contact information such as e-mail)
<i>Lima Health Centre</i>	<i>Box 123 Mlima Zone</i>	<i>Dr. Moyo</i>	<i>Tel: 123-458 or send message by railroad's daily contact with Mlima station</i>

## ANNEX 1D

## Laboratory functions by health system level

Level	1.0 Collect	2.0 Confirm	3.0 Report
<b>Community or Health Facilities</b>	<ul style="list-style-type: none"> <li>• Use standardized case definitions to determine initiation of collection process</li> <li>• Assist First Contact Laboratory in specimen collection within approved guidelines</li> <li>• Document specimens with patients' complete clinical history and description</li> <li>• Transport specimens to First Contact Laboratory and Referral Laboratory within approved guidelines</li> </ul>	<ul style="list-style-type: none"> <li>• Use standardized case definitions to initiate confirmation process as part of an outbreak investigation</li> <li>• Handle specimens within approved guidelines</li> </ul>	<ul style="list-style-type: none"> <li>• Record collection of specimens</li> </ul>
<b>District, Province</b>	<ul style="list-style-type: none"> <li>• Communicate collection policies and procedures to providers</li> <li>• Request additional specimen collection by laboratory or providers, as needed</li> <li>• Store specimens within approved conditions pending transport or additional studies</li> <li>• Direct additional collection as needed based on outbreak investigation</li> </ul>	<ul style="list-style-type: none"> <li>• Perform laboratory studies for presumptive diagnosis as appropriate: microscopy, staining, microscopy, RDT</li> <li>• Store representative slides from the outbreak as needed</li> <li>• Observe changes in trends during routine analysis of laboratory results</li> </ul>	<ul style="list-style-type: none"> <li>• Record laboratory results</li> <li>• Provide results to clinical staff and patients</li> <li>• Report results to local epidemiology offices</li> <li>• Report observed changes in trends during routine analysis of laboratory results</li> <li>• Use summary information in response to outbreaks</li> </ul>
<b>National Referral Laboratory</b> <i>(some laboratories may function as First Contact and as Referral Laboratories)</i>	<ul style="list-style-type: none"> <li>• Set collection policies and procedures with national epidemiology office and national reference laboratories</li> <li>• Distribute specimen collection kits for special surveillance activities</li> <li>• Request additional specimen collection by laboratory or providers, as needed</li> <li>• Store specimens within approved conditions pending transport or additional studies</li> </ul>	<ul style="list-style-type: none"> <li>• Set confirmation policies and procedures with national epidemiology office and national reference laboratories</li> <li>• Perform laboratories studies for confirmation as appropriate: culture, isolation, serogroup identification, antimicrobial susceptibility, serology</li> <li>• Store representative isolates from the outbreak as needed</li> <li>• Observe changes in trends during routine analysis of laboratory results</li> </ul>	<ul style="list-style-type: none"> <li>• Report results and summary data to national epidemiology office</li> <li>• Report laboratory results from screening sentinel populations at target sites</li> </ul>
<b>Global Reference Laboratories</b>	<ul style="list-style-type: none"> <li>• Request additional specimen collection by laboratory or providers, as needed</li> <li>• Direct additional collection as needed based on outbreak investigation</li> </ul>	<ul style="list-style-type: none"> <li>• Perform additional laboratory studies as appropriate</li> </ul>	<ul style="list-style-type: none"> <li>• Report laboratory results to appropriate epidemiology offices</li> <li>• Use summary information in response to outbreaks</li> </ul>

## ANNEX 1E List of national laboratories for confirming priority diseases and conditions

Periodically update the list of laboratories in your district or those specified by the national level for confirming priority diseases and conditions. Include in the list whom to contact for assistance. The following list is an example.

### EXAMPLE:

Priority Disease, Conditions and Events	Focal Person, Name of Lab, Address, and Phone Number
Polio	<i>Example: John Zimbe; National Laboratory, 145 Kenyatta Road, Pretoria, SA; 234-701342555</i>
Cholera	
HIV	
Tuberculosis	
Measles	
Plague	
Human influenza caused by a new subtype	
Rift Valley disease	
Dengue fever	
Public health events of national or international concern	
Anthrax	
Chikungunya	
Typhoid fever	



## Section 2

### Report priority diseases, conditions and events

This section describes how to:

- Report immediately-reportable diseases, conditions and events
- Report summary information for epidemic- and pandemic-prone diseases
- Report routine summary information for other diseases of public health importance
- Improve routine reporting practices



## 2.0 Report priority diseases, conditions and events

Ensuring reliable reporting of surveillance data throughout the system is important. Reliable reporting provides information for program managers, surveillance officers, the national IHR focal point, the WHO contact point, competent authority at Point of Entry (PoE) and other health staff to:

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

National policy determines whether the data from the districts and health facilities are reported immediately, weekly, monthly, or quarterly. The recommendations about when to report will depend on specific disease control activities in your country or district. Because the diseases targeted by IDSR are public health priorities requiring timely action, this guideline describes immediate reporting with case-based data and regular reporting of summary data. Districts should also be alert to, and report, unusual events that have the potential to affect human health.

This section provides an overview of recommended reporting methods and relevant IDSR forms for streamlining reporting of priority diseases, conditions and events.

### 2.1 Immediately reportable diseases and events

*Immediate reporting* allows for timely action to be taken to prevent the reemergence or rapid transmission of epidemic prone diseases or events, especially diseases due to highly pathogenic and lethal infectious (please see Table 2 on the following page), chemical or radio nuclear agents.

Immediate reporting is indicated when an epidemic-prone disease or other potential public health event of national concern (PHENC) is suspected or is otherwise required under the International Health Regulations. The diseases, conditions and events requiring immediate notification to the next level are listed in Table 2 on the following page.

*Please refer to Section 9 for disease-specific information including surveillance case definitions for reporting suspected cases or events.*

**Table 2: Diseases, conditions or events requiring immediate reporting**

Acute Flaccid Paralysis (AFP)	Maternal death
Acute hemorrhagic fever syndrome (Ebola, Marburg, Lassa Fever, RVF, Crimean-Congo)	Measles
Adverse effects following immunization (AEFI)	Meningococcal meningitis
Anthrax	Neonatal tetanus
Chikungunya	Plague
Cholera	Rabies (confirmed cases)
Cluster of SARI	SARS
Dengue fever	Smallpox
Diarrhoea with blood ( <i>Shigella</i> )	Typhoid fever
Dracunculiasis	Yellow fever
Influenza due to new subtype	Any public health event of international concern (infectious, zoonotic, food borne, chemical, radio nuclear or due to an unknown condition)

## 2.2 Report case-based information to the next level

If an immediately reportable disease, condition or other public health event is suspected:

- Make the initial report by the fastest means possible (telephone, text message, facsimile, e-mail, radiophone). The health facility should contact the district health authority immediately and provide information about the patient.
- Follow up the initial verbal report with a written report of the case-based report form. A sample case-based reporting form for recording case-based information is in Annex 2A at the end of this section. If a computer or other electronic device is available for surveillance or case management, complete and submit the form electronically to the next level.
- If a laboratory specimen is requested at this time, make sure that the patient's identifying information matches the information on the case-based reporting form. A sample laboratory form is included in Annex 2B.

- Disease-specific case-based reporting forms for particular diseases of concern (cholera, VHF, maternal death, and MDR/XDR TB) are in the annex at the end of Section 9. These forms may be used to begin gathering initial information for the case investigation.

Note: Some epidemic-prone diseases may have specific reporting requirements depending on national or regional policies. Please refer to disease-specific requirements in Section 9 of this guide.

- If a potential Public Health Event of International Concern (PHEIC) is suspected (as defined in Annex 2 of the IHR 2005 guidelines), notify the National IHR Focal Point using the fastest means of communication. A copy of the IHR decision instrument is in Annex 2C at the end of this section.
- For events and diseases with epidemic potential detected at Points of Entry, report immediately to the next higher level. Provide a copy of the report to the national (or central level) for the National IHR Focal Point to assess using the decision algorithm. Include yellow fever vaccination for those cases originating from endemic or risk areas.

### **2.3 Report summary information for priority diseases, conditions and events**

After immediately notifying the next level about instances of immediately reportable diseases, conditions or events, collect and report weekly summary information for the priority diseases, conditions and events listed in Table 2.

*Weekly reporting* provides data for monitoring trends of diseases or conditions to detect epidemics.

If no cases of an immediately reportable disease have been diagnosed during the week, record a zero (0) on the reporting form for that disease. If the space is left blank, the staff that receives the report will not be able to develop information from a blank space. Submitting a zero for each immediately reportable disease when no cases were detected during the week tells the staff at the next level that a complete report has been filled.

The summary data is important for analysis after an initial case has been detected or an outbreak is suspected or confirmed. For example, at the health facility or

district, the surveillance focal point can draw an epidemic curve to see if the epidemic thresholds for specific diseases have been crossed. Additionally, this data can be used to check whether the case fatality rate is under, at or over the target. The weekly data analysis should also help point out possible high risk groups with regard to a patients' case location or residence, age group, sex, and exposure during social events (for example, a funeral), occupational hazards (for example, butchering), consuming game meat, or exposure to a contaminated food or beverage.

At the district level, weekly data analysis includes verification of the quality of the data coming from the reporting sites and the completeness and timeliness of these reports. The incidence and case fatality rates will be evaluated against set thresholds, and epidemic curves will be updated and in-depth analysis of the case-based data sets received from the reporting sites will be performed. Laboratory-based data is analyzed similarly to case-based data: for action oriented analysis, give importance to the trends describing the quality of specimens, detected pathogens by place and person, age groups at high risk and pathogen resistance to recommended drugs.

Districts with a computer are encouraged to store the information electronically and forward the surveillance data sets to the next higher level in this format.

## **2.4 Report routine summary information for other diseases of public health importance**

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

Routinely report the total number of cases and deaths seen in a given period (for example, monthly or weekly) for other diseases of public health importance. Health facilities will report summary totals to the district. Districts will aggregate reports from all reporting sites and provide summary totals to the provincial, regional or central level. Each level should observe any unusual increases or events seen during analysis of monthly summary reports. The summary results should be analyzed and the results used to monitor progress toward disease control targets, measure achievements of disease prevention activities in the

district, and identify hidden outbreaks or problems so that a response action can be taken.

**Table 3: Diseases requiring monthly or quarterly summary reporting**

Acute viral hepatitis	Malaria
AIDS (New Cases)	Malnutrition in children under 5 years
Buruli ulcer	Mental health (Epilepsy)
Diabetes mellitus	Noma
Diarrhoea with severe dehydration in children under 5 years of age	Onchocerciasis
HIV (new detections)	Severe pneumonia in children under 5 years of age
Hypertension	Sexually transmitted diseases (STIs)
Influenza-like illness	Trachoma
Injuries (Road Traffic Accidents)	Trypanosomiasis
Leprosy (quarterly)	Tuberculosis (quarterly)
Lymphatic Filariasis	Underweight Newborns (less than 2500 g)

Each month, the health facility calculates the total number of cases and deaths due to priority diseases and events seen in the health facility. Separate totals are calculated for outpatient cases and inpatient cases. The summary totals are recorded on a form (please see Annex 2D) and sent to the district level. The district aggregates the totals from all the health facilities that reported and submitted district summary totals to the provincial, regional or central level.

Special effort shall be made to obtain from the health information system, the total number of outpatients and inpatients seen for any health condition (including those not in the IDSR list) during the reported period.

In cases where a computer is available for surveillance or case management, patient records can be analyzed to generate the weekly, monthly or quarterly reports. This information is important for producing national and sub-national situation reports. All data sets should be shared with the health authorities with a copy to the respective disease prevention and control programme: this is important for coordination at central level, and for the building or strengthening of a national IDSR database system.

## **2.5 Improve routine reporting practices**

In some health facilities, more than one person may be responsible for recording information about patients seen in the facility. For example, the clinician records the patient's name and diagnosis in a clinic register. Later in the day, a nurse tallies the number of cases and deaths seen in an outpatient service. The ward nurse tallies the number of hospitalized cases. Each week, month, or quarter, a records clerk or statistician calculates summaries for all the diseases and records them in a standard form. In case the health facility is equipped with computers, individual patient records shall be entered, from which the surveillance subset will be extracted and analyzed to get the required weekly, monthly or quarterly compilations.

### **2.5.1 Review the flow of information in the reporting site**

During supervisory visits to reporting sites, make sure that:

- Clinicians record information in the patient registers using the recommended case definitions so that health workers who tally the cases at the end of the day can reliably record the required diagnoses on the tally sheet.
- Clinicians, ward nurses or other responsible staff should complete the case-based reporting form preferably while the patient is still present.
- Records clerks or statisticians have summary forms that contain spaces for recording cases and deaths due to the priority diseases according to the standard case definitions.
- Health staff review the weekly, monthly and quarterly summary totals and provide comments on the forms about results seen during data analysis. (See Section 3).
- Health workers record the summary totals on a recommended weekly, monthly and quarterly summary reporting form.

### **2.5.2 Monitor access to forms and procedures**

Keep a record of IDSR forms and reports received at your level. The record you keep will be an essential data source for calculating indicators for your country's IHR report and for monitoring performance of the IDSR indicators. A sample IDSR Reports and Data Sharing Log Book form is in Annex 2E.

Periodically check with reporting sites that you supervise (community, health facility, and district) to ensure that the correct forms and procedures are available

to staff so they can record and report the required cases of priority diseases and conditions:

- Take steps to ensure that all health workers know the standard case definitions recommended by national policy. Establish or modify existing procedures so that all health workers will be able to apply the standard case definitions in detecting and reporting priority cases, outbreaks or events.
- Highlight with staff those diseases or conditions that require immediate reporting for case-based surveillance including PHEIC and other priority diseases or events of national and regional concern. For example, all the health staff should be aware of epidemic-prone diseases for which a single case is a suspected outbreak requiring immediate action, and of any unusual or unexplained event with potential for affecting human health.
- Review with health staff the role that case-based data plays in determining risk factors and the means of disease transmission or exposure to health risks in a public health event. Make sure the staff has access to a recommended form for reporting case-based information.
- Ensure that the surveillance unit has access to fast communication means (facsimile, telephone, text message, electronic mail, telegrams, personal messages, or other rapid communication means). For the district, specify how the district should notify the regional or national levels and who should be contacted at these levels.

### **2.5.3 Enhance linkages to strengthen community-based surveillance**

A community-based surveillance system relies on the community members' capacity to identify and report public health problems to the nearest health facility or to the district health office. In this system, trained surveillance informants identify and report events in the community that have public health significance. Community informants report to the health facility or, in the case of a serious event, directly to the district authorities.

*Example: A community surveillance informant hears of several cases of acute watery diarrhea with vomiting in the community. The informant suspects cholera and reports the rumor to the local health facility and to the district level health officer by text messaging. Members of the rapid response team (RRT) travel to the community to verify and investigate the possible outbreak, and, based on the investigation results, implement control and prevention measures. The outbreak is quickly contained thanks to the early warning from the community-based surveillance liaison.*

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

- Pharmacists
- School teachers
- Staff at private clinics
- Village leaders
- Religious leaders
- Traditional healers
- Birth attendants or other community health workers

The District can organize community-based surveillance informants by:

- Working with community leaders to identify members of the community to receive relevant training.
- Provide the community sources with information about the priority diseases and public health events or hazards you are interested in monitoring through surveillance. Give enough information about the disease so that the community source can refer cases to the health facility, or notify the health facility when unusual or unexplained health events occur in the community.
- Involve community surveillance informants in risk mapping, emergency simulation exercises and risk communication during outbreaks.
- Disseminate alert and epidemic thresholds

Please refer to the list in Annex 1B of key signs and symptoms to use in case definitions for community surveillance.

## **Annexes to Section 2**

- ANNEX 2A** IDSR immediate case-based reporting form
- ANNEX 2B** IDSR case based laboratory reporting form
- ANNEX 2C** IHR (2005) decision instrument
- ANNEX 2D** IDSR weekly/monthly summary reporting form
- ANNEX 2E** IDSR reports and data sharing log book



## ANNEX 2A

## IDSR immediate case-based reporting form

IDSR Immediate Case-Based Report Form		
Variables / Questions		Answers - Case n
1	Reporting Country	
2	Reporting Province/Region	
3	Reporting District	
4	Reporting Site (Health Facility, Camp, Village...)	
5	Disease/Event (diagnosis): *	
6	In-patient or Out-patient?	
7	Date seen at health facility (day/month/year)	\_ \_ \_ \_ \
8	Patient Name(s)	
9	Date of Birth (day/month/year)	\_ \_ \_ \_ \
10	Age (..... Years/.....Months/.....Days).	
11	Sex: M=Male F=Female	
12	Patient's residence: Town/City /Village	
13	Neighborhood	
14	District of residence	
15	Urban/Rural? (U=Urban R=Rural)	
16	Address, (cell)phone number ... If applicable, name of mother and father if neonate or child	
17	Date of onset (day/month/year) of first symptoms	\_ \_ \_ \_ \
18	Number of vaccine doses received in the past against the disease being reported	
19	Date of last vaccination	\_ \_ \_ \_ \
20	Laboratory results	
21	Outcome: (Alive, Dead, Transferred out, Lost to follow-up or unknown)	
22	Final Classification: Confirmed, Probable, Compatible, Discarded	
23	Date health facility notified District (day/month/year)	\_ \_ \_ \_ \
24	Date form sent to district (day/month/year)	\_ \_ \_ \_ \
25	Record's unique identifier	
26	Person completing form: name, function, signature	
<p>* <u>Disease/Event</u> (Diagnosis):  AFP, Anthrax, Cholera, Bloody Diarrhea, Dracunculiasis, Neonatal Tetanus, Measles, Meningitis, Yellow fever, Dengue, Chikungunya, Viral Hemorrhagic Fever, Plague, Typhoid fever, Rabies, Smallpox, SARS, SARI, Maternal death, Influenza due to new subtypes, Adverse Effects following immunization (AEFI), Any other event or disease of public health importance (Specify)</p>		

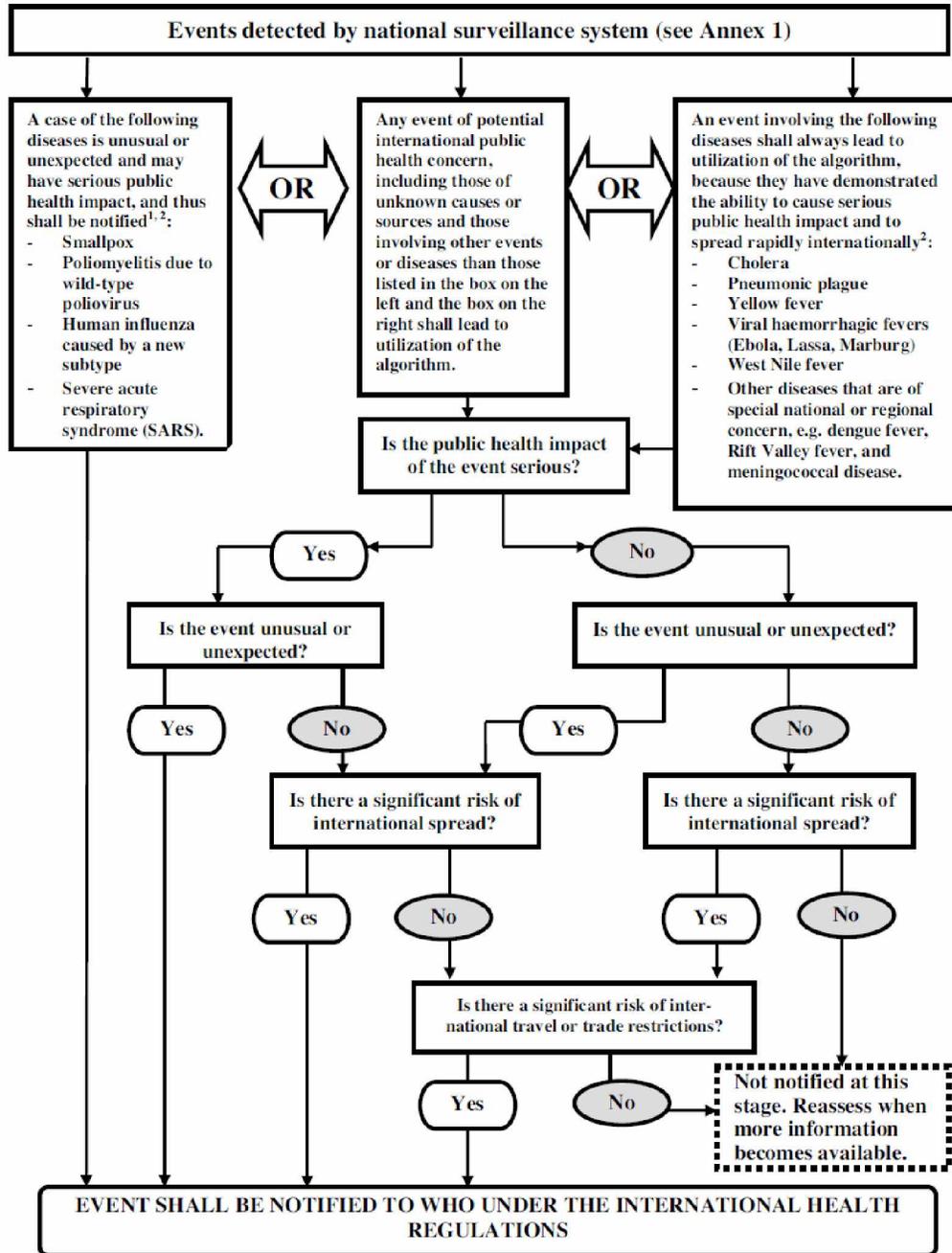
## ANNEX 2B      IDSR case-based laboratory reporting form

<b>IDSR case based Laboratory Reporting Form</b>		
<b><i>Part I. Referring health worker to complete this form and send a copy to the lab with the specimen</i></b>		
	Variables	Answers
1	Date of specimen collection (day/month/year)	
2	Suspected Disease or Condition	
3	Specimen type *	
4	Specimen unique identifier **	
5	Patient Name (s)	
6	Sex (M= Male F= Female)	
7	Age (..... Years/.....Months/.....Days).	
8	Date Specimen sent to lab (day/month/year)	\_\_\_\_\_\
<b><i>Part II. Lab to complete this section and return the form to district and clinician</i></b>		
	Variables	Answers
1	Laboratory Name and location	
2	Date lab received specimen (dd/mm/yyyy)	\_\_\_\_\_\
3	Specimen condition: (Adequate/Not adequate)	
4	Type of test(s) performed	
5	Final Lab Result(s)	
6	Date (dd/mm/yyyy) lab sent results to district	\_\_\_\_\_\
7	Date Results sent to the clinician (dd/mm/yyyy)	\_\_\_\_\_\
8	Date district received lab results (dd/mm/yyyy)	\_\_\_\_\_\
<p>* Blood, Plasma, Serum, Aspirate, CSF, Pus, Saliva, Biopsy, Stool, Uretral/Vaginal discharge, Urine, Sputum, food/water samples</p> <p>** Same as the patient's identifier in the IDSR immediate case based reporting form</p>		

ANNEX 2C

IHR (2005) decision instrument

DECISION INSTRUMENT FOR THE ASSESSMENT AND NOTIFICATION OF EVENTS THAT MAY CONSTITUTE A PUBLIC HEALTH EMERGENCY OF INTERNATIONAL CONCERN



<sup>1</sup> As per WHO case definitions.

<sup>2</sup> The disease list shall be used only for the purposes of these Regulations.

\*States Parties that answer “yes” to the question whether the event meets any two of the four criteria above shall notify WHO according to Article 6 of the IHR

## ANNEX 2D

## IDSR weekly/monthly summary reporting form

IDSR weekly/monthly summary reporting form					
Year:		Week:		Month:	
Country:		Province/Region:		District:	Population:
District Isocode:		Reporting Site Name:		Report Unique Identifier :	
Officially Expected Reports:		Number of reports received:			Reports received on time:
Notifiable Diseases and Events		Cases	Deaths	Lab confirmed cases	Observations
1	Acute Flacid Paralysis				
2	Acute hemorrhagic fever syndrome				
3	Acute viral hepatitis				
4	Adverse Effects following immunization (AEFI)				
5	AIDS/HIV				
6	Anthrax				
7	Buruli ulcer				
8	Chikungunya				
9	Cholera				
10	Dengue				
11	Dengue fever				
12	Diabetes mellitus				
13	Diarrhoea with blood				
14	Diarrhoea with severe dehydration <5				
15	Dracunculiasis				
16	Influenza-like illness				
17	Leprosy				

### IDSR weekly/monthly summary reporting form

18	Malaria				
19	Malnutrition < 5 years				
20	Maternal deaths				
21	Measles				
22	Meningococcal meningitis				
23	Mental health (Epilepsy)				
24	Neonatal tetanus				
25	Newborn with low birthweight (less than 2500 g)				
26	Noma				
27	Onchocerciasis				
28	Plague				
29	Poliomyelitis (AFP)				
30	Public health events of international or national concern				
31	Rabies				
32	SARS				
33	Severe Acute Respiratory Infection (SARI)				
34	Severe pneumonia <5				
35	Sexually Transmitted Infections				
36	Smallpox				
37	Trachoma				
38	Trypanosomiasis				
39	Typhoid fever				
40	Viral hemorrhagic fever				
41	Yellow Fever				

## IDSR weekly/monthly summary reporting form

### Analysis, Interpretation, Decision, Action and Recommendations

Epidemiological  
comments

Decisions and Action(s)  
taken

Recommendations

Report date :  
\_\_\_\_/\_\_\_\_/\_\_\_\_  
(dd/mm/yyyy)

Responsible Officer :





## **Section 3**

### **Analyze data**

This section describes how to:

- Receive, handle and store data from reporting sites
- Analyze data by time, place and person
- Compare analysis results with thresholds for public health action
- Draw conclusions from the analysis
- Summarize and use the information to improve public health action



## 3.0 Analyze data

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

- Observing trends over time and alerting health staff about emergent events or unusual patterns
- Identifying geographic areas of higher risk
- Characterizing personal variables such as age, gender or occupation that place a person at higher risk for the disease or event.

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

- Have any priority diseases or other public health events of concern been detected during the reporting period (this week, for example)? Is an epidemic or unusual public health event suspected?
- Of the cases, deaths or events detected, how many were confirmed?
- Where did they occur?
- How does the observed situation compare to previous observation periods of time this year? For example, when compared to the start of the 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?

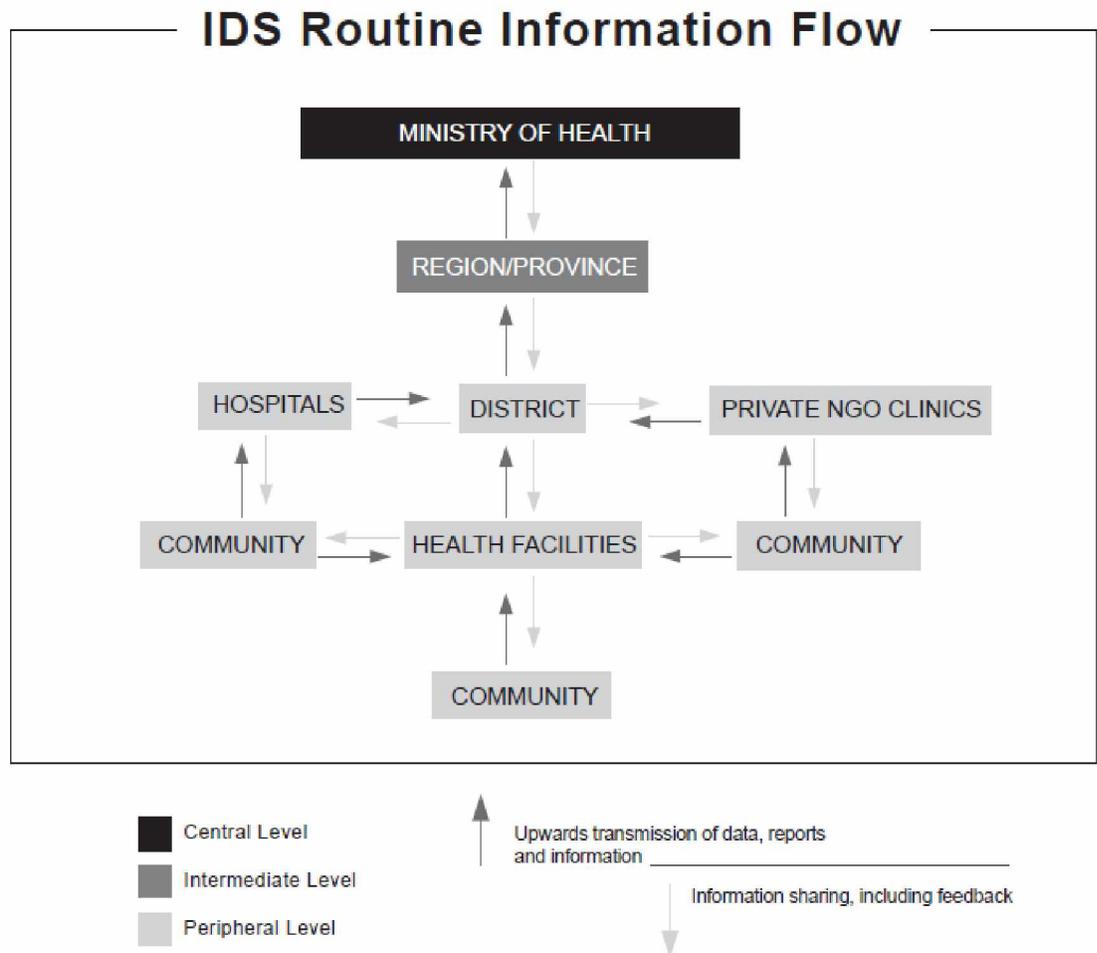
Each site that collects or receives data should prepare and follow an analysis plan for analyzing routine surveillance information (refer to Annex 3A of this section).

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

### 3.1 Receive, handle and store data from reporting sites

The routine flow of surveillance data is usually from reporting sites to the next level up to the central level as indicated in the diagram below. At the health facility level, both in-patient and out-patient areas are surveillance sites. The information collected from this site is compiled in standard forms, analysed and then forwarded, to the district health management team. In some countries, a sub-district team collects the data from the health facilities in its catchment area and forwards it to the district team. Districts merge, aggregate and send their data and reports to provinces, regions or states and subsequently to the central health authorities.

The diagram below illustrates a usual flow of surveillance data throughout a health system.



For special emergency situations (such as public health events of concern), an urgent data flow system should be defined in line with the International Health Regulations (2005). For example, a country may decide that during emergencies, the situation report is sent to the next level with an immediate copy to levels beyond the next higher 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). This article states, “If a State Party has evidence of an unexpected or unusual public health event within its territory, irrespective of origin or source, which may constitute a public health emergency of international concern, it shall provide to WHO all relevant public health information.”

### **3.1.1 Receive data**

Make a careful record of all data received at your site. The surveillance team at each level or reporting site where data is received should:

- Acknowledge receipt of the report.
- Log into an appropriate log-book any data set or surveillance report received from any reporting site (Refer to Annex 2E in Section 2).
- Review the data quality.
- Verify whether the form (hard copy or electronic file) is filled out accurately and completely.
- Check to be sure there are no discrepancies on the form.
- Record in the log the date the data was received, what it is about and who is the sender.
- Verify whether the data set arrived timely or was late.
- Merge the data and store them in a database.

### **3.1.2 Enter and clean the data**

At each level where data is received (health facility, district, province or national), the surveillance team should take steps to correctly enter the data into aggregated reporting forms listing data from all the reporting sites. Troubleshooting and cleaning data prior to analysis is an important data management practice. Disease trends and maps will not be accurate if information about 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 log books or reporting forms. Emphasize that patient logs are sources of data for reporting public health

information and may play a role in detecting an unusual event or otherwise undetected public health problem.

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 which 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. 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.

### **3.2 Analyze data by time, place and person**

Findings from data analysis may trigger investigations and subsequent response to an outbreak, condition, or public health event. Data should be analyzed by time, place and person (refer to Table 4, on the following page).

**Table 4: Types of analysis, objectives, tools and methods**

Type of analysis	Objective	Tools	Method
<b>Time</b>	Detect abrupt or long-term changes in disease or unusual event occurrence, how many occurred, and the period of time from exposure to onset of symptoms.	Record summary totals in a <b>table</b> or on a <b>line graph</b> or <b>histogram</b> .	Compare the number of case reports received for the current period with the number received in a previous period (weeks, months, seasons or years)
<b>Place</b>	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 <b>spot map</b> of the district or area affected during an outbreak.	Plot cases on a map and look for clusters or relationships between the location of the cases and the health event being investigated.
<b>Person</b>	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 <b>table</b> .	Depending on the disease, characterize cases according to the data reported for case-based surveillance such as age, sex, place of work, immunization status, school attendance, and other known risk factors for the diseases.

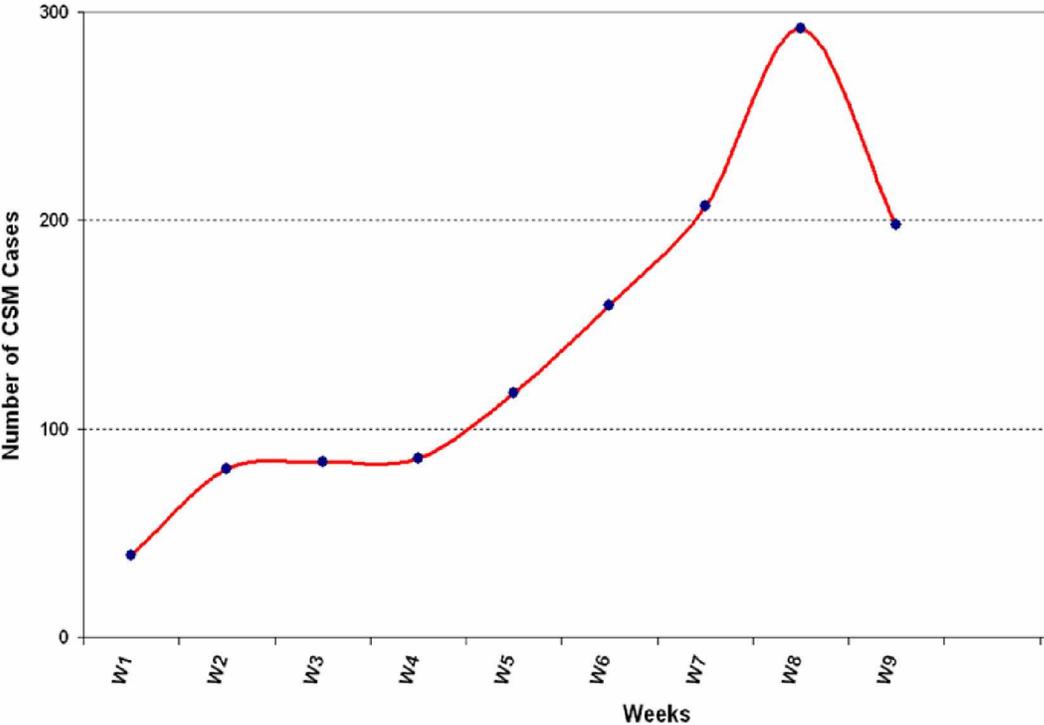
### 3.2.1 Analyze data by time

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

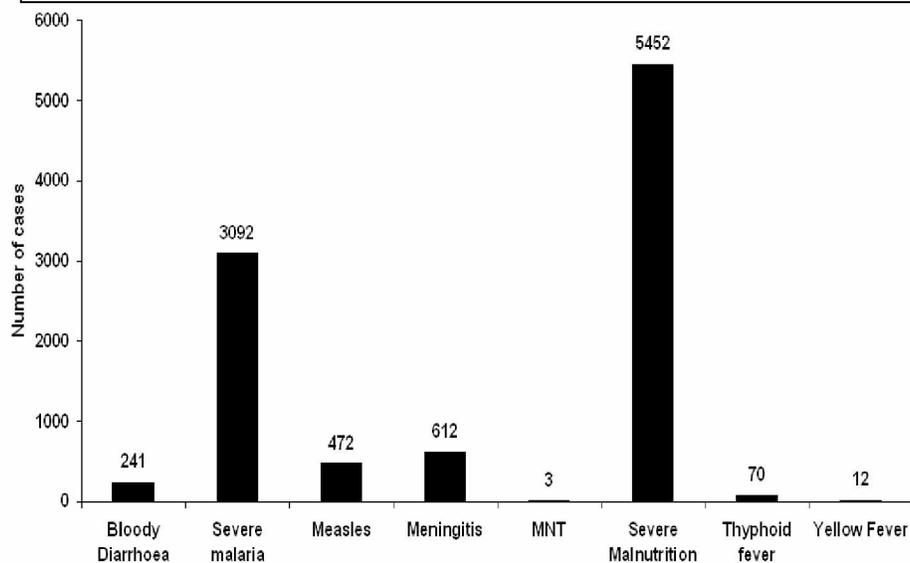
Graphs can show how many cases and deaths have occurred in a given time. It is easier to see changes in the number of cases and deaths by using a graph, especially for large numbers of cases or showing cases over a period of time.

Graphs are made with lines (a trend line) or bars (a bar graph or histogram) to measure the number of cases over time. How to *make a graph* is described in Annex 3B of this section.

**Example of trend line of reported cases for Cerebrospinal Meningitis, weeks 1-9, 2010**



**Example of a bar graph of cases of reported diseases  
for weekly surveillance Jan-Aug, 2010**



### *Using a histogram*

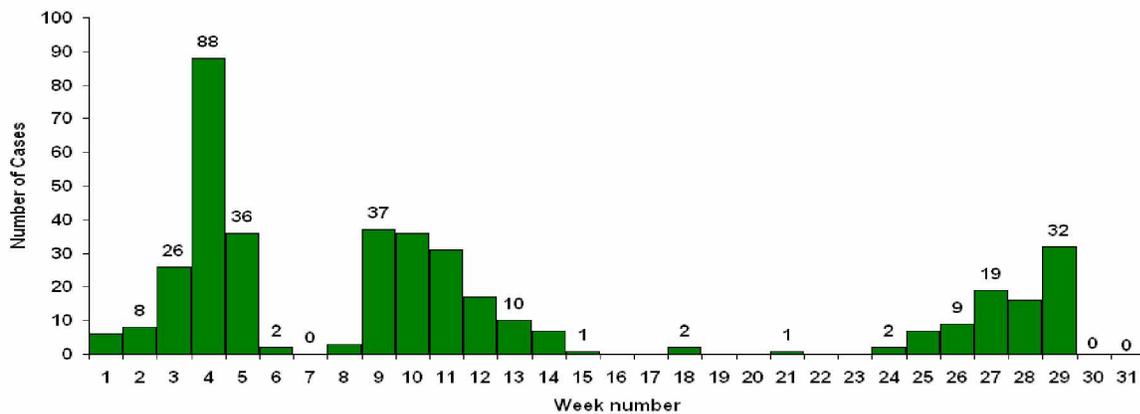
Prepare a histogram using data from the case reporting forms and line lists. Plot each case on the histogram according to the date of onset. Use symbols to represent each case. As the histogram develops, it will demonstrate an epidemic curve. Define the geographical area the curve will represent. For example, decide if the curve should describe the entire district or the health facility catchment area where the case occurred.

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

- Onset of the first (or index) case
- The health facility notified the district
- The first case was seen at the health facility
- The district began the case investigation
- A response began
- The district notified the higher level

The results of this analysis allow users of this information to look back at the outbreak and answer questions such as when were patients exposed to the illness and the length of the incubation period.

**Example of histogram showing detected cholera cases  
by epidemiologic week 1 to 31**



### 3.2.2 Analyze 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.

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

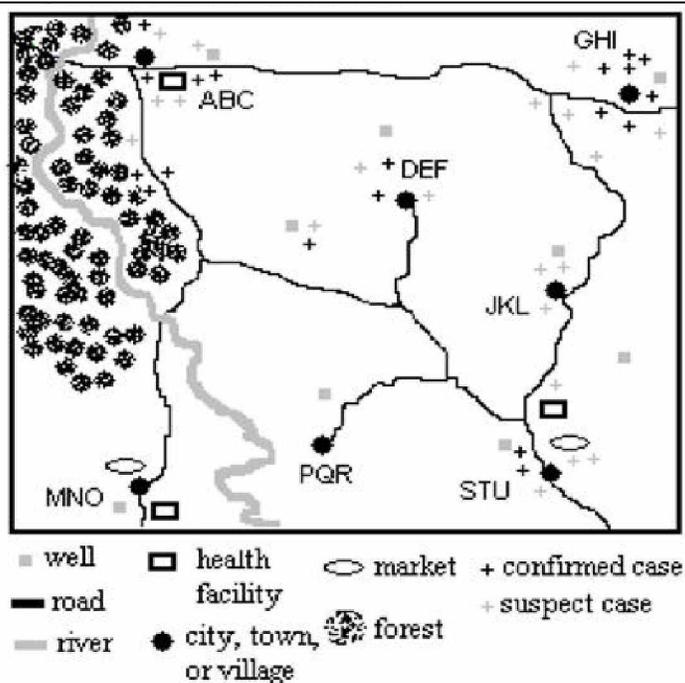
- Clusters of cases occurring in a particular area
- Travel patterns that relate to the method of transmission for this disease
- Common sources of infection for these cases.

Use manual methods or geographic information software to create a map to use as part of routine analysis of surveillance of disease. On a map of the area where cases occurred, mark the following:

- Roads, water sources, location of specific communities and other factors related to the transmission risk for the disease or condition under investigation. For example, a map for neonatal tetanus includes locations of traditional birth attendants and health facilities where mothers deliver infants.

- Location of the patients' residences or most relevant geographical characteristic for this disease or condition (for example, by village, neighbourhood, work camp, or refugee settlement. Another example is when mapping young patients during a meningitis outbreak, remember to locate the school that the patients attend.)
- Other locations appropriate to the disease or condition being investigated. Please see the disease specific guidelines for specific recommendations for analyzing data by place.

**Example of district spot map showing location of suspected and confirmed cases**



### 3.2.3 Analyze data by person

Analysis by person describes the population with the condition as well as those at risk of contracting the condition or being exposed to factors associated with it.

Make a distribution of the cases by each of the person variables in the reporting form. For example, compare the total number and proportion of suspected and confirmed cases by:

- Age group
- Sex
- Occupation
- Urban and rural residences
- Vaccination status
- Risk factors
- Outcomes
- Final classification

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

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

### ***Identifying numerators and denominators***

A simple count of cases does not provide all of the information needed to understand the impact of a disease on the community, health facility or district. Simple percentages and rates are useful for comparing information reported to the district.

The first step in analyzing 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 Guinea worm that occurred during the year in school age children)
- 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).

***Using simple percentages***

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

Health facility	Number of Guinea worm cases this year in school age children
A	42
B	30

By looking only at the number of reported cases, it appears that a higher occurrence of Guinea worm cases occurred in health facility A.

But when the number of reported cases at each health facility is compared to the total number of school-aged children living in each catchment area, then the situation becomes clearer.

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

By calculating the percentage of the number of cases of Guinea worm during the last 12 months in school aged children, the district officer can compare the impact of the illness on each facility. The numerator is the number of 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	4%
B	5%

### 3.2.4 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 organized in columns and rows. The purpose of a table is to present the data in a simple way. For surveillance and monitoring, use a table to show the number of cases and deaths from a given disease that occurred in a given time.

#### To make a table:

1. Decide what information you want to show on the table. For example, consider analysis of measles cases and deaths by age group
2. Decide how many columns and rows you will need. Add an extra row at the bottom and an extra column at the right to show totals as needed. In the example, you will need a row for each age group, and a column for each variable such as age group or cases and deaths.
3. Label all the rows and columns, including measurements of time. In the example below, the analysis is done yearly. Analysis of person is also recommended for analysis of outbreak data.
4. Record the total number of cases and deaths as indicated in each row. Check to be sure the correct numbers are in the correct row or column.

Age group	Number of reported 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

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

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

1. 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.)
2. Calculate the total number of cases for the time or characteristic being measured. (In this example, there are 78 cases whose age is known.)
3. Divide the total number of cases within each age group by the total number of reported cases. (For example, for children age 0 up through 4 years, divide 40 by 78. The answer is 0.51.)
4. Multiply the answer by 100 to calculate the percent. (Multiply  $0.51 \times 100$ . The answer is 51%.)

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

### 3.2.6 Calculate a case fatality rate

A case fatality rate helps to:

- Indicate whether a case is identified and managed 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 districts.
- Identify underlying conditions to severe diseases e.g. immune deficiency.

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

**To calculate a case fatality rate:**

1. Calculate the total number of deaths. (In the example of the measles data, there are a total of 5 deaths.)
2. Divide the total number of deaths by the total number of reported cases. (For example, the total number of reported cases is 78. The number of deaths is 5. So divide 5 by 78.  $5 \div 78$  is 0.06.)
3. Multiply the answer times 100 ( $0.06 \times 100$  equals 6%).

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

Please see the disease specific guidelines in Section 9.0 for recommendations about the essential variables to compare for each disease.

### 3.3 Compare analysis results with thresholds for public health action

Thresholds are markers that indicate when something should happen or change. They help surveillance and program managers answer the question, “When should I take action, and what will that action be?” Information on establishing thresholds is in Section 4.1 of this guide.

Thresholds are based on information from two different sources:

- A situation analysis describing who is at risk for the disease, what are the risks, when is action needed to prevent a wider outbreak, and where do the diseases usually occur?
- International recommendations from technical and disease control program experts.

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

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

An ***epidemic threshold*** triggers a definite response. It marks the specific data or investigation finding that signals an action beyond confirming or clarifying the problem. Possible actions include communicating laboratory confirmation to affected health centres, implementing an emergency response such as an immunization activity, community awareness campaign, or improved infection control practices in the health care setting.

Several thresholds have been proposed for action based on disease surveillance findings. For rare diseases or diseases targeted for eradication, detection of a single case suggests an epidemic. In such situations, one case is unusual and is a serious event. This is because these rare or targeted diseases have the potential for rapid transmission or high case fatality rates.

In other situations, a number of cases will trigger a response. For example, the epidemic threshold for cerebrospinal meningitis in countries of the meningitis belt is 10 cases per 100,000 population, and the alert threshold is 5 cases per 100,000.

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

Suggested thresholds for taking action in specific diseases or conditions are discussed Section 9.0.

### **3.4 Draw conclusions from the findings**

Routinely gather or present the graphs, maps and tables and meet with the district (or relevant) health team to review analysis results and discuss the findings. Systematically review the findings following the district's analysis plan (see Annex 3A) if one has been prepared. At minimum, review the findings to:

- Assess whether the situation is improving or not, and
- Find what explains the observed situation.

### **3.5 Summarize and use the analysis to improve public health action**

Prepare and share with all stake holders who need this information, a concise action oriented summary of the surveillance findings. Use simple tables, graphs and maps, with clear and short description, interpretation, comments and recommendations.

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

- Conduct an investigation to find out why 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.

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



## **Annexes for Section 3.0**

**ANNEX 3A** Make a plan for routine analysis of surveillance information

**ANNEX 3B** How to manually make a line graph



## **ANNEX 3A      Make a plan for routine analysis of surveillance information**

A minimum plan for routine analysis of surveillance information should include the following tables, graphs and maps.

1. Calculate completeness and timeliness of reporting

Monitoring whether surveillance reports are received on time and if all reporting sites have reported is an essential first step in the routine analysis of the surveillance system. This assists the district (or other level) surveillance team in identifying silent areas (areas where health events may be occurring but which are not being reported) or reporting sites that need assistance in transmitting their reports.

2. Calculate district (or other level) totals by week (or by month). Update the total number of reported cases and deaths for the whole year. This is summary information that helps to describe what has happened in the particular reporting period.
3. Prepare cumulative totals of cases, deaths and case fatality rates since the beginning of the reporting period.
4. Use geographic variables (such as hospitals, residence, reporting site, neighborhoods, village and so on) to analyze the distribution of cases by geographic location. This is information that will help to identify high risk areas.
5. Analyze disease trends for at least the diseases of highest priority in your district. Monitor the trends for cases, deaths, and case fatality rates to identify any unusual increases or disease patterns.

An example of a product from an analysis plan for routine surveillance information is on the next page.

### Example of analysis plan for cholera in Country A, 2010

Distribution by Time				
Onset week	Outcome		Total	Case fatality rate
	Deaths	Alive		
26	7	16	23	30
27	5	92	97	5
28	1	87	88	1
29	2	19	21	10
32	0	11	11	0
33	2	9	11	18
<b>Total</b>	17	234	251	7
Distribution by Place				
District	Outcome		Total	Case fatality rate
	Deaths	Alive		
District 1	0	1	1	0
District 2	6	86	92	7
District 3	11	147	158	7
<b>Total</b>	17	234	251	7
District	Population	Cases	Attack rate_per 100,000	
District 1	179888	92	51	
District 2	78524	158	201	
Distribution by Person				
Age Group	Outcome		Total	Case fatality rate
	Deaths	Alive		
00-4 years	2	35	37	5
05-9 years	5	50	55	9
10-14 years	2	28	30	7
15-19 years	0	23	23	0
20-24 years	1	27	28	4
25-29 years	2	24	26	8
30-34 years	1	11	12	8
35-39 years	2	6	8	25
40 + years	2	30	32	6
<b>Total</b>	17	234	251	7
Sex	Outcome		Total	Case fatality rate
	Deaths	Alive		
F	8	114	122	7
M	9	120	129	7
<b>Total</b>	17	234	251	7

## ANNEX 3B      How to manually make a line graph

How to make a line graph	
1.	Decide what information you want to show on the graph.
2.	Write a title that describes what the graph will contain (for example, <i>Monthly totals for inpatient cases and deaths due to malaria with severe anaemia</i> ).
3.	Decide on the range of numbers to show on the vertical axis. <ul style="list-style-type: none"> <li>• Start with 0 as the lowest number</li> <li>• Write numbers, going up until you reach a number higher than the number of cases</li> <li>• Chose an interval if the numbers you will show on the vertical axis are large.</li> </ul>
4.	Label the vertical axis, explaining what the numbers represent.
5.	Label the horizontal axis and mark the time units on it. The horizontal axis is divided into equal units of time. Usually you will begin with the beginning of an outbreak, or the beginning of a calendar period, such as a week, month or year.
6.	Make each bar on the graph the same width.
7.	Mark the number of cases on the graph or histogram. For each unit of time on the horizontal axis, find the number of cases on the vertical axis. Fill in one square for each case, or for some number of cases in the column for the day on which the patient was seen. Show deaths by using a different pattern of lines, or a different color. If you are making a line graph, instead of making a bar or filled-in squares, draw a cross or make a point where the horizontal and vertical lines cross. Connect the points on the graph to show the trend going up or down over time.



## Section 4

### Investigate suspected outbreaks and other public health events

This section describes how to:

- Decide to investigate a reported outbreak or other public health event
- Record outbreaks, public health events and rumours
- Verify reported information
- Prepare to conduct an investigation
- Confirm the outbreak or event
- Conduct an immediate response
- Analyze the investigation results to determine what caused the Public health event or risk



## **4.0 Investigate and confirm suspected outbreaks and other public health events**

The results of an investigation of an outbreak or other public health event lead to identification and assessment of people who have been exposed to an infectious disease or affected by an unusual health event. The investigation provides relevant information to use for taking immediate action and improving longer-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 in the district such as when an increase in chronic or non-communicable disease is detected.

The purpose of an investigation is to:

- Verify the outbreak or the public health event and risk.
- Identify and treat 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.
- Select appropriate response activities to control the outbreak or the public health event.

### **4.1 Decide to investigate a reported outbreak, or public health event**

The responsibility for investigating outbreaks depends on national policy, resources, and local policy. In most countries, districts have the overall responsibility for investigating outbreaks. These guidelines assume that the district level has responsibility for leading the investigation, and the guidelines also apply to health facilities and provinces.

For some communicable diseases, a single suspected case is the trigger for taking action, reporting the case to a higher level, and conducting an investigation. This is because these are dangerous diseases with either the potential for rapid transmission or high case fatality rates if cases are not treated promptly.

For other diseases, the trigger is when cases reach a defined threshold (a particular number of cases per 100,000 population, for example). Health staff should promptly investigate the problem and respond to the immediate cases.

Preparations for taking a wider public health response should be made. Alert and epidemic thresholds are described in Section 3.

*NOTE: The threshold for some diseases will not change between districts or health facilities because the thresholds trigger immediate notification, and are set by national policy*

Still, some urgent health events require investigations to be started immediately. ***Regardless, districts should aim to investigate suspected outbreaks and events within 48 hours of notification.***

Conduct an investigation when:

- The district receives a report of a suspected outbreak due to a disease that is targeted for immediate notification
- An unusual increase is seen in the number of cases or deaths during routine analysis of data
- Alert or epidemic thresholds have been reached for specific priority diseases.
- Communities report rumours of deaths or a large number of cases that are not being seen in the health facility
- A cluster of illnesses or deaths occurs for which the cause is not explained or is unusual (for example, an adult death due to bloody diarrhoea)

## **4.2 Record reported outbreaks, public health events and rumours**

Prepare a method for tracking the reporting suspected outbreaks, events and rumours to the district. The purpose for tracking reported outbreaks is to ensure that the report of each suspected outbreak or rumour is followed by some action and resolution. Keeping this record will help to gather information for evaluating the timeliness and completeness of the outbreak investigation and response process.

A sample form for tracking reports of outbreaks is in Annex 4A of this section. If the district is using a district analysis workbook for recording and analyzing long term trends, include the tracking form in the workbook.

## **4.3 Verify the reported information**

Investigating outbreaks requires human, logistic and financial resources. When a suspected outbreak or event is reported, promptly verify that the information is accurate and reflects conditions suggesting a true outbreak or event. This will help to ensure that resources are used effectively.

To verify the information, consider the following factors:

- Source of information (for example, is the source of the rumour reliable? Is the report from a health facility?)
- 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
- Transmission mode of suspected pathogen and risk for wider transmission
- Political or geographic considerations
- Importance of maintaining good partner and community relations
- Available resources.

After taking the above factors into consideration, the situation may require a more urgent response than it might otherwise have done. For example, reports of a suspected viral hemorrhagic fever case are treated with more urgency than reports of a less virulent disease because of the potential for high rates of death and rapid transmission.

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

#### **4.4 Prepare to conduct an investigation**

Mobilize the district epidemic response team and make arrangements for investigating the report. Include the district coordinator for the disease or event being investigated and any other relevant staff who have already been identified and trained to be part of the rapid response team in the investigation planning. (Note: periodically review and update the immunization status of personnel who take part in infectious diseases outbreak investigation and response activities.)

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).

#### **4.4.1 Specify work health workers are expected to do**

Inform health staff about the tasks they will be expected to do during the investigation and the functions they will support. Contribute to the positive motivation for doing the investigation. For example, make sure that the investigation team understands the link between the investigation results and the selection of response activities for preventing additional cases and saving lives. Ensure that health staff has access to and know how to use required personal protection equipment and universal precautions relevant for the possible cause of the suspected outbreak or event.

#### **4.4.2 Define supervision and communication lines**

Make a plan for how the teams will communicate during an investigation. Prepare a diagram showing who will report to whom and how information will move both within the investigation team and between the district and other levels, including the most local level. For example, define who will communicate with the Ministry of Health, the media and the community. State the methods for communicating and how often it should be done during an outbreak to keep officials informed. Methods may include daily updates by radiophone, mobile phone, facsimile, electronic mail or conference calls. Show on the diagram the lines of authority and the roles of each staff person on the team. Define the role of non-health workers and how they should be supervised.

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

#### **4.4.3 Decide where the investigation will take place**

Review information already known about the suspected illness, including its mode of transmission and risk factors. Use this information to define the geographical boundaries and target population for conducting the investigation. Begin the investigation in the most affected place.

Contact nearby health facilities to see if they have seen similar cases or an increase in cases with the same diagnosis. Involve the community and local health facility staff in planning and conducting the investigation. Listen to and seek out information about local customs, culture, and routines could affect the success of the outbreak investigation.

#### **4.4.4 Obtain the required authorizations**

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

#### **4.4.5 Finalize forms and methods for collecting information and specimens**

Select those variables needed to identify, record, and analyze the disease being investigated (A selection of case investigation forms with key variables noted are in the annex to this section). Depending on staff responsibilities, review how to:

- Record case information on a line list for later use in summarizing variables for use in time, place and person analysis
- Prepare (and update as needed) an epidemic curve
- Construct a spot map showing location of geographic variables such as location of cases and deaths
- Develop analysis tables for risk factors, age group, sex, immunization status and so on.

#### **4.4.6 Arrange transportation and other logistics**

Make travel arrangements for getting to and from the site of the investigation and for travelling during the investigation. Make sure transportation for moving specimens to the appropriate laboratories has been arranged in advance of the team's departure.

#### **4.4.7 Gather supplies for collecting laboratory specimens**

Some districts may already have in place a rapid response kit that contains supplies and equipment for carrying out an investigation (including laboratory supplies).

If a kit is not available in your district, look at the disease specific program guidelines and talk to laboratory specialists to find out the requirements for laboratory supplies for proper collection, storage, and transport of relevant specimens (refer to Annex 4B).

*Use of personal protective equipment (PPE) and disinfection materials is strongly recommended (refer to Annex 4C).*

Refer to the disease specific guidelines in Section 9 for laboratory requirements.

## **4.5 Confirm the outbreak or event**

### **4.5.1 Review the clinical history and epidemiology**

Examine the patient or patients to confirm that their signs and symptoms meet the case definition. Ask the patient or a family member who can speak for the patient:

- Where do you live?
- When did the symptoms begin?
- Who else is sick in your home, school, workplace, village, and neighbourhood?
- Where have you travelled to recently?
- Where have you been living during the past 3 weeks prior to the onset of symptoms (residence at time of infection)?
- Were you visited by anyone within the last 2 weeks?
- Have you been in contact with sick or dead poultry or birds or animals recently (for zoonosis)?
- What vaccines have you received recently (for AEFIs)?

### **4.5.2 Collect laboratory specimens and obtain laboratory results to confirm the diagnosis**

If the disease can be confirmed by laboratory testing, refer to the laboratory requirements in Section 9.0 to determine the diagnostic test and the specimen that is required. The disease specific laboratory requirements also describe how to collect, store and transport the relevant specimen, and how many specimens to collect to confirm an outbreak for that particular disease.

Review laboratory results with the investigation team, clinicians, and laboratory persons at the health facility. Are the laboratory results consistent with the clinical

findings? Seek additional assistance from national level program managers or technical experts if you have any questions about the laboratory results.

## **4.6 Conduct an immediate response**

### **4.6.1 Isolate and treat cases as necessary**

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

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

### **4.6.2 Search for additional cases**

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

#### **4.6.2.1 Search for suspected cases and deaths in the health facility records**

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

See Annex 4D at the end of this section for instructions on conducting a register review. Make sure to follow up any cases that have been allowed to go home.

#### **4.6.2.2 Search for contact persons and suspected deaths in the community**

Identify areas of likely risk where the patients have lived, worked, or travelled such as a zoo, poultry farm, laboratory, or hunting sites. Also talk to other informants in the community such as pharmacists, school

teachers, veterinarians (to know about the animal health situation), farmers, and community leaders.

The areas for the search may be influenced by the disease, its mode of transmission, and factors of risk related to time, place and person 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. Find out if anyone else in the area around the case has been ill with signs or symptoms that meet the case definition. Collect information that will help to describe the magnitude and geographic extent of the outbreak.

Refer newly identified cases to the health facility for treatment. See Annexes 4E and 4F of this section for examples of forms for recording and following-up on contacts for additional cases.

## **4.7 Record information about the additional cases**

For each new case either in the health facility register or in searches of the community that fits the surveillance case definition, record the collected information on either a case-based reporting form, line list or other recommended form.

### **4.7.1 Record information on a case reporting form**

At a minimum, record information on a case reporting form for the first five patients. Also record information on a case form for all those from which laboratory specimens will be taken. For each case, record at least:

- The patient's name, address, and village or neighbourhood and locating information. If a specific address is not available, record information that can be used to contact patients if additional information is needed or to notify the patient about laboratory and investigation results
- The patient's age and sex. This information is used to describe the characteristics of the population affected by the disease
- The date of onset of symptoms and date the patient was first seen at the health facility
- Relevant risk factor information such as immunization status if the disease being investigated is a vaccine-preventable disease
- The name and designation of the person reporting the information.

Some diseases have their own more detailed case investigation form. Detailed forms outlining particular information for investigating specific diseases are in the Annexes at the end of Section 9.

#### **4.7.2 Record information about additional cases on a line list**

When more than five to ten cases have been identified, and the required number of laboratory specimens has been collected, record any additional cases on a line list. Use the line list as a laboratory transmittal form if 10 or more cases need laboratory specimens collected on the same day and specimens will be transported off to the lab in a batch.

### **4.8 Analyze data about the outbreak**

The methods for analyzing outbreak data are similar to how the analysis of summary 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:

- 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 (refer to the steps in Section 3).
- Calculate attack rates (refer to the steps in Section 3).

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.

## 4.9 Interpret analysis results

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

- 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?

### 4.9.1 Interpret the time analysis results

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

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

### 4.9.2 Interpret the place analysis results

Use the map to:

- 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.

### 4.9.3 Interpret the person analysis results

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 yellow fever cases occurred in patients less than 15 years of age, then the immunization response would need to target children less than 15 years of age.

## **4.10 Conclusions and recommendations of the investigation**

After reviewing the analysis results, formulate conclusions and recommendations about the outbreak:

- Situation is confirmed as an outbreak or public health problem.
- Population affected and at risk
- Possible causes of the outbreak/ public health problem, laboratory results, source of infection, mode of transmission, attack rate, case fatality rate and possible risk factors
- Measures already initiated to contain the outbreak
- Recommendations:
  - For controlling the situation
  - Further investigation/studies

## **4.11 Report the outbreak investigation**

The district rapid investigation team should immediately prepare an outbreak investigation report. This detailed report of the outbreak investigation should be prepared and disseminated immediately to all concerned including the health facility where the outbreak occurred.

A suggested outline for writing an investigation report is described in Annex 7A of Section 7.

## **4.12 Conduct a risk assessment and identify the determinants to explain the outbreak or the event**

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

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

The national level may be called upon to participate in the risk assessment at the end of which the decision will be made on whether the event is potential PHEIC hence warranting its notification (refer to decision instrument in Section 2)



## **Annexes to Section 4**

**ANNEX 4A** District log of suspected outbreaks and rumours

**ANNEX 4B** Checklist of laboratory supplies for use in an outbreak investigation

**ANNEX 4C** Recommended list of personal protective equipment

**ANNEX 4D** How to conduct a register review

**ANNEX 4E** Contacts recording sheet

**ANNEX 4F** Contact tracing form (follow-up)



## ANNEX 4A District log of suspected outbreaks and rumours

*Record verbal or written information from health facilities or communities about suspected outbreaks, rumours, or reports of unexplained events.  
Record the steps taken and any response activities carried out.*

Condition or Disease or Event (1)	Number of cases initially reported (2)	Location (Health Centre, village, etc) (3)	Date district was notified (4)	Date suspected outbreak was investigated by the district (5)	Result of District investigation (Confirmed, Ruled Out, or Unknown) (6)	Date Outbreak Began Date onset index case/date crossed threshold or first cluster) (7)	Date a case was first seen at a health facility (8)	Date specific intervention began (9)	Type of Concrete Intervention that was begun (10)	Date District Notified National Level of the Outbreak (11)	Date District received national response (12)	Comments (13)

## ANNEX 4B Checklist of laboratory supplies for use in an outbreak investigation

<b>For using standard safety precautions when collecting and handling all specimens:</b> <input type="checkbox"/> Pieces of bar soap and bleach for setting up hand-washing stations <input type="checkbox"/> Supply of gloves <input type="checkbox"/> Safety boxes for collecting and disposing of contaminated supplies and equipment	
<b>For collecting laboratory specimens:</b>	
<b>Blood</b> <input type="checkbox"/> Sterile needles, different sizes <input type="checkbox"/> Sterile syringes <input type="checkbox"/> Vacutainers <input type="checkbox"/> Test tube for serum <input type="checkbox"/> Antiseptic skin disinfectant <input type="checkbox"/> Tourniquets <input type="checkbox"/> Transport tubes with screw-on tops <input type="checkbox"/> Transport media (Cary-Blair, Trans-Isolate)  <b>Blood films (malaria)</b> <input type="checkbox"/> Sterile or disposable lancet <input type="checkbox"/> Glass slides and cover slips <input type="checkbox"/> Slide box  <b>Respiratory specimens</b> <input type="checkbox"/> Swabs <input type="checkbox"/> Viral transport medium	<b>Cerebral spinal fluid (CSF)</b> <input type="checkbox"/> Local anaesthetic <input type="checkbox"/> Needle and syringe for anaesthetic <input type="checkbox"/> Antiseptic skin disinfectant <input type="checkbox"/> Sterile screw-top tubes and tube rack <input type="checkbox"/> Microscope slides in a box <input type="checkbox"/> Trans-Isolate transport medium <input type="checkbox"/> Latex kit <input type="checkbox"/> Gram stain <input type="checkbox"/> May Grunwald Giemsa Kit  <b>Stool</b> <input type="checkbox"/> Stool containers <input type="checkbox"/> Rectal swabs <input type="checkbox"/> Cary-Blair transport medium  <b>Plague</b> <input type="checkbox"/> Gram stain kit <input type="checkbox"/> Rapid diagnostic test (dipstix AgF1) <input type="checkbox"/> Cary-Blair transport
<b>If health facility has a centrifuge:</b> <input type="checkbox"/> Sterile pipette and bulb <input type="checkbox"/> Sterile glass or plastic tube, or bottle with a screw-on top	
<b>For packaging and transporting samples:</b> <input type="checkbox"/> Cold box with frozen ice packs or vacuum flask <input type="checkbox"/> Cotton wool for cushioning sample to avoid breakage <input type="checkbox"/> Labels for addressing items to lab <input type="checkbox"/> Labels for marking "store in a refrigerator" on outside of the shipping box <input type="checkbox"/> Case forms and line lists to act as specimen transmittal form <input type="checkbox"/> Marking pen to mark tubes with patient's name and ID number (if assigned by the district)	
<b>Appropriate personal protection (PPE) (for all EPR diseases such as VHF, suspected avian influenza, etc.)</b>	

## ANNEX 4C Recommended list of personal protective equipment (PPE)

The following equipment should be available for the personal protection of all staff investigating a suspected case of any viral haemorrhagic fever or avian influenza. The equipment should be held at Provincial level. See Annex 5A for other stocks that may be needed to respond to a suspected outbreak.

Composition of one set of PPE	WHO Deployment Kit
1 surgical gown	100 surgical gowns
1 coverall	100 coveralls
1 head cover	100 head cover
2 pairs of goggles	50 pair of goggles
1 pair of rubber gloves	100 pairs
1 mask N95	200 pieces
1 boot cover*	0
1 box 50 pairs of examination gloves	800 pairs of examination gloves
1 plastic apron re-usable	20 pieces
1 pair of gum boots	20 Gum boots
1 hand sprayer	2 of 1.5 litres each
1 Back sprayer	1 back sprayer of 10-12 litres
specimen containers	
Scotch of tapes	3 rolls
Anti fog for goggles	3 bottles
Chlorine	
N.B: chlorine and gum boots can be purchased locally * Not essential	

## **ANNEX 4D      How to conduct a register review**

### **1.      *Background***

The purpose of a register review is to collect information on cases admitted to the health facility during a specific period. Explain that the information will be used to determine what caused the outbreak or increase in number of cases.

- Any inpatient facility with **more than 10 hospital beds**. Give priority to government health facilities.
- Large reference or teaching hospitals with paediatric wards because they receive referrals from other health facilities.
- Small hospitals or health facilities that serve remote areas and high risk populations. For example, nomadic groups, refugees, or areas without regularly scheduled health services.

### **2.      *Meet with the health facility staff and explain the purpose of the review***

Explain to the health facility's senior staff the purpose of the review. The information will assist the district and health facility in determining the most appropriate action for limiting the outbreak and preventing future cases from occurring. Emphasize that the activity is an information-gathering exercise, and is not a review of health worker performance.

### **3.      *Arrange to conduct the review***

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

### **4.      *Identify sources of information***

During the visit, depending on the priority disease or condition or events being investigated, check inpatient registers for the paediatric and infectious disease wards. The inpatient register for the paediatric ward is a good source because it lists all children admitted to the ward. Annual summary reports are not always accurate, and outpatient registers often include only a provisional diagnosis.

Review the system and procedures health workers use to record information in the registers about diagnoses. Make sure that the information needed for investigating any suspect case is available. At a minimum, the register should include:

- the patient's name and location
- the signs and symptoms
- date of onset of symptoms and outcome (for example, date of death, if relevant)
- immunization status, if appropriate to this disease

If the health facility does not keep at least the minimum information, talk with senior staff about how to strengthen the record keeping so that the minimum information is collected.

**5. *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.

**6. *Line-list the suspected cases that are found***

Record information about the suspected cases. This information will be used during case investigation activities.

**7. *Provide feedback to the health facility staff***

Meet with the health facility supervisor and discuss the findings of the activity. Use the opportunity to review any features of case management for the illness that may help health workers in the facility. Reinforce the importance of immediate reporting and case investigation as tools for prevention of priority diseases and conditions.

**8. *Report any suspected cases to the next level***

Report the suspected cases according to local procedures. Investigate the case further to determine the factors that placed the patient at risk for the disease or condition. Develop an appropriate case response.







## Section 5

### Prepare to respond to outbreaks and other public health events

This section describes how to:

- Establish a district public health management committee
- Establish a district emergency rapid response team
- Prepare an epidemic preparedness and response plan
- Set up contingency stocks of drugs, vaccines, reagents and supplies
- Carry out risk mapping for outbreaks and PH events



## **5.0 Prepare to respond to outbreaks and other public health events**

A public health emergency such as an acute outbreak or public health event calls for an immediate response. Being prepared to detect and respond to such an event is an essential role of the district. Examples of advanced preparations include: identifying key members of an event management team, mapping available resources, and 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 deaths or disabilities due to the emergency.

This section describes steps for organizing preparedness activities in the district. Preparedness activities should take place through the health system and may be guided by a national preparedness plan. The plan should address the roles and responsibilities for a national Public Health Emergency Management Committee and emergency Rapid Response Teams at the national, regional, and district/state/province levels. National preparedness guidelines are followed at the district level to develop contingency plans and other preparedness activities.

### **5.1 Establish a district public health emergency management committee**

District-level public health emergency management committees (PHEMC) work closely with their counterparts at the provincial/regional and national levels to plan and monitor the implementation of public health emergency plans. PHEMCs are coordinating committees composed of technical and non-technical members from health and other sectors. The role of the PHEMC is to develop and oversee the implementation of emergency preparedness strategies, action plans, and procedures.

#### **5.1.1 Identify functions of the emergency management committee**

The district's public health emergency management committee should meet to develop the district emergency preparedness and response plan. Once the plan is developed, the committee should periodically review and update the plan in response to any changes in technical, managerial or epidemiologic situations in the district.

The main functions of the district public health emergency committee are to:

- Develop a district emergency preparedness and response plan that accounts for all potential emergencies including disease outbreaks and detection of other emergent public health events or hazards.
- Establish a community communications plan for sharing information with communities before, during, and after any public health emergency. The plan should also include a plan for disseminating information to the public and media about activities conducted for preparedness and during a response. The plan should also include liaison activities with relevant partners in multiple sectors including Points of Entry and other required reporting sites.
- Mobilize resources for emergency prevention and control including procurement of response and communication supplies. Plan to monitor the use of the resources before, during and after the emergency event.
- Support the procurement of emergency material stockpiles within the district.
- Enhance linkages with community surveillance informants to ensure flow of data for early detection of public health events.
- Coordinate community risk mapping activities within the district and ensure all reporting sites are aware of the use of thresholds for reporting acute outbreaks or events.
- Coordinate training of community, health facility, and district personnel in emergency preparedness and response.
- Plan to periodically conduct emergency response simulation activities at the district and community levels.
- Coordinate the post-emergency evaluation and plan to disseminate findings with the affected communities.

### **5.1.2 Identify members of the PHEMC**

Organize the district PHEMC to include a mix of representatives from the public, non-governmental organizations (NGO) and private sectors.

Participants from the public sector may include:

- District administrator or equivalent
- District police commissioner
- District civic or community representative (for example, the district chief)
- District director of health services
- District public health nurse
- District disease control officer
- District environmental health officer
- The district medical or clinical officer
- Wildlife and veterinary experts
- Laboratory technician or laboratory technologist from the district laboratory

From non-governmental organizations with health care activities in the area, include representatives from:

- Community health programs and mission hospitals
- Red Cross, Red Crescent or similar agencies working in the area

From the private sector, involve participation from:

- Clinical or nursing officers from private hospital, clinic or laboratory
- Pharmacists or chemists

### **5.1.3 Meet regularly before and during public health events**

When there is no *epidemic*, the PHEMC should:

- Meet to review district disease trends and updates on preparedness steps adopted by the district
- Review the level of preparedness at the beginning of each epidemic season (e.g. before the period when cases of meningitis increase)
- Share conclusions and recommendations of these meetings with the regional and national level authorities
- Organize simulation exercises/drills to test the operation plans

During an *emergency or outbreak response*, the epidemic management committee should:

- Meet as soon as the epidemic or event is recognized
- Assess the need for, and request support from, the regional or national PHEMC 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

## **5.2 Establish a district emergency rapid response team**

A Rapid Response Team is a technical, multi-disciplinary team that is readily available for quick mobilisation and deployment in case of emergencies.

### **5.2.1 Identify members of the district epidemic rapid response team**

Members of the district epidemic rapid response team (DRRT) should include:

- An epidemiologist or public health officer (the disease control officer, for example)
- Laboratory technologist or technician
- Clinician
- Environmental health officer
- Veterinary or wildlife management experts
- Others based on availability of technical staff and specificity of the outbreak (such as experts in industrial poisoning or chemical events, for example)

### **5.2.2 Identify roles and responsibilities of the district rapid response team**

- Investigate rumours, reported outbreaks, and other public health emergencies
- Propose appropriate strategies and control measures including risk communications activities
- Coordinate rapid response actions with partners and other agencies

- Initiate the implementation of the proposed control measures including capacity building
- Prepare detailed investigation reports
- Contribute to the final evaluation of the outbreak response

### 5.3 Prepare an epidemic preparedness and response plan

The purpose of the plan is to strengthen the ability of the district to respond promptly when an acute outbreak or other public health event is detected.

This plan should:

- Be based on district risk assessments, and should specify the resources available for epidemic preparedness and response.
- Take into account diseases with epidemic potential in the district and in neighboring districts.
- Provide estimates of the population at risk for epidemic-prone diseases and other public health emergencies.
- Clearly indicate for each suspected outbreak which reference laboratory will be used for confirmation.
- Provide estimates of quantities of drugs, vaccines and supplies for each epidemic-prone disease likely to occur in the district.
- Plan to be tested before implementation.
- Include standard operating procedures (SOPS) in the training plan.

***Key sections of the epidemic preparedness and response plan should include:***

1. Designated coordination committees
2. Epidemiology and surveillance including data management
3. Steps for carrying out a risk communication strategy including social mobilization
4. Operational actions according to expected phases of the epidemic
5. Laboratory: specimen collection, handling , transportation and processing
6. Case management , Treatments (anti-viral, antimicrobial, decontamination, disinfection or others as indicated) & Infection control
7. Pre- and post-exposure prophylaxis treatment
8. Immunization strategies
9. Rapid containment activities and additional methods if rapid containment fails
10. Capacity building including required training, sensitization meetings and simulation
11. Logistics including supply lists
12. Environment, water and sanitation
13. Monitoring of the outbreak or event

## **5.4 Set up contingency stocks of drugs, vaccines, reagents and supplies**

Outbreaks and other public health emergencies require the rapid mobilization of resources such as vaccines, medicines and lab supplies. It is prudent to establish and preposition stockpiles of materials before an emergency occurs.

As follow up to the public health risk assessment activity, districts should set up a contingency stock of drugs, vaccines, reagents and supplies to permit prompt management of the first cases without delay before support arrives from higher levels. Also regularly and carefully monitor the contingency stock in order to avoid shortages and expiry of drugs, vaccines, reagents and supplies. Examples of stock management tools are included in the annexes at the end of this section.

The content of the contingency stock varies with the nature of epidemic-prone diseases and the risk of outbreak in the district. Risk assessment activities help to develop a list of materials that should be stockpiled at the district and community levels. A suggested list of contingency drugs and supplies is available in Annex 5A at the end of this section.

### **5.4.1 Conduct stock management for outbreak response**

Maintain a reliable supply of supplies and materials for responding to an outbreak or public health event.

Use an inventory checklist such as the one in Annex 5B to assess which supplies are already available for use during a response activity. If the supplies are already available, determine if they can be set aside for use during a response. If they are not available, can they be purchased or requested through the national system for procurement?

Periodically, for example, every 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.

1. List all required items for carrying out surveillance, laboratory and response necessary for detecting and responding to priority diseases, conditions and events. Consider:
  - a. Forms
  - b. Laboratory reagents and supplies
  - c. Case management and field intervention materials
2. Make an inventory and note the quantity of each item that is available.
3. Complete and regularly update a stock balance sheet for each item.
4. Observe expiry dates and practice best logistical practices for packing, shipping, storing and disposing of supplies and materials.
5. 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.
6. Monitor the stock balances against the critical quantity established.
7. Report regularly on the IDSR stock situation. See Annex 5C for an example of a stock item transaction and balance sheet.

## **5.5 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, once a year, for example, assess those risks and record the information on a map. This is useful information when considering supplies, transport and other resource issues necessary for the response.

Risk mapping should extend to all public health hazards as specific by IHR (2005) including chemical, zoonotic, radiological and nuclear.



## **Annexes to Section 5**

**ANNEX 5A** Essential stock items for responding to outbreaks

**ANNEX 5B** Stock situation report

**ANNEX 5C** IDSR stock item transaction and balance sheet



## ANNEX 5A

## Essential stock items for responding to outbreaks

Essential Stock items for Responding to Outbreaks				
Drugs	Disinfectants, Insecticides and Rodenticides	Supplies	Vaccines	Equipment
Benzyl penicillin	<b>Disinfectants</b>	Auto-disable syringes	Meningitis vaccines AC	Body bags
Ciprofloxacin	2% Chlorine	Auto-disable syringes	Meningitis vaccines ACW135	Buckets
Diazepam	Bleach	Bed nets	Meningitis vaccines Conjugated	Camping kits
Doxycycline	Calcium hypochlorite	Personal Protective Equipment (see Annex 4D)	Cholera vaccines	Candles
Drugs for supportive care	Cresol	Laboratory supplies (see Annex 4C)	Tetanus anatoxin	Computer
Erythromycin	Sodium hypochlorite	Mosquito nets	Yellow fever	Containers
Nalidixic acid	<b>Pesticides</b>	Nasogastric tubes 2.7 mm OD, 38 cm	Other vaccines	Cook-ware
Oily chloramphenicol	Cypermethrin	Nasogastric tubes 5.3 mm OD, 50 cm		Diesel
Oral rehydration salts	Malathion	Needles		Front lamp
Paracetamol	Permethrin	Intravenous giving sets ( different sizes)		GPS
Penicillin V	<b>Rodenticides</b>	Teaspoons		Kerosene lamp
Rehydration fluids:	Brodifacom	Sprayers (pump and fogger)		Lab: see annex 5a
Ribavirin	Bromadione			Lamps
Ringer lactate				Maps
Streptomycin				Paraffine
Tetracyclin				Phones
Trimetoprim-sulfamethoxazole				Plastic sheets
				Power generator
				Radio
				Sprayers







## Section 6

### Respond to outbreaks and other public health events

This section describes how to:

- Convene the district public health emergency management committee and Select appropriate public health response
- Mobilize response teams for immediate action
- Implement response activities
- Provide regular situation reports on the outbreak and events
- Document the response

## **6.0 Respond to outbreaks and other public health events**

The goal of an integrated disease surveillance and response is to use data for public health action. When an outbreak, acute public health event or condition is detected, an investigation should take place to determine the cause of the problem. The results of the investigation should guide the selection of 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. Regardless of the specific recommended response, the district's role in selecting and implementing a recommended response is essential for safe-guarding the health and well-being of communities in the district.

As a result of the International Health Regulations, districts are also involved in response to other infectious, zoonotic, chemical, radio-nuclear and other unknown events if they are detected.

This section will describe steps for conducting a public health response and provide general directions for immediate response actions for leading causes of illness, death and disability. Please consult relevant WHO guidelines for responding to chemical and radio-nuclear events.

### **6.1 Convene the district public health emergency management committee**

Once an outbreak or event is confirmed, the District Health Management Team (DHMT) convenes the public health epidemic management committee to assess and implement the response. The following steps should take place:

1. Report the outbreak or event to the next level. It is likely that the outbreak has already been reported to the next level and coordination has been ongoing with the investigation
2. Take every opportunity to communicate with the designated level that is providing coordination for the response
3. Request outbreak or event response funds to be released

4. Alert nearby districts about the outbreak. If they are reporting a similar outbreak, coordinate response efforts with them
5. Assign clear responsibilities to individuals or teams for specific response activities
6. Provide orientation or training along with adequate supplies of relevant supplies for the district response team and affected health facility staff.
7. The national level in collaboration with the district will assess whether the event is a potential public health event of international concern (PHEIC) using the decision instrument
8. Review existing resources as defined in the preparedness plan. Determine what additional resources are required. For example, consider:
  - Human resources that could be mobilized to manage the epidemic
  - Funds to support response activities
  - Emergency stocks or required drugs and other medical supplies
  - Laboratory support for confirmation of pathogens responsible for the epidemics. If the district does not have the capacity to collect, package and ship the specimen, contact the reference laboratory for assistance
9. Mobilize logistics support (travel of rapid response team, accommodation arrangement, communication, other essential equipment)
10. If supplies are not available locally:
  - Contact the provincial or central levels to request alternate suppliers
  - Borrow from other services, activities, or non-governmental organizations in your area
  - Identify practical low-cost substitutes

### **6.1.1 Select appropriate public health response**

Review investigation results and data analysis interpretation to select appropriate response activities to contain the confirmed outbreak or public health problem.

Refer to Section 9 and national disease specific guidelines to select response activities, which involve:

- Proven measures to prevent unnecessary deaths or disabilities due to the specific cause of the problem
- A mix of activities for immediately controlling the problem in the short-term, and reducing the risk of ongoing transmission in the long-term through prevention activities
- Participation from the community, health care facilities and the district personnel

For example, response activities for particular outbreaks or public health problems or events include the following:

- Conduct emergency vaccination campaigns, when recommended
- Provide relevant chemoprophylaxis and vaccination for health workers
- Improve access to clean water
- Improve safe disposal of human waste
- Improve food handling practices
- Reduce exposure to mosquitoes and other vectors
- Control vectors

## **6.2 Mobilize response teams for immediate action**

Rapid response teams should have already been identified during preparedness activities. Mobilize the teams and make sure that the membership of the team reflects the technical needs of the response. Refer to Section 5 of these guidelines for recommendations on the composition of the rapid response team and the team's roles and responsibilities.

## **6.3 Implement response activities**

Implementing a response means carrying out the operational steps so the actions take place as planned. Regardless of the specific causes of the outbreak or event, the success of the response relies on the success of general factors such as case management, provision of supplies, and trained health staff. The selected response activities common factors for responding to outbreaks or public health events include the following:

### **6.3.1 Strengthen case management and infection control measures**

Take steps to support improved clinical practices in the district. Review the recommendations in Annex 6A for treating cases during an outbreak. Prepare health workers to conduct these responses.

- 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.
- In a large epidemic, ask the medical officer at each health facility to identify an area that can be used to accommodate a large number of patients.

- Provide Standard Operating Procedures that include Infection control guidelines.
- Implement infection control and risk mitigation measures, for example:
  - Establish an isolation ward for highly infectious diseases (Ebola, Cholera, SARS, etc.)
  - Ensure health staff access to safety and personal protective measures for any infectious diseases (especially for Ebola and SARS).
- Make the necessary drugs and treatment supplies available.

### **6.3.2 Update health staff skills**

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 rapid response team 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:

1. Give clear and concise directions to health workers taking part in the response.
2. Select topics for orientation or training. Emphasize case management for the specific disease according to disease specific recommendations. Select other training topics depending on the risk of exposure to the specific public health hazard for example:
  - 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

### 3. Conduct training

- 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.

#### **6.3.3 Enhance surveillance during the response**

During a response to an outbreak, encourage health staff at all health facilities to be vigilant in surveillance of the disease or condition. For example, members of the response teams and health staff in affected facilities should:

- Search for additional persons who have the specific disease and refer them to the health facility or treatment centres, or if necessary quarantine the household and manage the patient.
- Ensure timely exchange of laboratory information with the team
- Update the line list, make data analysis by time (epi-curve), person (age and sex) and place (mapping cases).
- Monitor the effectiveness of the outbreak or response activity.
- Report daily at the beginning of the epidemic. Once the epidemic matures, the committee can decide on a different frequency of reporting.
- Actively trace and follow up contacts as indicated.

#### **6.3.4 Inform and educate the community**

Effective risk communication is an essential element of managing public health events. When the public is at risk of a real or potential health threat, treatment options may be limited, direct interventions may take time to organize, and resources may be few. Communicating advice and guidance, therefore, may be the most important public health tool in managing a risk.

Keep the public informed to calm their fears and encourage cooperation with the outbreak response. Develop community education messages with information about recognizing the illness, how to prevent transmission and when to seek treatment. Begin communication activities with the community as soon as an epidemic or public health problem is identified.

1. Decide what to communicate by referring to disease specific recommendations in Section 9. Make sure to include:
  - Signs and symptoms of the disease
  - How to treat the disease at home, if home treatment is recommended, including preparing disinfectant solutions
  - Prevention behaviours 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
  
2. Decide how to state the message. 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

Sample community education messages are in Annex 6F at the end of this section.

3. Select appropriate communication methods that are present in your district. 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 centres, schools, women's and other community groups, service organizations, religious centres
  
4. Give health education messages to community groups and service organizations and ask that they disseminate them during their meetings.
  
5. Give health education messages to trusted and respected community leaders and ask them to transmit them to the community.
  
6. Select and use a community liaison officer, focal point, or health workers to serve as spokesperson to the media. As soon as the outbreak has been recognized:

- Tell the media the name of the spokesperson, and that all information about the outbreak will be provided by the spokesperson
  - Release information to the media only through the spokesperson to make sure that the community receives clear and consistent information.
7. On a regular basis, meet with the community spokesperson to give:
- Frequent, up-to-date information on the outbreak and response
  - Clear and simple health messages that the media should use without editing
  - Clear instructions to communicate to the media only the information and health education messages from by the Epidemic Response Committee

### **6.3.5 Conduct a mass vaccination campaign**

Collaborate with the national EPI and disease control program manager to conduct a mass vaccination campaign, if indicated. Begin planning the mass 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).

A worksheet called “Planning a mass vaccination campaign” is in Annex 6C at the end of this section.

A worksheet called “estimating vaccine supplies for vaccination activities in Annex 6D at the end of this section. Annex 6E describes recommended vaccination practices for use during the vaccination campaign.

### **6.3.6 Improve 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 diarrhoeal diseases.

<b>Daily water needs per person*</b>		
	<b><i>Non-outbreak situation</i></b>	<b><i>During outbreak of diarrhoeal disease</i></b>
<b><i>Home use</i></b>	20 litres per day	50 litres
<b><i>Health care setting</i></b>	40 to 60 litres 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  
MacMillan

Safe sources of drinking water include:

- Piped chlorinated water
- Chlorination at point-of-use to ensure safe drinking water
- Protected water sources (for example, closed wells with a cover, rain water collected in a clean container)
- Boiled water from any source

If no local safe water sources are available during an emergency, water supply may need to be brought from outside.

To make sure that families have ***safe drinking water at home*** (even if the source is safe) provide:

- Community education on how to keep home drinking water safe. Refer to Annex 6F for sample community messages and references to specific prevention guidelines for preparing safe water at home.
- 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 faeces should at least be 30 metres or more away from sources of water.

### **6.3.7 Ensure safe disposal of infectious waste**

To make sure that human excreta are disposed safely to avoid secondary infections due to contact with contaminated substances:

- Assign teams to inspect local areas for human waste disposal. Safe practices include disposing of faeces in a latrine or burying them in the ground more than 10 metres 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.

### **6.3.8 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.

### **6.3.9 Reduce exposures to infectious or environmental hazards**

As indicated by the outbreak or event, take action to reduce exposure to hazards or factors contributing to the outbreak or event. This may involve chemical, physical or biological agents. Technical requirements for reducing exposure will be determined according to national policy and through collaboration with those who have experience in these areas. For example, occupational or industrial exposure to heavy metals (for example, lead) will require coordination with multiple ministries and partners. Community education and behaviour 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.

### **6.3.10 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.

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

## **6.4 Provide regular situation reports on the outbreak and events**

Periodically, report on progress with the outbreak response (refer to Annex 6G). Provide information developed by the PHEMC 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.

The situation reports will be an important reference for evaluating the response and developing a final report. A suggested format of the report is in Annex 7A of Section 7. Steps for monitoring and evaluating a response are in Section 8.

## **6.5 Document the response**

At the end of the response, the district health management team should:

- Collect all the documents including minutes of the meeting, activity, process, epidemic report, evaluation report and other relevant documents.
- Prepare a coversheet listing of all the above documents.

This will become an essential source of data for evaluating the response. How to monitor and evaluate IDSR activities is described in Section 8.

## **Annexes to Section 6**

- ANNEX 6A** Treat cases during an outbreak
- ANNEX 6B** Preparing disinfectant solutions from ordinary household products
- ANNEX 6C** Planning an emergency immunization campaign
- ANNEX 6D** Estimating vaccine supplies for immunization activities
- ANNEX 6E** Recommended immunization practices
- ANNEX 6F** Sample messages for community education
- Hand-washing
  - Safe handling of food
  - Safe disposal of human waste
  - Clean drinking water and storage
  - Safe burial of bodies
  - Reducing exposure to mosquitoes
- ANNEX 6G** Outbreak communication



## Annex 6A Treat cases during an outbreak

Use appropriate drugs and treatments for managing cases during an outbreak. Below are treatment recommendations for use in an outbreak situation for:

1. Cholera
2. Dysentery
3. Measles
4. Bacterial meningitis.

### 1. Treat cholera in an outbreak situation

Source: *WHO guidelines for management of the patient with cholera, WHO/CDD/SER/91.15 and The New Emergency Health Kit 98, WHO/DAP/98.10*

1. Assess the patient for signs of dehydration. See assessment guide below.
2. Give fluids according to the appropriate treatment plan (see next page).
3. Collect a stool specimen from the first 5 suspected cholera patients seen.
4. Give an oral antibiotic to patients with severe dehydration.

<b>Assess the patient for signs of dehydration</b>	
<ul style="list-style-type: none"> <li>• Look at patient's general condition: Is the patient lethargic, restless and irritable or unconscious?</li> <li>• Are the patient's eyes sunken?</li> <li>• Offer the patient fluid. Is the patient: not able to drink, or drinking poorly, drinking eagerly, thirsty?</li> <li>• Pinch the skin of the abdomen. Does it go back very slowly (longer than 2 seconds?) or slowly?</li> </ul>	
<b>Decide if the patient has severe, some, or no signs of dehydration, and give extra fluid according to the treatment plan</b>	
If two of the following signs are present: <ul style="list-style-type: none"> <li>• lethargic or unconscious</li> <li>• sunken eyes</li> <li>• not able to drink or drinking poorly</li> <li>• skin pinch goes back very slowly</li> </ul>	<b>SEVERE DEHYDRATION*</b>  Give fluid for severe dehydration (Plan C)
*In adults and children older than 5 years, other signs for severe dehydration are "absent radial pulse" and "low blood pressure".	
If two of the following signs are present: <ul style="list-style-type: none"> <li>• restless, irritable</li> <li>• sunken eyes</li> <li>• drinks eagerly, thirsty</li> <li>• skin pinch goes back slowly</li> </ul>	<b>SOME DEHYDRATION</b>  Give fluid according to "for some dehydration" (Plan B)
If there are not enough signs to classify as some or severe dehydration	<b>NO DEHYDRATION</b>  Give fluid and food to treat diarrhoea at home (Plan A)

Give antibiotics recommended for treatment of severely dehydrated cholera patients		
Antibiotic	Children	Adults
<b>Doxycycline</b> one single dose	–	300 mg
<b>Tetracycline</b> 4 times per day for 3 days	12.5 mg per kg	500 mg
<b>Trimethoprim-sulfamethoxazole (TMP-SMX)</b> 2 times a day for 3 days	TMP 5 mg per kg and SMX 25 mg per kg <sup>4</sup>	TMP 160 mg and SMX 800 mg
<b>Furazolidone</b> 4 times per day for 3 days	1.25 mg per kg	100 mg <sup>5</sup>
<b>Erythromycin</b> <u>adults</u> : 4 times per day for 3 days <u>children</u> : 3 times per day for 3 days	10 mg per kg	250 mg

- If the patient vomits while taking fluid, wait 10 minutes. Then allow the patient to resume feeding, but more slowly.
- Continue monitoring the patient and replacing fluid until the diarrhoea stops.
- When the patient is ready to leave the facility, counsel the patient on treating diarrhoea at home.
- Refer to IMCI guidelines for treating children under 5 years of age and to national guidelines for further information on treating acute watery diarrhoea and confirmed cholera.
- Tetracycline should be avoided in children under 8 years of age.

### Plan A: Treat diarrhoea at home

If patients showed no signs of dehydration when they were first assessed, they may be treated at home. Give a 2-day supply of ORS and explain how to take the ORS solution according to the following schedule: Advise the mother to give extra fluid; give zinc supplements and continue feeding.

AGE	Amount of solution after each loose stool	Provide enough ORS packets for preparing:
Up to 2 years	50 to 100 ml after each loose stool	500 ml per day
2 years up to 10 years	100 to 200 ml after each loose stool	1000 ml per day
10 years or more	As much as the patient wants	2000 ml per day

### Plan B: Treat some dehydration with ORS

<sup>4</sup> TMP-SMX is WHO's antibiotic of choice for children. Tetracycline is equally effective. However, in some countries, it is not available for paediatric use.

<sup>5</sup> Furazolidone is WHO's antibiotic of choice for pregnant women.

In the clinic, give the recommended amount of ORS over a 4-hour period. Determine the amount according to the patient's weight. Use the patient's age only when the weight is not known.

<b>&lt; Determine the amount of ORS to give during the first 4 hours</b>						
<b>AGE or WEIGHT</b>	<b>Up to 4 months</b>	<b>4 months up to 12 months</b>	<b>12 months up to 2 years</b>	<b>2 years up to 5 years</b>	<b>5 years up to 14 years</b>	<b>15 years and more</b>
Weight in kg	< 6 kg	6 - < 10 kg	10 - < 12 kg	12 - < 19 kg	19 - 30 kg	30 kg and more
Give this amount of ORS	200 – 400 ml	400 - 700 ml	700- 900 ml	900 -400 ml	1400-2200 ml	2200-4000 ml

- If the patient wants more ORS than shown, give more.
- For infants under 6 months who are not breast-fed, also give 100-200 ml of clean water during this period.
- Give frequent small sips from a cup.
- If the patient vomits, wait 10 minutes. Then continue giving fluids, but more slowly.
- For infants who are breast-feeding, continue breast-feeding whenever the infant wants.
- Assess patients every 1-2 hours to make sure they are taking ORS adequately and to monitor fluid loss. Completely reassess the patient's dehydration status after 4 hours, and follow the appropriate treatment plan for the patient's dehydration classification.

### Plan C: Treat severe dehydration quickly

1. Start intravenous fluids immediately. If the patient is a child and can drink, give ORS by mouth while the drip is set up. Give 100 ml per kg of Ringer's Lactate Solution divided as follows:

<b>For giving IV fluids:</b>		
	<b>First:</b>	<b>Then:</b>
For <b>adults</b> (and patients 1 year and older), give 100 ml per kg IV within 3 hours as follows:	First, give 30 ml/kg as rapidly as possible within 30 minutes	Then, give 70 ml per kg during the next 2 ½ hours
For <b>patients less than 1 year</b> , give 100 ml per kg IV in 6 hours as follows:	First, give 30 ml per kg in the first hour*	Then, give 70 ml per kg in the next 5 hours

\* Repeat once if radial pulse is still very weak or not detectable after the first 30 ml per kg is given.

2. Reassess the patient after the first 30 ml per kg, and then every 1 to 2 hours. If hydration status is not improving, give the IV drip more rapidly.
3. Also give ORS (about 5 ml per kg per hour) as soon as the patient can drink. This is usually after 3 to 4 hours for infants and after 1 to 2 hours for patients older than one year.
4. Reassess the patient after 6 hours (for infants) or 3 hours (for one year and older). Classify dehydration. Then choose the appropriate plan (Plan A, Plan B, Plan C) to continue treatment.
5. Give antibiotics recommended for treatment of severely dehydrated cholera patients. See the schedule on the next page.
6. Give patients information about home care before they leave the health facility.
  - If the patient vomits while taking ORS, wait 10 minutes and then continue giving fluids more slowly.
  - Continue breast-feeding of infants and young children.
  - Return for treatment if the patient develops any of the following:
    - increased number of watery stools
    - eating or drinking poorly
    - marked thirst
    - repeated vomiting
    - fever
    - blood in the stool

## 2. Give an appropriate oral antibiotic for outbreaks of bloody diarrhoea due to *Shigella dysenteriae* type 1.

Source: WHO Guidelines for the control of epidemics due to *S. dysenteriae* type 1. WHO Geneva. 1995

	<b>NALIDIXIC ACID</b> <input type="checkbox"/> Give four times daily for 5 days	<b>CIPROFLOXACIN</b> <input type="checkbox"/> Give two times daily for 5 days	<b>COTRIMOXAZOLE</b> (trimethoprim + sulphamethoxazole) <input type="checkbox"/> Give two times daily for 5 days		
<b>WEIGHT</b>	<b>TABLET</b> 250 mg	<b>TABLET</b> 250 mg	<b>ADULT TABLET</b> 80 mg trimethoprim + 400 mg sulphamethoxazole	<b>PEDIATRIC TABLET</b> 20 mg trimethoprim + 100 mg sulphamethoxazole	<b>SYRUP</b> 40 mg trimethoprim + 200 mg sulphamethoxazole per 5 ml
<b>Children's dose</b>					
3 - 5 kg	¼	¼	1/4	2	5.0 ml
6 - 9 kg	½	½	1/2	2	5.0 ml
10 - 14 kg	1	1	1	3	7.5 ml
15 - 19 kg	1	1	1	3	7.5 ml
20-29 kg	2	2	1	6	15 ml
<b>Adult dose</b>	<b>TABLET</b> 250 mg	<b>TABLET</b> 250 mg	<b>TABLET</b> 160 mg TMP +800 mg SMX		
	4 tablets	4 tablets	2 tablets		

### 3. Give vitamin A to children with measles

- Give the first dose in the health facility or clinic.
- Give the mother one dose to give at home the next day.

Source: *WHO guidelines for epidemic preparedness and response to measles outbreaks, WHO/CDS/CSR/ISR/99.1*

AGE	Vitamin A Capsules		
	200 000 IU	100 000 IU	50 000 IU
Up to 6 months		½ capsule	1 capsule
6 months up to 12 months	½ capsule	1 capsule	2 capsule
12 months up to 5 years	1 capsule	2 capsules	4 capsules

### 4. Give appropriate antibiotic for bacterial meningitis cases during an outbreak

Source: *Control of epidemic-prone meningococcal disease, WHO practical guidelines, 2<sup>nd</sup> edition 1998, WHO/EMC/BAC/98.3*

1. Admit patient to a health facility for diagnosis and treatment.
2. Start an antibiotic immediately. Intra-muscular injectable oily chloramphenicol is best choice during an epidemic. It is very effective and a single dose is usually effective. If injectable treatment is not possible, give oral amoxicillin or cotrimoxazole or treat with an antimicrobial recommended by national treatment guidelines for meningitis.
3. Patient isolation is not necessary. Provide good supportive care and simplify case management.

#### Give a single dose of oily chloramphenicol

AGE	INTRAMUSCULAR OILY CHLORAMPHENICOL 100 mg per kg in a single dose, If the patient has not improved, give a second dose 24 to 48 hours later.	
	Dose in grams	Dose in millilitres
<b>Adult:</b> Age 15 years and older	3.0 g	12 ml
<b>Child:</b> 10 to 14 years	2.5 g	10 ml
6 to 9 years	2.0 g	8 ml
3 to 5 years	1.5 g	6 ml
1 to 2 years	1.0 g	4 ml
2 to 11 months	0.5 g	2 ml
1 to 8 weeks	0.25 g	1 ml

## Other recommended antibiotics to treat meningitis

<b>Agent</b>	<b>Route</b>	<b>Dose for adults</b>	<b>Dose for children</b>	<b>Duration of treatment</b>
Penicillin G	IV	3-4 MU daily, every 4-6 hours	400 000 Units/ kg	4 days
Ampicillin or Amoxicillin	IV	2-3 g daily every 6 hours	250 mg per kg	4 days
Amoxicillin	Oral	2-3 g every 6 hours	250 mg per kg	4 days
Chloramphenicol	IV	1 g every 8-12 hours	100 mg per kg	4 days
Cefotaxime	IV	2 g every 6 hours	250 mg per kg	4 days
Ceftriaxone	IV	1-2 g over 12-24 hours	50-80 mg per kg	4 days
Ceftriaxone	IM	1-2 g single dose	50-80 mg per kg	1-2 days

## 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 this chlorine product	To make a 1:10 solution for disinfecting:	To make a 1:100 solution for disinfecting:
	<ul style="list-style-type: none"> <li>-- <i>Excreta</i></li> <li>-- <i>Cadavers</i></li> <li>-- <i>Spills of infectious body fluids</i></li> </ul>	<ul style="list-style-type: none"> <li>-- <i>Gloved hands</i></li> <li>-- <i>Bare hands and skin</i></li> <li>-- <i>Floors</i></li> <li>-- <i>Clothing</i></li> <li>-- <i>Equipment</i></li> <li>-- <i>Bedding</i></li> </ul>
Household bleach 5% active chlorine	1 litre bleach per 10 litres of water	100 ml per 10 litres of water, or 1 litre of 1:10 bleach solution per 9 litres of water
Calcium hypochlorite powder or granules 70% (HTH)	7 grams or ½ tablespoon per 1 litre of water	7 grams or ½ tablespoon per 10 litres of water
Household bleach 30% active chlorine	16 grams or 1 tablespoon per 1 litre of water	16 grams or 1 tablespoon per 10 litres 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      Planning an emergency immunization activity

1. Specify the target population for the immunization activity.
2. Estimate the necessary amounts of vaccine, diluent, and immunization supplies such as sterile syringes and sterile needles, cold boxes and safety boxes.
3. Choose the immunization sites and inform the community.
  - a. Coordinate with the EPI or disease control program in your district to identify sites for conducting the immunization activity.
  - b. Identify the facilities that can participate in the activity.
  - c. Identify a mobile immunization team, if needed.
  - d. Determine if there are any hard-to-reach areas, e.g. a transient workers' camp. Identify a mobile immunization team to reach these areas.
  - e. Contact the facilities and schedule the immunization sites.
  - f. Contact the national level to request vaccine. If a national reserve stock is not available, the national EPI program manager will request an emergency supply from WHO.
  - g. Make sure there is enough capacity to store extra amounts of the vaccine during storage and transportation to the immunization site.
4. Select immunization teams. For every 100 to 150 people expected at the immunization site, the following staff is required:
  - a. One to two vaccinators to give immunizations
  - b. One recorder to record on immunization cards
  - c. Volunteers to verify age and immunization status
5. Work with your EPI team to conduct refresher training for vaccinators on recommended immunization practices.
6. Mobilize the community. Inform the public about the emergency immunization activity.
7. Arrange staff transportation to the immunization site.
  - a. Plan their transportation to and from the site.
  - b. Schedule vehicles and plan for fuel and other costs.
  - c. Estimate *per diem* costs and make necessary arrangements for lodging if the site is away from the health worker's usual station.
8. Monitor the number of doses of vaccine given.

## 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 20%
- 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. 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.

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

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.

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

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).

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

6. If the vaccine requires a diluent, multiply the number of millilitres of diluent per vial times the total number of vials required.

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

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.

Source: *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      Recommended immunization practices**

Work with your EPI team to give refresher training to the vaccinator teams that will conduct the emergency immunization activity. As a minimum, make sure vaccinator teams know how to:

1.      Reconstitute the vaccine correctly:
  - Determine the appropriate quantity of diluent to reconstitute the freeze-dried vaccine.
  - Use a sterile syringe and sterile needle for each dose.
  - Using the dilution syringe, draw up and expel the diluent several times in the vial that contain the vaccine so as to mix the reconstituted vaccine well.
2.      Wrap the vial in silver foil or cover it with a dark cloth. This will protect the vial from sunlight.
3.      In a field situation, protect the vaccine and diluent from contamination. Cover the open top of the vial with foil to keep out dirt and flies.
4.      Place reconstituted vaccine vials and opened liquid vaccine vials immediately into a cup of ice, or stand them on an ice pack. Keep the ice and vaccines in the shade.
5.      Follow national policy for reusing opened liquid vaccine vials such as DTP.
6.      Record the dose on an immunization card for each person immunized, if it is national policy to require immunized persons to have a card.
7.      Collect data for monitoring the activity. For example, record the number of doses given on a tally sheet so that coverage from the campaign can be calculated.
8.      Remind health workers about the risk of getting blood-borne diseases from an accidental needle stick. Review safe practices for handling and disposing of sharp instruments and needles using a sharps box.
9.      Arrange for safe disposal of used injection materials at the end of the activity. They can be burned or buried in a pit.
10.     Give instructions for use of safe injection techniques. Review with health workers the need to plan vaccination campaigns.

## ANNEX 6F      Sample messages for community education

### IMPROVE HAND-WASHING

Hand-washing with soap may be the most effective way to prevent transmission of some organisms causing infectious diseases. For that reason, promote hand-washing in every family. Hand-washing is particularly important after defecation, after cleaning a child who has defecated, after disposing of a child's stool, before preparing or handling food and before eating.

Hand-washing is practiced more frequently where water is plentiful and within easy reach. If possible, water for washing should be stored separately from drinking-water. During an epidemic, soap should be provided to those without it. If soap is not available, ash or earth can be used to scrub the hands. Do not dry washed hands with dirty cloths. Air-dry wet hands.

#### Message:

***ARE YOU PROTECTED FROM DYSENTERY (bloody diarrhea)?***

Washing your hands protects yourself and others from disease.

***Always*** wash:

- after defecation
- after cleaning a child who has defecated
- after disposing of a child's stool
- before and after eating
- before preparing or handling food

#### Message:

***ARE YOU READY FOR HAND-WASHING?***

**Do you have:**

- Clean water and soap (or if you do not have soap, use ash or earth to scrub your hands)
- Clean cloth for drying

## SAFE HANDLING OF FOOD

Encourage the following food safety practices:

- Wash hands with soap before preparing food
- Thoroughly wash the fruit and green vegetables before consuming using clean water
- Cook food until it is hot throughout
- Eat food while it is still hot, or reheat it thoroughly before eating
- Wash all cooking and serving utensils after use
- Keep cooked food and clean utensils separate from uncooked foods and potentially contaminated utensils
- Cover your food appropriately

**Message:**

### ***DO YOU PREPARE FOOD SAFELY?***

#### ***Cooking kills germs***

- Thoroughly cook all meats, fish and vegetables
- Eat cooked meats, fish and vegetables while they are hot

#### ***Washing protects from disease***

- Wash your hands before preparing or serving food
- Wash your dishes and utensils with soap and water
- Wash your cutting board especially well with soap

#### ***Peeling protects from disease***

- Only eat fruits that have been freshly peeled (such as bananas and oranges)

***KEEP IT CLEAN: COOK IT, PEEL IT, OR LEAVE IT.***

### **Five Keys to Safer Food**

- Keep clean
- Separate raw and cooked
- Cook thoroughly
- Keep food at safe temperature
- Use safe water and raw materials

# Five keys to safer food



## Keep clean

- ✓ Wash your hands before handling food and often during food preparation
- ✓ Wash your hands after going to the toilet
- ✓ Wash and sanitize all surfaces and equipment used for food preparation
- ✓ Protect food and areas around food from insects, pests and other animals

### Why?

While most microorganisms do not cause disease, dangerous microorganisms are widely found in food, water, animals and people. These microorganisms are carried on hands, washing dishes and utensils, especially cutting boards and the slightest contact can transfer them to food and cause foodborne disease.



## Separate raw and cooked

- ✓ Separate raw meat, poultry and seafood from other foods
- ✓ Use separate equipment and utensils such as knives and cutting boards for handling raw foods
- ✓ Store food in containers to avoid contact between raw and prepared foods

### Why?

Raw food, especially meat, poultry and seafood, and their juices, can contain dangerous microorganisms, which may be transferred onto other foods during food preparation and storage.

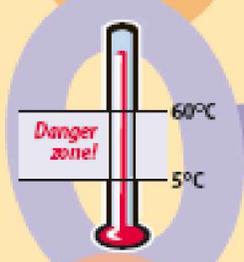


## Cook thoroughly

- ✓ Cook food thoroughly, especially meat, poultry, eggs and seafood
- ✓ Bring foods like soups and stews to boiling to make sure that they have reached 70°C. For meat and poultry, make sure that juices are clear, not pink. Ideally, use a thermometer
- ✓ Reheat cooked food thoroughly

### Why?

Proper cooking kills almost all dangerous microorganisms. Foods that do not reach a minimum of 70°C can help ensure it is safe for consumption. Foods that require special attention include reheated meats, reheated poultry joints and meat and whole poultry.



## Keep food at safe temperatures

- ✓ Do not leave cooked food at room temperature for more than 2 hours
- ✓ Refrigerate promptly all cooked and perishable food (preferably below 5°C)
- ✓ Keep cooked food piping hot (more than 60°C) prior to serving
- ✓ Do not store food too long even in the refrigerator
- ✓ Do not thaw frozen food at room temperature

### Why?

Microorganisms can multiply very quickly if food is stored at room temperature. To help prevent exposure to temperatures below 5°C or above 60°C, the growth of microorganisms is slowed down or stopped. Some dangerous microorganisms still grow below 5°C.



## Use safe water and raw materials

- ✓ Use safe water or treat it to make it safe
- ✓ Select fresh and wholesome foods
- ✓ Choose foods processed for safety such as pasteurized milk
- ✓ Wash fruits and vegetables, especially if eaten raw
- ✓ Do not use food beyond its expiry date

### Why?

Raw materials, including water and food, may be contaminated with dangerous microorganisms and chemicals. To eat the most safe and sound Indian and other local foods, careful handling of raw materials and simple measures such as washing and peeling may reduce risks.

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## SAFE DISPOSAL OF HUMAN WASTE

High priority should be given to ensuring the safe disposal of human waste at all time, and especially during epidemics of diarrhoea. Sanitary systems appropriate for local conditions should be constructed with the cooperation of the community.

Community messages should emphasize:

- Everyone should use latrines properly, including children
- Transfer children's excreta with a scoop or shovel to the latrine or bury in a hole.
- Avoid defecating on the ground, or in or near the water supply

When large groups of people congregate—as for fairs, funerals, or religious festivals—, ensure the safe disposal of human waste. If there is no latrine, designate areas for defecation and provide a shovel to bury the excreta.

### Message:

***ARE YOU PROTECTED FROM DYSENTERY (bloody diarrhoea)?  
DO YOU USE A TOILET OR LATRINE?***

Germs that cause dysentery live in feces. Even a person who is healthy might have dysentery germs.

- *Always use* a toilet or latrine. If you don't have one – build one!
- Keep the toilet or latrine *clean*
- *Wash your hands* with soap (or ash) and clean water after using the toilet or latrine

***KEEP IT CLEAN: USE A TOILET OR LATRINE***

## CLEAN DRINKING WATER AND STORAGE

- **Community drinking water supply and storage**

1. *Piped water.* To maintain safety, properly chlorinate piped water. To prevent entry of contaminated groundwater into pipes, repair leaking joints and maintain constant pressure in the system.
2. *Closed wells.* Equip with a well-head drainage apron, and with a pulley, windlass, or pump.
3. *Trucked in.* If locally available water is likely to be contaminated, drinking water should be supplied by tankers or transported in drums, if it is adequately chlorinated and a regular supply can be ensured. The trucking of water, however, is expensive and difficult to sustain; it is usually considered a short-term measure until a local supply can be established.

- **Home drinking water storage and treatment**

When the safety of the drinking water is uncertain, it should be chlorinated in the home or boiled.

To prevent contamination of drinking water, families should store drinking water using one of the following types of containers:

1. *Covered containers* that are cleaned daily and kept away from children and animals. Water should be removed from the containers using a long-handled dipper, kept especially for this purpose.
2. *Narrow-mouthed containers* with an opening too small to allow the insertion of a hand. Water should be removed by pouring from the opening or spout.

Water used for bathing, washing and other purposes other than drinking need not be treated and should be stored separately from drinking water.

## **SAFE DISPOSAL OF BODIES**

The body fluids of persons who die due to diarrhoea or a viral hemorrhagic fever are still infectious. Use extreme caution when preparing the bodies of suspected cholera or viral hemorrhagic fever patients. Encourage safe funeral and burial practices

## **REDUCING EXPOSURE TO MOSQUITOES**

Mosquito control is the main intervention for reducing malaria transmission. It can reduce malaria transmission from very high levels to close to zero. In high transmission areas, mosquito control can significantly reduce child and maternal deaths. Personal protection against mosquito bites represents the first line of defense for malaria prevention.

### **Message:**

#### **ARE YOU PROTECTED FROM MOSQUITO BITES?**

Whenever possible,

- Avoid going out between dusk and dawn when mosquitoes commonly bite
- Wear long-sleeved clothing and long trousers when going out at night, and avoid dark colours, which attract mosquitoes
- Apply insect repellent to exposed skin ( if the repellent is available)
- Use screens over doors and windows
- Use a insecticide treated mosquito net over the bed
- Use anti-mosquito sprays or insecticide dispenser (if available)

Malaria transmission can rapidly be reduced by indoor residual spraying (IRS) with insecticides. IRS works for between 3 to 12 months, depending on the insecticide used and the type of surface on which it is sprayed.

## **ANNEX 6G      Outbreak communication**

### **Introduction**

Following confirmation and verification of the event, the primary health and the district level authorities should liaise with the national level authorities to communicate and receive guidance on common positions to be delivered to the media.

From first announcement throughout the outbreak, communication from the district level should follow the directions and the key messages developed at national level in consultation with the field team, in order to ensure consistency and speaking with one voice.

Even though communication should be centrally coordinated by the national level, media would approach local and district public health response level to obtain first hand information from direct sources.

In addition, the director of the district level hospital should support the communication and provide scientific expertise as evidence for intervention.

### **Actions at the district level**

- Identify spokesperson(s) at district level (political and technical)
- Liaise regularly with national authorities to provide them with first hand information (received at the community local level, the media, local stakeholders)
- Be in contact regularly with national authorities to receive common messages including guide and answers for frequently asked questions to feed the local media
- Be available for interviews by local media upon request to provide accurate, transparent and updated information following directions from national level in simple clear key messages
- Organize press briefings to provide regular information to local media, following directions from national level
- Develop good relationships with local media to partnership for delivery of accurate, transparent, timely messages to the population
- Use information materials developed at the national level with clear consistent messages to provide guidance to the population
- Identify local powerful channels for the delivery of information to the population
- Meet regularly with local stakeholders to disseminate correct message of prevention and surveillance to the population
- Organize preventive door-to-door campaigns to reach the remote rural areas and promote prevention and surveillance, following directions from national level



## Section 7

### Communicate information

This section describes how to:

- Prepare an outbreak or event response report
- Inform stakeholders and the population
  - Develop fact sheets
  - Communicate with community leaders and stakeholders
  - Develop and distribute public health bulletins
- Provide feedback to health staff
  - Develop information summary sheets
  - Develop district newsletters



## 7.0 Communicate information

Effective communication is an essential function of surveillance. For example, providing decision makers with summary information about an outbreak response allows them to review how resources were applied to contain the event. Effective communication during an outbreak or a public health event also demonstrates transparency in the management of the event. Ensuring reliable participation of the population in responding to a disease or other public health event relies on provision of information and addressing community concerns.

Feedback consists of communicating with health staff from other levels about the data, results of the analysis of these data and measures that were taken to respond to the potential public health event reported. Feedback aims at reinforcing health workers efforts to participate in the surveillance system.

### 7.1 Prepare an outbreak or event response report

After an outbreak or event response has taken place, district staff who led the investigation should prepare a report. The purpose of the report is to document how the problem was identified, investigated, responded to, what the outcome was, decision taken and recommendations made. Make sure that the health unit that reported the initial cases receives a copy of the report.

See Annex 7A at the end of this section for an example of a recommended format.

### 7.2 Inform stakeholders and the population

#### 7.2.1 Develop fact sheets

Fact sheets are brief summaries of 1 to 2 pages. They are usually prepared by health staff for consumption by the general public and deal with a single topic or message. For example, a fact sheet on a *Shigella* outbreak in a district may contain the following information for the community; the cause of *Shigella*, how it is transmitted, steps for: prevention and updates on the number of cases and deaths. The fact sheets could be posted on a bulletin board or distributed to community groups that are planning health education campaigns.

## **7.2.2 Communicate with the affected community and stakeholders**

Partner coordination is essential during outbreak and event response. Thus establishing routine communication structures and processes between the health and community partners helps to ensure that this vital link is available and functional during an emergency. Options for communicating between the various partners can range from SMS, telephone, hand-carried message, fax, email updates and exchanges of communication materials to more formal decision-making committees. Regardless of the mechanism, ensure that the focus is on transparent and trustworthy communication that takes community experiences into account.

## **7.2.3 Develop and distribute public health bulletins**

In many countries, the national level or region publishes a national public health bulletin on a regular basis. These bulletins have a wider audience than just the health staff in a particular district or health facility. The bulletins are usually brief (2 to 8 pages). They are seen by policy makers, legislators and other decision-makers. The bulletins are valuable channels for reaching technical and donor partners.

The bulletins contain at least:

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

If a national public health bulletin is sent to the district office, display it where everyone can see it. Make copies to distribute to health facility staff. Take a copy of the bulletin with you on your next supervisory visit to show health workers how data they report contributes to public health.

A sample template for preparing a bulletin is in Annex 7B.

## 7.3 Provide feedback

In most cases, health facilities and districts reliably report surveillance data to the next level as required. But if the facility does not receive information from the next level about how the data were used or what the data meant, health staff may think that their reporting is not important. As a result, future reporting may not be as reliable because health staff will not know if the information they sent to other 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 district or national level.

When the district or national managers receive data, they should respond to the health facilities that reported it. The purpose of the feedback is to reinforce health workers efforts to participate in the surveillance system. Another purpose is to raise awareness about certain diseases and any achievements of disease control and prevention projects in the area.

Feedback may be written, such as a monthly newsletter, or it may be given orally through a telephone call or periodic meetings. This section focuses on district level feedback. But the information can also be applied in health facility and national levels.

### 7.3.1 Develop information summary sheets

An information summary sheet is a report that presents data and its interpretation in a table or other graphic format. For example:

- At a staff meeting, or during a supervisory visit, give a verbal report or comment about the data that were reported by the health facility during a given period of time. Display the data in a simple table. Sit with the health staff and show them the data. Talk together about the likely conclusions that can be drawn. Consider conclusions not only for the health facility, but for the district as a whole.
- Prepare a single sheet with a simple table that shows how the data reported for this period are different from the data reported for some other period or target population. For example, show the number of cases of diarrhoea with dehydration in children less than 5 years of age from the same period last year. Compare them with a corresponding period this year, after a safe water project was implemented in a high-risk area, for example.

- Use the summary sheets to support requests made to higher levels for additional funds, supplies and resources.

### **7.3.2 Develop district newsletters**

The purpose of a district newsletter is to provide shorter updates than those provided in a more detailed feedback bulletin. The district newsletter is useful for informing and motivating health staff.

The target audience for a newsletter could be health staff in the district. The newsletter can be 2 to 4 pages long and produced simply with a computer-entered or typewritten text.

Examples of articles that could be carried in a newsletter are:

- Summary of national or district data for a given priority disease
- Report of progress towards a specific public health target
- Report of a specific achievement towards public health by an individual health worker or a group of health workers
- Description of special events or activities (for example, a change in market day)

## **Annexes to Section 7**

**ANNEX 7A** Sample district outbreak report

**ANNEX 7B** Sample public health bulletin



## ANNEX 7A      Sample district outbreak report

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Title/Description (include disease/condition investigated)	
Period	Place (Villages, Neighborhoods, District, Province)

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### Executive summary:

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### I. Introduction:

- Background
- Reasons for investigation (public health significance, threshold met, etc.)
- Investigation and outbreak preparedness

### II. Methods:

- Dates of investigation
- Site(s) of investigation (health care facilities, villages, other)
- Case finding (indicate what was done regarding case finding, e.g., register review, contact investigation, alerting other health facilities, other)
- Lab specimens collection
- Description of response and intervention (include dates)
- Data management

### III. Results:

- Date and location of first known (index) case
- Date and health facility where first case was seen by the health care system
- Results of additional case finding
- Lab analysis and results
- With text, describe key features of results of time, place, and person analysis
- For detailed results by time (epi curve), place (map), and person characteristics (tables) and line lists
- Results of response and evidence of impact

#### IV. Self-evaluation of the timeliness and quality of preparedness, outbreak detection, investigation, and response

##### Epidemic Preparedness

Indicator	Yes	No
Were adequate drugs and medical supplies available at the onset of the outbreak		
Were treatment protocols available to health workers?		
Does the district epidemic management committee regularly meet as part of epidemic preparedness?		

##### Outbreak Detection

Indicator	Date 1	Date 2	Interval
Interval between onset of index case (or occurrence of an unusual cluster at the community level) [date 1] to arrival of first outbreak case at the health facility [date 2] (Target: <3 days)			
Interval between initial outbreak case seen at the health facility (or date of outbreak threshold crossing at the health facility) [date 1] and reporting to the district health team [date 2] (Target: within 24 hours)			
Cumulative interval between onset of index case (or occurrence of an unusual cluster at the community or health facility) [date 1] to notification to the district [date 2] (Target: <7 days)			

##### Outbreak investigation

Indicator	Yes	No
Were case forms and line lists completed?		
Were laboratory specimens taken (if required)?		

Indicator	Date 1	Date 2	Interval
Interval between notification of district [date 1] and district field investigation conducted [date 2] (Target: within 48 hours)			
Interval between sending specimens to the lab [date 1] and receipt of results by the district [date 2] (Target: 3-7 days, depending on type of test)			

##### Outbreak response:

Indicator	Date 1	Date 2	Interval
Interval between notification of outbreak to district [date 1] and concrete response by the district [date 2] (Target: within 48 hours of notification)			

**Evaluation and Feedback:**

<b>Indicator</b>	<b>Date 1</b>	<b>Date 2</b>	<b>Interval</b>
Interval between end of the outbreak [date 1] and finalization of outbreak report with case forms/line list sent to national level [date 2] (Target: 2 weeks)			

<b>Indicator</b>	<b>Yes</b>	<b>No</b>
Did the outbreak management committee meet to review investigation results?		
Was feedback given to health facilities and community?		

**V. Evaluation of other aspects of the response:**

**VI. Interpretations, discussion, and conclusions:**

**VII. Recommended public health actions:**

Comment on following levels: community, health facility, district, partners, provincial, and national

District Epidemic Committee Chairperson:

\_\_\_\_\_

Name

\_\_\_\_\_

Signature

District Medical Officer:

\_\_\_\_\_

Name

\_\_\_\_\_

Signature

Date reported completed: \_\_\_\_\_

## ANNEX 7B      Sample public health bulletin

### MINISTRY OF HEALTH WEEKLY EPIDEMIOLOGICAL BULLETIN

District \_\_\_\_\_ Epidemiological Week \_\_\_\_\_ Week ending (date) \_\_\_\_\_

#### I. Epidemiological Situation: Week (insert week number and date here)

**Table 1: Epidemiological Situation: Week \_\_\_\_\_**

Disease	Cases	Deaths	Fatality (%)	Districts in Alert	Districts in Epidemic	Reported week	Timeliness (%)	Completeness (%)
D1								
D2								
Dn...								
Total								

Comments:

Contact us:

#### II. Synthesis of the Epidemiological Situation (insert the weeks being reported on here)

**Table 2: Epidemiological Situation: Weeks \_\_\_\_\_**

Districts	Cases	Deaths	Fatality (%)	Districts in Alert	Districts in Epidemic	Reported week	Timeliness (%)	Completeness (%)
D1								
D2								
Dn								
Total								

Comments:

#### III. Graphs (This section provides a graphical representation of data)

#### IV. Epidemic Trends

## **Section 8**

### **Monitor, evaluate, and improve surveillance and response**

This section describes how to:

- Identify targets and indicators
- Monitor the quality of surveillance activities at the district level
- Supervise surveillance and response activities
- Evaluate the surveillance and response system
- Take action to improve surveillance and response system



## 8.0 Monitor, evaluate, and improve surveillance and response

Monitoring of surveillance and response systems refers to the routine and continuous tracking of planned surveillance activities (for example, reports are received on time). Evaluation periodically (for example annually) assesses whether surveillance and response objectives have been achieved. Both monitoring and evaluation are used to improve surveillance and response.

Section 3 of these guidelines describes how each month, the health staff responsible for surveillance at the health facility and at the district level review and analyze the data reported during the month. Each month they make conclusions about:

- The timeliness and completeness of reporting from each level, and
- The quality of routine prevention and control activities are taking place so that when problems are detected, districts respond with appropriate action.

The same information can also be used to routinely monitor and annually evaluate:

- The timeliness in reporting immediately-notifiable diseases, conditions or events
- Outbreak investigations and responses and
- Reporting of summary data on a routine basis

When problems are detected in the surveillance and response system, action can be taken to strengthen the system. By making corrections as they are identified, it is more likely that the end of the year results will show the desired outcomes. For example, use the monthly monitoring data to do an evaluation at the end of the year. Questions to help evaluate include:

- Are surveillance objectives for existing activities being met?
- Was surveillance data used for taking public health action?
- Did surveillance, laboratory and response activities have an impact on the outcome of health events in the district?

The information in this section will describe how to routinely monitor and annually evaluate the performance of the surveillance system and specific disease or public health events control and prevention programs.

## 8.1 Identify targets and indicators

Using indicators is a method for measuring the extent of achievement for a particular program or activity. The achievement is compared to overall recommended standard quality practices. It can also measure progress towards implementing an overall program target. For example, a district may have as its goal the achievement of 100% completeness of reporting by a certain period. An indicator can be developed to measure the proportion or percentage of facilities that are reporting. This proportion is then compared with the desired goal or target, and can be used to evaluate progress and, therefore, the quality of the service or activity.

Use indicators in accordance with national goals and to specific plans for improving integrated surveillance and response activities in a district. Select the indicators that are most relevant to the district's plan for improving surveillance this year and that will provide information that the district can use.

Selected indicators are likely to be the following:

- Indicators for measuring quality of surveillance in general. For example, to evaluate timeliness and completeness of reporting, select as an indicator the percentage of health facilities that reported routine information on time.
- Indicators for measuring quality of surveillance for specific diseases or public health events (for example, to monitor response to surveillance data about meningitis, select as an indicator the percentage of health facilities where meningitis outbreaks were detected -- that is, the rate was more than 15 suspected cases per 100 000 population -- and which were laboratory confirmed)
- Additional indicators may be necessary to measure the impact of public health interventions.

Suggested indicators and a chart for monitoring core indicators at the health facility are in Annexes 8A and 8B. Core indicators for the district level are in Annex 8C and 8D, for the province in Annex 8E and for the national level in 8F.

**Indicators for monitoring performance of core functions of  
Integrated Disease Surveillance and Response**

1.	Proportion of health facilities submitting weekly (or monthly) surveillance reports on time to the district
2.	Proportion of districts submitting weekly (or monthly) surveillance reports on time to the next higher level
3.	Proportion of cases of diseases targeted for elimination, eradication and any other diseases selected for case-based surveillance that were reported to the district using case-based or line-listing forms
4.	Proportion of suspected outbreaks of epidemic-prone diseases notified to the next higher level within 2 days of surpassing the epidemic threshold
5.	Proportion of districts in which a current trend analysis (line graph or histogram) is available for selected priority diseases
6.	Proportion of reports of investigated outbreaks that include analyzed case-based data
7.	Proportion of investigated outbreaks with laboratory results
8.	Proportion of confirmed outbreaks with a nationally recommended public health response
9.	Case fatality rate for each epidemic prone disease reported
10.	Attack rate for each outbreak of a priority disease
11.	The number of epidemic detected at the national level that were missed by the district level during the last year
12.	Proportion of districts that report laboratory data for diseases under surveillance
13.	Proportion of district laboratories that received at least one supervisory visit that included written feedback from the provincial or national level during the last year
14.	Proportion of provinces reporting monthly analyzed laboratory data to the national reference laboratory

**Indicators for monitoring performance of core functions  
for IHR (2005) implementation**

1.	Proportion of Hospitals with Infection Prevention and Control (IPC) requirements established
2.	Proportion of districts with Public health risks and resources mapped
3.	Proportion of districts reporting information using event-based surveillance
4.	Proportion of districts provided by national authorities with laws or instruments sufficient for implementation of obligations under IHR
5.	Proportion of districts with mechanism for the coordination of relevant sectors in the implementation of IHR established

**8.1.1 Select data for measuring the indicators**

After you have selected relevant indicators, specify the numerator and the denominator. For example, a district objective is for all health facilities to keep trend lines for selected priority diseases. The numerator and denominator are defined as follows:

- Indicator:*** The proportion of health facilities in the district that keep trend lines for priority diseases.
- Numerator:*** The number of health facilities that keep trend lines for priority diseases.
- Denominator:*** The number of health facilities in the district.

### 8.1.2 Ensure sources of data are available

Each level should make sure that the level it supervises has the following sources of data available.

Form	Health Facility	District	Provincial	National
Monitoring chart for tracking indicators (Sample charts are in Annex 8A.)	X	X	X	X
Outpatient register	X			
Inpatient register	X			
Health facility reporting forms	X			
Case-based and/or line listing reporting forms	X	X	X	X
Outbreak investigation report	X	X	X	X
Log of suspected outbreaks and rumours	X	X	X	X
Supervisory reports from district and/or province	X	X	X	X
Laboratory reports received	X	X	X	X

## 8.2 Monitor the quality of the surveillance activities at district level

An important indicator of a quality reporting system is the timeliness and completeness at each level. When reports are sent and received on time, the possibility of detecting a problem and conducting a prompt and effective response is greater. Completeness of reporting describes whether all the reporting units have reported as expected. If reports are late, or are not submitted, the aggregated information for the district (or other administrative area) will not be accurate. Outbreaks can go undetected, and other opportunities to respond to public health problems will be missed.

### 8.2.1 Monitor detection and notification of immediately reportable diseases or events

Monitor how well the system is able to detect immediately notifiable diseases or events. Monitor the interval between the onset of the first known case and when first case was seen in the health facility. If this interval is too long, it will

seriously affect the outcome of individual patients and will alter the spread of the outbreak.

Other intervals to monitor for detection of immediately reportable diseases include monitoring reporting from the community to the health facility (within 48 hours of onset of illness), from the health facility to the district (within 24 hours) and from the time the threshold is reached to a concrete response (within 48 hours).

### **8.2.2 Monitor the timeliness and completeness of monthly reporting**

Routinely monitor the receipt of reports to evaluate the timeliness of reporting and the completeness of the information. Use a monitoring tool such as a record of reports received to monitor timeliness and completeness of reporting in your district. A sample form for recording timeliness of reporting is in Annex 8G at the end of this section.

If you routinely record and review the dates on which reports are received, the effectiveness of the system can be assessed easily each month during the analysis of routine and case-based data. For example, use the record of reports received to:

- Measure how many reporting units submitted reports for a given month
- Identify which reporting units have reported
- Measure how many reports were timely, i.e., submitted before the last day of the following month (for example, March data received by the next level by 30 April)

### **8.2.3 Identify problems and take action**

If the monitoring information shows that a health facility or other reporting unit has not provided a report, or if the report is not on time, contact the surveillance focal point at the facility. Work with the designated staff to identify what has caused the problem and develop solutions together (for example, find out if a reliable supply of forms or other reporting method such as text messaging or radiophone is available). Additionally, ask if a new staff person has started at the facility and has yet to receive orientation on the procedure for reporting. Or, find out if health staff receives feedback about reports they have made and have resources to take action as a result of the information.

Make plans with the reporting unit to find solutions for improving the situation. Explain that when information is complete, the district can assist health staff more efficiently with planning responses and carrying them out. For example, if lack of supplies is a problem, the district can use the reporting information to advocate with higher levels in the system.

#### **8.2.4 Report timeliness and completeness to other levels**

When routine reports of the number of cases are sent to the provincial, regional 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. For example, if the report to the central level states that two cases of measles were detected during the month, it should also include information about the number of health facilities that reported. It will make a difference to the other levels when they evaluate the information if the 2 cases occurred with only 20% rather than 100% of the units reporting.

### **8.3 Supervise surveillance and response activities**

Supervision is a process of helping to improve work performance. Supervision is not an inspection. Rather, good supervision aims to sustain good quality services rather than finding things that are wrong.

In a good system, supervisors and health professional work together to review progress, identify problems, decide what has caused the problem and develop feasible solutions.

#### **8.3.1 Prepare job descriptions for surveillance staff**

Job descriptions are the basis for conducting supervision and assessing performance. Review the job descriptions of health staff who have a role in the surveillance and response system. Make sure that the job description states:

- The surveillance tasks to perform
- To whom the staff person reports

### **8.3.2 Prepare a supervision plan**

Include surveillance and response targets in the overall plan for supervision in your district. For example:

- Decide how often to monitor health staff performance. For example, a district may decide to conduct a supervisory visit at least 2 times a year for each health facility. In some countries, depending on resources, supervisory visits take place more often (monthly, for example).
- Ask health facility supervisors to make a schedule of the supervision they will conduct over the next year in their own facilities and to any community sites that report to the facility.
- Make sure that transport is available for supervision and for surveillance activities that require transportation. For example, coordinate travel or logistics for surveillance supervisory visits with visits made by other programs or activities.
- Include other reporting sites in supervision of district surveillance activities such as clinics, medical centres and community reporting sites in the overall plan. Include private health centers, if feasible.

### **8.3.3 Use a supervisory checklist**

Each health facility has unique problems and priorities that require specific problem solving and corrections. To maintain the positive motivation of the health facility staff for making the improvements, consider developing a graduated checklist to guide the supervisory visit. The items listed in a graduated checklist (such as the one in Annex 8H) are selected based on what has been achieved so far at the health facility. For example, when the facility has achieved one objective (using standard case definitions consistently, for example), work with health facility staff to include the next indicator or item for monitoring performance (using thresholds for action, for example). Revise the supervisory checklist accordingly. Use it during future visits to help health staff monitor their activities and progress towards an improved system.

During the visit, use a checklist to monitor how well health staff are carrying out the recommended surveillance functions. For example, a district surveillance officer visiting a health facility for a supervisory visit should verify the following:

<b>Identify and register cases</b>	<p>Check in the clinic register to see if the diagnoses correspond to the recommended case definition.</p> <p>Check the register to see if all the columns in the registry are filled out correctly.</p>
<b>Confirm cases</b>	<p>Compare the laboratory records for priority diseases with the number of cases seen in the clinic for the same period of time. For example, compare the number of positive malaria slides with the reported number of hospitalized malaria cases.</p>
<b>Reporting</b>	<p>Ask to see copies of the most recent reports for the most recent reporting period. Compare the number of cases of priority diseases that were reported with the number recorded in the register.</p> <p>Check the date on which the case report was sent against the date recommended for sending the report.</p> <p>Check the reports to make sure they are complete and accurate.</p>
<b>Review and analyse data</b>	<p>Verify that trend lines are prepared and kept up-to-date for priority diseases. Ask to see the “Health Facility Analysis Book,” if these are in use in your district. Look to see if the trend lines for selected diseases are up to date.</p>
<b>Preparedness</b>	<p>Look at the stocks of emergency drugs, supplies and protective clothing to be sure there is an adequate supply.</p>

**Note:** A sample supervisory checklist is in Annex 8H at the end of this section. 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.

### **8.3.4 Conduct supervisory visits**

Begin regularly scheduled supervision in the district to ensure that:

- Appropriate supplies (e.g. forms, job aids) and required standard case definitions/ guidelines are available.
- Health staff 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 (disease of public health importance) and case-based diseases (epidemic-prone diseases, and diseases targeted for eradication or elimination).
- 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.

Make sure during the visit to:

1. Provide feedback to health staff. Let the health staff know what is working well and what is not working. Also give feedback on how the data reported previously was used to detect outbreaks and take action to reduce illness, mortality and disability in the district. If improvements are needed, discuss solutions with the staff.
2. Provide on-the-job training as needed if a problem is identified. For example, during a review of the analysis workbook, the supervisor noted that case fatality rates were not calculated correctly. The supervisor met with the health staff who do the calculation and reviewed the steps for calculating the rate with the staff.
3. Follow up on any request for assistance such as for emergency response equipment or supplies.
4. If a solution to a pre-existing problem was identified in a previous visit, check to see how well the solution has been implemented. Find out if problems are still occurring and modify the solution if necessary.

### **8.3.5 Write a report of the supervisory visit**

Put in the report achievements that were recognized during the visit. Also state the actions that were planned with the health staff and any requests for additional resources, funds or special problems.

### **8.3.6 Use supervisory visits to improve surveillance activities in the district**

Visits of surveillance supervisors and regional or provincial disease control programs are good opportunities to discuss and improve disease control in your district. For example, if a national malaria control person visits the district, you might discuss why the inpatient malaria deaths have not been declining. You can ask about additional ideas or resources that the malaria control program can provide.

## **8.4 Evaluate performance of surveillance and response system**

The purpose of the evaluation is to assess the effectiveness of the surveillance and response system in terms of timeliness quality of data, preparedness, case management, overall performance and using the indicators to identify gaps or areas that could be strengthened.

Depending on the development status of surveillance in a district, select indicators for evaluation that will provide information that relates to the district's priorities and objectives for the year.

### **8.4.1 Compile and organize monitoring data and other results**

The *district health office* should summarize the surveillance data received from all health facilities in the catchment area, and submit the compiled report to the province or national level as appropriate. The submission of the report should not be delayed until reports from all health facilities are received. Submit all reports received on time. Late reports may be submitted when they arrive. Follow up with health facilities who did not report or who consistently provide late reports.

Help the health facility to solve any problems that prevent them from submitting their summary reports on time. Provide feedback to health facilities about the indicator results on a regular basis. Feedback is a positive tool for motivating health staff to provide information on time and contribute to the national system.

The ***provincial health department*** should compile the surveillance data received from all districts in the province and submit the report to the national level. Submission of the report should not be delayed until the last report is collected. The province should compile and submit the available reports on time. The late reports may be sent separately when they are received.

The ***national level*** should compile the surveillance data received from all the provinces (or regions). The national level should look for epidemics that were not identified by the districts. Follow up with areas where reporting continues to be unreliable or does not happen at all. Support the provinces in providing assistance to the districts when they evaluate the measurements and take action to improve the situation. Provide feedback to each of the levels about the national, provincial, district and health facility levels.

Use a monitoring chart such as the one on the next page to monitor performance of the indicators at your level. Share these results with the staff in your catchment level. Acknowledge successes and help health staff to maintain the positive progress. When problems occur, talk together about what is causing the problem and how it can be solved. Seek assistance of the next level as needed for obtaining additional help or resources.

Gather data from several sources. For example:

- Review the objectives for the year listed in the district's annual plan for improving surveillance and response.
- Gather the monthly summaries of cases and deaths reported to the district, spot maps, and other analysis results performed by the district.
- Collect any results from special surveys or studies that were done in the district over the last year.
- Include case investigation forms and reports of outbreak response activities that took place in the district.
- Gather summary information from the community and also from health staff.

### **8.4.2 Analyze results**

As you evaluate the summary data for the year, some items to decide on are:

- Were the 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?

### **8.4.3 Identify problems and their causes**

If problems occurred, and the district did not meet an expected target, or reach a desired level of performance with any indicator, find out what caused the difference between what was planned and what actually occurred. If a problem is identified, talk with the district team and health facility staff to find out the possible causes of the problem.

### **8.4.4 Update plans for improvements to surveillance and response**

Include in the district plan successful activities that should continue. Also include feasible solutions selected as a result of analysis of this year's annual evaluation. Plan to implement the solution. For example:

1. State the new activity and its objectives.
2. Specify the personnel who will carry out the activity.
3. Estimate the cost of the activity (if any).
4. Develop a timetable for the activity. Define the sequence of activities in logical order.
5. Specify the logistics for the new activity (equipment, personnel, transportation, resource allocation).

#### **8.4.5 Provide feedback to health facilities about the evaluation**

Provide a report and give feedback to health facilities and others in the district about the results of the evaluation activity. Mention in the feedback report:

- What the objectives were for the year?
- What was actually achieved?
- What were likely reasons for any differences between what was planned and what was achieved?
- Recommended solutions and prioritized activities for improving surveillance and response in the district.

## Annexes to Section 8

- ANNEX 8A** IDSR core indicators for the health facility level
- ANNEX 8B** Chart for monitoring performance of IDSR indicators at health facility level
- ANNEX 8C** IDSR core indicators for the district level
- ANNEX 8D** IHR core indicators for monitoring the implementation at district level
- ANNEX 8E** IDSR core indicators for the provincial level
- ANNEX 8F** IDSR core indicators for the national level
- ANNEX 8G** Sample form for recording timeliness and completeness of monthly reporting from the health facility to the district level
- ANNEX 8H** Checklist for supervising surveillance and response activities at the health facility
- ANNEX 8I** Monitoring chart for use of indicators at district, regional or provincial level



## ANNEX 8A

## Core indicators for the health facility level

Indicator	Purpose	Numerator	Denominator	Source of information	Target
1 Proportion of complete <sup>6</sup> surveillance reports submitted on time to the district	Measures the practice of health facilities in submitting timely surveillance reports to the next level	Number of complete surveillance reports submitted on time to the district	Number of expected surveillance reports from the health facility	Monitoring chart for timely submission of report <sup>7</sup>	80%
2 Proportion of priority diseases for which a current line graph <sup>8</sup> is available. <sup>9</sup>	Measures the practice and capacity to analyze surveillance data	Number of priority diseases for which a current line graph is available.	Number of priority diseases	The activity checklist for the “in charge” at the health facility and the IDSR summary reporting forms from the health facility	80%
3 Proportion of cases of diseases targeted for elimination, eradication and any other disease selected for case-based surveillance reported with case-based forms or line lists.	Measures reporting of surveillance data with detailed information to use for further analysis	Number of diseases selected for case-based surveillance reported with case-based forms or line list	Total number of cases of diseases selected for case-based surveillance that occurred in the health facility	Routine summary reports and case-based or line listing reports	80%
4 Proportion of suspected outbreaks of epidemic prone disease notified to the district level within 2 days of surpassing the alert threshold	Measures early detection and timely reporting of outbreaks	Number of suspected outbreaks of epidemic prone diseases notified to the district within 2 days of surpassing the alert threshold	Total number of suspected outbreaks of epidemic prone diseases in the health facility	Health facility log of suspected outbreaks and rumors	80%
5 Case fatality rate for each epidemic prone disease reported	Measures quality of case management	Number of deaths from each of the epidemic-prone diseases	Number of cases from the same epidemic-prone disease	Routine reports and outbreak investigation reports	Depends on disease

<sup>6</sup> “Complete” in this indicator means that all possible cells in the reporting forms are filled in.

<sup>7</sup> A chart for monitoring health facility performance is on the next page.

<sup>8</sup> The national IDSR team should define the list of diseases for which a line graph should be kept at the health facility level. AFRO recommends that at a minimum, health facilities maintain current line graphs for 1) weekly trend analysis of cerebrospinal meningitis, particularly in the meningitis belt countries, 2) monthly malaria inpatient cases and deaths in children under 5 years of age and 3) trends for malaria in children under 5 years of age.

<sup>9</sup> “Current” in this indicators means that the line graph display should reflect data within the past three months from the day of the assessment.

## ANNEX 8B Chart for monitoring performance of IDSR indicators at health facility level

### Instructions:

Use this chart to keep track of the health facility's performance with those indicators relevant to health facility performance for IDSR.

Each month, summarize and compile the health facility's summary data for priority diseases. Report the summary data to the district level on time. Record on this chart the indicator results. Share this chart with the district supervisor during his or her visit to the health facility, or bring it to the quarterly district meeting.

Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Proportion of complete surveillance reports submitted on time to the district												
Proportion of priority diseases for which a current line graph is available												
Proportion of cases diseases selected for case-based surveillance, which were reported to the district using case-based or line listing forms												
Proportion of suspected outbreaks of epidemic prone diseases notified to the district level within 2 days of surpassing the epidemic threshold												
Case fatality and attack rate for each epidemic-prone disease reported												
Reply YES or NO to the following checklist items												
Were surveillance reports submitted on time?												
Are the trend graphs up-to-date?												
If YES, have you observed any changes in the trends?												
If YES, has the threshold been crossed?												
If YES, have you taken action to alert the district?												

## ANNEX 8C

## Core indicators for the district level

Indicator	Purpose	Numerator	Denominator	Source of information	Target
1 Proportion of health facilities submitting surveillance reports on time to the district	Measures the timeliness of submission of surveillance reports	Number of health facilities that submitted surveillance reports on time to the district	Number of health facilities in the district	Monitoring chart for timely submission of report <sup>10</sup>	80%
2 Proportion of cases of diseases targeted for elimination, eradication and any diseases selected for case-based surveillance reported with case-based forms or line lists.	Measures reporting of surveillance data with detailed information to use for further analysis	Number of diseases targeted for elimination, eradication, and any diseases selected for case-based surveillance reported with case-based forms or line list	Total number of cases of diseases selected for case-based surveillance that occurred in the district	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	80%
3 Proportion of suspected outbreaks of epidemic-prone diseases notified to the provincial level within 2 days or surpassing the epidemic threshold	Measures use of data and thresholds for early detection of outbreaks and timely reporting at the local level	Number of suspected outbreaks of epidemic-prone diseases notified to the province within 2 days of surpassing the epidemic threshold	Number of suspected outbreaks of epidemic-prone diseases in the district	Log of suspected outbreaks and rumors District analysis book or other routine analysis tool	80%
4 Proportion of priority diseases for which a current line graph <sup>11</sup> is available. <sup>12</sup>	Measures the practice and capacity of the district health management team to analyze surveillance data	Number of selected diseases (at least malaria and meningococcal meningitis in districts at high risk for meningitis) for which a line graph is available and current	Total number of selected diseases with a line graph (at least malaria and meningococcal meningitis if district is at high risk for meningitis)	Indicator monitoring chart District analysis book	80%
5 Proportion of health facilities that have current trend analysis	Measures the practice and capacity of the health facility team to	Number of health facilities that have current trend analyses for selected	Total number of health facilities in the district	Supervisory report Health facility data analysis tools	80%

<sup>10</sup> A chart for monitoring district indicator performance is in Annex 5.

<sup>11</sup> The national IDSR team should define the list of diseases for which a line graph should be kept at the health facility level. AFRO recommends that at a minimum, health facilities maintain current line graphs for 1) weekly trend analysis of cerebrospinal meningitis, particularly in the meningitis belt countries, 2) monthly malaria inpatient cases and deaths in children under 5 years of age and 3) trends for malaria in children under 5 years of age.

<sup>12</sup> “Current” in this indicators means that the line graph display should reflect data within the past three months from the day of the assessment.

<b>Indicator</b>	<b>Purpose</b>	<b>Numerator</b>	<b>Denominator</b>	<b>Source of information</b>	<b>Target</b>
(line graphs) for selected priority diseases	analyze surveillance data	priority diseases			
6 Proportion of reports of investigated outbreaks that include analyzed case-based data	Measures availability of additional variables for further analysis	Number of outbreak investigation reports that include case-based data	Total number of outbreak investigation reports conducted in the district	Investigation report Epidemic curve Map Person analysis table Line lists or case-based reporting forms	80%
7 Proportion of investigated outbreaks with laboratory results	Measures capacity of laboratory to confirm diagnosis and involvement of laboratory in surveillance activities	Number of investigated outbreaks with laboratory results in a given time period	Total number of investigated outbreaks that occurred in a given time period	Log of suspected outbreaks and rumours Laboratory reports Outbreak investigation reports	80%
8 Proportion of confirmed outbreaks with a nationally recommended public health response	Measures capacity of the district to respond to outbreaks	Number of confirmed outbreaks with a nationally recommended response	Number of confirmed outbreaks in the district	Log of suspected outbreaks and rumors Outbreak investigation reports Supervisory reports	80%
9 Case fatality rates for outbreaks of priority diseases	Measures quality of case management	Number of deaths from each of the outbreak diseases	Number of cases from the same outbreak due to that disease	Routine summary report Outbreak investigation report	Will vary; depends on disease
10 Attack rate for each outbreak of a priority disease	Helps to identify the population at risk and efficacy of the intervention	Number of new cases of an epidemic-prone disease that occurred during an outbreak	Number of population at risk during the outbreak	Demographic data about the district Outbreak investigation report with line lists or case-based forms	Will vary; depends on disease

## ANNEX 8D IHR core indicators for monitoring the implementation at district level

IHR Indicator	Purpose	Numerator	Denominator	Source of information	Target
1. Proportion of Hospitals with Infection Prevention and Control (IPC) requirements established	Measures the practice and the Capacity of the hospital to apply infection control requirements	Number of Hospitals that reported having established Infection Prevention and Control (IPC) requirements established	C01. Total number of Hospitals in the District	Routine summary reports and supervisory reports	80%
2. Proportion of districts with Public health risks and resources mapped	Measures the practice and the Capacity of the district to conduct mapping of available resources and health risks	Number of districts that reported having conducted Public health risks and resources mapping	C02. Total number of districts targeted for public health risks and resources mapping	Risk assessment and mapping reports and supervisory reports	80%
3. Proportion of districts reporting information using Event-based surveillance	Measures the practice and the capacity of the district submitting surveillance reports using event-based surveillance methods	Number of districts reporting information using event-based surveillance methods	C03. Total number of districts	Routine summary reports and supervisory reports	80%
4. Proportion of districts provided by national authorities with laws or legal instruments sufficient for implementation of obligations under IHR	Measures use of laws or instruments to facilitate the implementation of IHR obligations	Number of districts reporting having been provided with laws or legal instruments	C04. Total number of districts	Routine summary reports and supervisory reports	80%

IHR Indicator	Purpose	Numerator	Denominator	Source of information	Target
5. Proportion of districts with mechanism for the coordination of relevant sectors in the implementation of IHR established	Measures the practice and the capacity of the district to coordinate IHR implementation	C05. Number of districts which established mechanism for the coordination of relevant sectors in the implementation of IHR	C05. Total number of districts	Meetings reports and supervisory reports	80%

## ANNEX 8E

## Core indicators for the provincial level

Indicator	Purpose	Numerator	Denominator	Source of information	Target
1 Proportion of monthly surveillance reports submitted from the district to the province on time in the last 3 months	Measures the practice of timely submission of surveillance data	Number of districts that submitted IDSR reports on time to the province	Total number of districts that report to the province	Monitoring chart Routine summary reports	80%
2 Proportion of cases of diseases targeted for elimination, eradication and any diseases selected for case-based surveillance reported with case-based forms or line lists.	Measures reporting of surveillance data with detailed information to use for further analysis	Number of diseases targeted for elimination, eradication, and any diseases selected for case-based surveillance reported with case-based forms or line list	Number of districts that submitted case-based surveillance reports on time to the province	Routine summary reports and case-based or line listing reports	80%
3 Proportion of suspected outbreaks of epidemic prone disease notified to the provincial level within 2 days of surpassing the alert threshold	Measures early detection and timely reporting of outbreaks	Number of suspected outbreaks of epidemic prone diseases notified to the province within 2 days of surpassing the alert threshold	Total number of suspected outbreaks of epidemic prone diseases in the province	Log of suspected outbreaks and rumors Routine summary reports	80%
4 Proportion of districts that maintain a current line graph <sup>13</sup> for selected priority diseases. <sup>14</sup>	Measures the practice and capacity to analyze surveillance data	Number of districts for which a current line graph is available	Number of districts	Supervisory reports District analysis book	80%
5 Proportion of reports of investigated outbreaks that includes analyzed case-based data	Measures availability of additional variables for further analysis including possible risk factors involved	Number of district outbreak investigation reports that include epi curve, mapping, personal tables and case-based forms or line lists	Number of district outbreak investigation reports	Investigation reports Routine summary reports	80%

<sup>13</sup> The national IDSR team should define the list of diseases for which a line graph should be kept at the health facility level. AFRO recommends that at a minimum, health facilities maintain current line graphs for 1) weekly trend analysis of cerebrospinal meningitis, particularly in the meningitis belt countries, 2) monthly malaria inpatient cases and deaths in children under 5 years of age and 3) trends of malaria in children under 5 years of age.

<sup>14</sup> “Current” in this indicators means that the line graph display should reflect data within the past three months from the day of the assessment.

<b>Indicator</b>	<b>Purpose</b>	<b>Numerator</b>	<b>Denominator</b>	<b>Source of information</b>	<b>Target</b>
6 Proportion of investigated outbreaks with laboratory results	Measures capacity of the laboratory to confirm the diagnosis and involvement of laboratory in the surveillance activities	Number of investigated outbreaks with laboratory results	Number of investigated outbreaks in the province	Outbreak investigation reports Laboratory reports Routine summary reports Log of outbreaks and rumours	80%
7 Proportion of confirmed outbreaks with a nationally recommended public health response	Measures capacity of the province to respond to outbreaks	Number of confirmed outbreaks with a nationally recommended public health response	Number of confirmed outbreaks	Log of suspected outbreaks and rumors Outbreak investigation reports Supervisory visit reports	80%
8 Case fatality rate for each epidemic prone disease reported	Measures quality of case management	Number of deaths from each of the epidemic-prone diseases	Number of cases from the same epidemic-prone disease	Routine reports and outbreak investigation reports	Depends on disease
9 Attack rate for each outbreak of a priority disease	Helps to identify the population at risk and efficacy of the intervention	Number of new cases of an epidemic-prone disease that occurred during an outbreak	Number of population at risk during the outbreak	Demographic data about the province Outbreak investigation report with line lists or case-based forms	Will vary; depends on disease

## ANNEX 8F

## Core indicators for the national level

Indicator	Purpose	Numerator	Denominator	Source of information	Target
1 Proportion of monthly IDSR reports submitted from the province to the national level on time in the last 3 months	Measures the practice of timely submission of surveillance data	Number of provinces that submitted IDSR reports on time to the national level	Total number of provinces that report to the national level	Monitoring chart Routine summary reports	80%
2 Proportion of health facilities submitting surveillance reports on time to the district	Measures practice of timely submission of surveillance data from health facilities to district	Number of health facilities submitting reports on time to the districts	Number of districts	Summary reporting forms	80%
3 Proportion of cases of diseases targeted for elimination, eradication and any diseases selected for case-based surveillance reported with case-based forms or line lists.	Measures reporting of surveillance data with detailed information to use for further analysis	Number of diseases targeted for elimination, eradication, and any diseases selected for case-based surveillance reported with case-based forms or line list	Number of diseases targeted for elimination, eradication and any other disease selected for case-based surveillance	Routine summary reports and case-based or line listing reports	80%
4 Proportion of suspected outbreaks of epidemic prone disease notified to the national level within 2 days of surpassing the alert threshold	Measures early detection and timely reporting of outbreaks	Number of suspected outbreaks of epidemic prone diseases notified to the national level within 2 days of surpassing the alert threshold	Total number of suspected outbreaks of epidemic prone diseases	Log of suspected outbreaks and rumors Routine summary reports	80%
5 Proportion of districts in which a current line graph <sup>15</sup> is available <sup>16</sup> for selected priority diseases	Measures the practice and capacity to analyze surveillance data	Number of priority diseases for which a current line graph is available in the districts.	Number of districts	Supervisory reports District analysis book	80%

<sup>15</sup> The national IDSR team should define the list of diseases for which a line graph should be kept at the health facility level. AFRO recommends that at a minimum, health facilities maintain current line graphs for 1) weekly trend analysis of cerebrospinal meningitis, particularly in the meningitis belt countries, 2) monthly malaria inpatient cases and deaths in children under 5 years of age and 3) trend analysis of malaria in children under 5 years of age.

<sup>16</sup> “Current” in this indicators means that the line graph display should reflect data within the past three months from the day of the assessment.

Indicator	Purpose	Numerator	Denominator	Source of information	Target
6 Proportion of reports of investigated outbreaks that includes analyzed case-based data	Measures availability of additional variables for further analysis including possible risk factors involved	Number of outbreak investigation reports that include epi curve, mapping, personal tables and case-based forms or line lists	Number of outbreaks investigation reports	Investigation reports Routine summary reports	80%
7 Proportion of investigated outbreaks with laboratory results	Measures capacity of the laboratory to confirm the diagnosis and involvement of laboratory in the surveillance activities	Number of investigated outbreaks with laboratory results	Number of investigated outbreaks	Outbreak investigation reports Laboratory reports Routine summary reports Log of outbreaks and rumours	80%
8 Proportion of confirmed outbreaks with a nationally recommended public health response	Measures capacity of the province to respond to outbreaks	Number of confirmed outbreaks with a nationally recommended public health response	Number of confirmed outbreaks	Log of suspected outbreaks and rumors Outbreak investigation reports Supervisory visit reports	80%
9 Case fatality rate for each epidemic prone disease reported	Measures quality of case management	Number of deaths from each of the epidemic-prone diseases	Number of cases from the same epidemic-prone disease	Routine reports and outbreak investigation reports	Depends on disease
10 Attack rate for each outbreak of a priority disease	Helps to identify the population at risk and efficacy of the intervention	Number of new cases of an epidemic-prone disease that occurred during an outbreak	Number of population at risk during the outbreak	Demographic data about the district Outbreak investigation report with line lists or case-based forms	Will vary; depends on disease
11 The number of epidemics detected at the national level and that were missed by the district level	Checks the capacity of the entire health system to detect epidemics and shows that the national level is checking whether districts are observing trends	Number of epidemics detected by the regional or national level from analyzing district specific data	Total number of epidemics reported by the districts	District summary reporting forms District analysis book Supervisory reports Standard surveillance reports	Zero

<b>Indicator</b>	<b>Purpose</b>	<b>Numerator</b>	<b>Denominator</b>	<b>Source of information</b>	<b>Target</b>
12 Proportion of districts that report laboratory data for diseases under surveillance	Measures if districts are collecting and reporting lab data to higher level	Number of district labs that submitted monthly data to higher level	Total number of district labs	National log book of reports received	
13 Proportion of district laboratories that received at least one supervisory visit with written feedback by provincial/national level	Measures the support supervision district labs receive to help to solve problems	Number of district laboratories that received at least one supervision activity	Total number of district laboratories	Reports of the District Lab Focal Person -this may require field visits	
14 Proportion of provincial laboratories reporting analysed lab data to the national lab	Measures how well provincial levels analyse district laboratory data	Number of provincial laboratories analysing and reporting to NPHL monthly	Total number of provincial laboratories	NPHL	

## ANNEX 8G Sample form for recording timeliness and completeness of monthly reporting from the health facility to the district

### Legend

T = arrived on time

L = arrived late

NR=report not received

Country \_\_\_\_\_ District \_\_\_\_\_ Year \_\_\_\_\_

Name of health Facility	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total number of reports expected (N)												
Total reports sent on time (T)												
Total reports sent late (L)												
Total number of reports not received (W)												
Timeliness of the reports = $100 * T / N$												
Completeness of reporting = $100 * (N-W) / N$												

\*The timeliness and completeness are expressed as percentages (%). When the surveillance system is good, the rates for timeliness and completeness should approach 100%. This table allows for monitoring the progress of these two indicators in the district so that action can be taken to improve timeliness for each health facility in the district.

## ANNEX 8H Checklist for supervising surveillance and response activities at the health facility

Health Facility: \_\_\_\_\_ Date of Supervisory Visit: \_\_\_\_\_

ACTIVITY	SUPERVISORY QUESTION	ANSWER	COMMENT (What Caused Problem)
<b>Data collection to identify Suspected Cases within health facilities</b>	1. How often do you collect information from the community about reports of suspected cases or deaths due to a priority disease or condition?	_____	
<b>Register cases</b>	1. Are diagnoses of cases of priority diseases recorded in the clinic register according to the standard case definition?	Yes No	
<b>Report</b>	1. Do health staff use a standard case definition to report the suspected cases and outbreaks?  2. Do you record information about immediately notifiable diseases on a case form or line list?	Yes No  Yes No	
<b>Analyze and Interpret</b>	1. Do you plot the numbers of cases and deaths for each priority disease on a graph? (Ask to see the health facility's analysis book. Look to see if the trend lines are up-to date.)  2. Do you plot the distribution of cases on a map?	Yes No  Yes No	
<b>Investigate and Confirm Reported Cases and Outbreaks</b>	1. If an epidemic-prone disease was suspected, was it reported immediately to the district office?  2. For the cases of priority diseases needing laboratory tests seen since the last supervisory visit, how many had laboratory results?  3. Are appropriate supplies available or set aside for collecting laboratory specimens during an urgent situation and show me the supply?	Yes No  Number of results obtained: _____ Number of expected cases seen: _____  Yes No	

ACTIVITY	SUPERVISORY QUESTION	ANSWER	COMMENT (What Caused Problem)
<b>Respond</b>	1. Are appropriate supplies available for responding to a confirmed case or outbreak ( <i>for example, immunization supplies and vaccine, ORS, antibiotics, and so on</i> )?  2. Please show me the supplies for carrying out a recommended response.  3. Who is the outbreak coordinator for this facility?  4. How often do you provide information and training in outbreak response to the staff of this facility?	Yes No  Yes No  Name: _____ Designation: _____  Training is done _____	
<b>Provide Feedback</b>	1. How often do you report information to the community?  2. Do you receive the latest bulletin from the ( <i>central, subnational</i> ) level?	Report it _____	
<b>Evaluate and Improve the System</b>	1. Were the last 3 routine monthly reports sent to the district office?  2. Were the last 3 routine monthly reports sent on time?	Yes No  Yes No	
<b>Epidemic Preparedness</b>	1. What precautions do health staff (including laboratory staff) take routinely with all patients regardless of the patients' infection status?  2. How do you estimate the number of supplies to set aside for use during an emergency situation?	Minimum level of standard precautions: _____  How supplies are estimated: _____	

## ANNEX 8I Monitoring chart for use of indicators at district, regional or provincial level

*District:* \_\_\_\_\_ *Region/Province:* \_\_\_\_\_ *Year:* \_\_\_\_\_

*Note: Please compute the actual percentage for each cell*

Indicator	Indicator results as a percentage												
	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Proportion of health facilities submitting surveillance reports on time to the district													
Proportion of suspected outbreaks of epidemic prone diseases notified to the next higher level within 2 days of surpassing the alert threshold													
Proportion of cases of diseases targeted for elimination, eradication and any other diseases selected for case-based surveillance which were reported to the district using case-based or line-listing forms													
Proportion of reports of investigated outbreaks that included analyzed case-based data.													
Proportion of districts that have current trend analysis (line graphs) for selected priority diseases.													
Proportion of health facilities that have current trend analysis (line graphs) for selected priority diseases													
Proportion of outbreaks with laboratory results													
Proportion of confirmed outbreaks with recommended response													
Case fatality rate for each epidemic-prone disease (priority disease) reported													
Attack rate for each epidemic-prone disease reported													
(for national level) The number of epidemics detected at the national level and that were missed by the district level													
Have you calculated the indicators this month?													
If YES, have you used the results to take action correct any problems?													



## Section 9

### Summary guidelines for specific priority diseases and conditions

This section provides disease specific guidance to:

- Take action to respond to alert and epidemic thresholds for specific diseases
- Identify surveillance goals and objectives for each priority disease
- Identify surveillance data to analyze and interpret for each priority disease
- Prepare to use the district analysis workbook



The pages in this section provide summary guidelines for each of the priority diseases targeted for surveillance by WHO/AFRO. This section is intended as a rapid reference only. When further information is required, please use the detailed references listed in the summary. The table below shows how information is organized in this section.

*In adapting these guidelines each country will create a list of priority diseases depending on the local epidemiological situation.* The list of priority diseases could vary from country to country depending on national policy and resources.

### Priority disease or event for integrated disease surveillance

<p><b>Background</b></p> <p>In this section, you will find general information about:</p> <ul style="list-style-type: none"> <li>• The disease or event, the causative agent, geographic range affected, and other epidemiologic information.</li> <li>• Transmission routes such as person-to-person, unprotected contact with infectious body fluids or contaminated materials, vector-borne, and so on.</li> <li>• 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.</li> <li>• General and specific risk factors in African countries.</li> <li>• Any additional background information that might serve the district surveillance team.</li> </ul>
<p><b>Surveillance goal</b></p> <p>This section states how the surveillance information is used for action.</p>
<p><b>Standard case definition</b></p> <p><b>Suspected case:</b> A definition is provided for suspecting a case or outbreak of this disease or event.  <b>Probable case:</b> A definition is provided for a suspected case with epidemiological link to a confirm case or an outbreak.  <b>Confirmed case:</b> A definition is provided for classifying a case as confirmed through laboratory diagnostic testing.</p>
<p><b>Respond to alert threshold</b></p> <p>Some diseases or events have program specific thresholds for alerting the health facility or district to a potential problem.  <i>For epidemic-prone diseases, diseases targeted for elimination or eradication, or public health events of international concern,</i> a single case is a suspected outbreak and requires immediate reporting followed by patient treatment, collection of specimens for case confirmation, and investigation of the case to determine the risk factors and potential interventions.  <i>For other priority diseases of public health importance,</i> an outbreak or event is suspected when there is any unusual cluster, pattern, or increase in the number of cases when compared with previous time periods. This should prompt a response such as investigating what might have caused the unusual events. If laboratory confirmation is indicated, specimens should be collected for laboratory confirmation.</p>
<p><b>Respond to action threshold</b></p> <p><i>For epidemic-prone diseases, diseases targeted for elimination or eradication, or public health events of international concern,</i> a confirmed case should trigger a response such as conducting an emergency immunization activity, enhancing access to safe drinking water, community education campaigns, and improving case management.  <i>For other priority diseases of public health importance,</i> a confirmed outbreak should prompt an appropriate response such as improving coverage for specified immunizations, strengthening case management, providing information, education and communication about preventing and controlling the disease, and so on.</p>
<p><b>Analyze and interpret data</b></p> <p>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).</p>
<p><b>Laboratory confirmation</b></p> <p>In this section 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.</p>
<p><b>Reference</b></p> <p>Appropriate references for further information stated for each disease. Most are available from the WHO website.</p>

# Acute haemorrhagic fever syndrome

## Background

Acute haemorrhagic fever syndromes can be attributable to Ebola and Marburg viral diseases (filoviridae); Lassa fever (arenaviridae), Rift Valley fever (RVF) and Crimean-Congo haemorrhagic fever (CCHF) (bunyaviridae); dengue (dengue haemorrhagic fever (DHF)) and yellow fever (flaviviridae); and other viral, bacterial or rickettsial diseases with potential to produce epidemics.

All cases of acute viral haemorrhagic fever syndrome whether single or in clusters, should be immediately notified without waiting for the causal agent to be identified.

## Surveillance goal

Early detection of acute viral haemorrhagic fever syndrome cases and outbreaks, rapid investigation, and early laboratory verification of the aetiology of all suspected cases.

Investigation of all suspected cases with contact tracing.

During epidemics, most infected patients do not show haemorrhagic symptoms and a specific case definition according to the suspected or confirmed disease should be used (e.g. case definitions for Ebola-Marburg, CCHF, RVF, Lassa, DHF, and yellow fever).

## Standard case definition

**Suspected case:** Acute onset of fever of less than 3 weeks duration in a severely ill patient AND any 2 of the following; haemorrhagic or purpuric rash; epistaxis (nose bleed); haematemesis (blood in vomit); haemoptysis (blood in sputum); blood in stool; other haemorrhagic symptoms and no known predisposing factors for haemorrhagic manifestations.

**Confirmed case:** A suspected case with laboratory confirmation or epidemiologic link to confirmed cases or outbreak.

**Note:** *During an outbreak, case definitions may be changed to correspond to the local event.*

## Respond to alert threshold

### If a single case is suspected:

- Report case-based information immediately to the appropriate levels.
- Suspected cases should be isolated from other patients and strict barrier nursing techniques implemented. Standard precautions should be enhanced throughout the health care setting.
- Treat and manage the patient with supportive care.
- Collect specimen safely to confirm the case.
- Conduct case-contact follow-up and active case search for additional cases.

## Acute haemorrhagic fever syndrome

<b>Respond to action threshold</b>	
<p><b>If a single case is confirmed:</b></p> <ul style="list-style-type: none"> <li>• Maintain strict VHF infection control practices* throughout the outbreak.</li> <li>• 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 and during funerals.</li> <li>• Conduct case-contact follow-up and active searches for additional cases that may not come to the health care setting.</li> <li>• Request additional help from other levels as needed.</li> <li>• Establish isolation ward to handle additional cases that may come to the health centre.</li> </ul>	
<b>Analyze and interpret data</b>	
<p><b>Person:</b> 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><b>Time:</b> Graph cases and deaths daily/weekly. Construct an epidemic curve during the outbreak.</p> <p><b>Place:</b> Map locations of cases' households and work sites.</p>	
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<p>Presence of IgM antibodies against Ebola, Marburg, CCHF, Lassa or West Nile Fever</p> <p style="text-align: center;"><i>or</i></p> <p>Presence of Ebola in post-mortem skin necropsy</p>
<b>Specimen</b>	<p><i>For ELISA:</i> Whole blood, serum or plasma</p> <p><i>For PCR:</i> Whole blood or blood clot, serum/plasma or tissue</p> <p><i>For immunohisto-chemistry:</i> Skin or tissue specimens from <i>fatal</i> cases</p>
<b>When to collect the specimen</b>	<p>Collect specimen from the first suspected case.</p> <p>If more than one suspected case, collect until specimens have been collected from 5 to 10 suspected cases.</p>

## Acute haemorrhagic fever syndrome

<p><b>How to prepare, store, and transport the specimen</b></p>	<p>HANDLE AND TRANSPORT SPECIMENS FROM SUSPECTED VHF PATIENTS WITH EXTREME CAUTION. WEAR PROTECTIVE CLOTHING AND USE BARRIER PRECAUTIONS.</p> <p><i>For ELISA or PCR:</i></p> <ul style="list-style-type: none"> <li>• Refrigerate serum or clot</li> <li>• Freeze (-20C or colder) tissue specimens for virus isolation</li> </ul> <p><i>For Immunohistochemistry:</i></p> <ul style="list-style-type: none"> <li>• Fix skin snip specimen in formalin. Specimen can be stored up to 6 weeks. The specimen is not infectious once it is in formalin.</li> <li>• Store at room temperature. Formalin-fixed specimens may be transported at room temperature.</li> </ul>
<p><b>Results</b></p>	<p>Diagnostic services for VHF are not routinely available. Advance arrangements are usually required for VHF diagnostic services. Contact the appropriate National authority or WHO.</p>
<p><b>Reference</b></p>	
<ul style="list-style-type: none"> <li>• <i>Interim Infection Control Recommendations for Care of Patients with Suspected or Confirmed Filovirus (Ebola, Marburg) Hemorrhagic Fever.</i> BDP/EPR/WHO, Geneva March 2008</li> <li>• <i>Infection control for VHF in the African health care setting,</i> WHO, 1998. WHO/EMC</li> <li>• <i>WHO Recommended Surveillance Standards</i> WHO/CDS/CSR/ISR/99.2</li> <li>• <i>WHO recommended Guidelines for Epidemic Preparedness and Response: Ebola Haemorrhagic Fever (EHF).</i> WO/EMC/DIS/97.7.</li> <li>• <i>Infection Control for Viral Hemorrhagic Fevers in the African Health Care Setting</i> WHO/EMC/ESR/98.2</li> <li>• <i>Viral Infections of Humans; Epidemiology and Control.</i> 1989. Evans, A.S. (ed). Plenum Medical Book Company, New York</li> </ul>	

# Acute viral hepatitis

## Background

### Viral hepatitis A and viral hepatitis E

- Enterically transmitted HAV and HEV are a worldwide problem.
- Common source epidemics have been related to contaminated water and to contamination via infected food handlers.
- In general, both HAV and HEV are self-limiting viral infections; case fatality is normally low (0.1 – 0.3%). Women in the third trimester of pregnancy are especially susceptible to fulminant HEV disease.
- Both HAV and HEV are transmitted via the faecal-oral route.
- Prevention and control measures for hepatitis A and hepatitis E include adequate supplies of safe-drinking water and improvement of sanitary and hygienic practices to eliminate faecal contamination of food and water.

### Viral hepatitis B and viral hepatitis C:

- Estimates indicate that worldwide, there are 350 million carriers of hepatitis B virus and 170 million carriers of hepatitis C virus.
- Hepatitis B and C epidemics are uncommon.
- Chronic infection and severe sequelae occur with hepatitis B – an estimated 15% to 25% of chronically infected persons will die prematurely of either cirrhosis or hepatocellular carcinoma. Chronic infection is common in hepatitis C and 5% to 20% of those infected with HCV may develop cirrhosis. There seems to be a connection between HCV infection and hepatocellular carcinoma.
- Hepatitis B is transmitted by percutaneous or permucosal exposure to blood or other infectious body fluids. Major modes of transmission include sexual contact with an infected person, perinatal transmission from mother to infant, shared needles or syringes among injecting drug users, household contact (e.g., communally used razors and toothbrushes) and nosocomial exposure (transfusions, unsafe injection practices). In most countries where HBV is highly endemic, most infections occur during infancy and early childhood.
- Hepatitis C is transmitted by parenteral exposure to blood and plasma derivatives. It is found in highest concentrations in blood. The major causes of HCV infection worldwide are use of unscreened blood transfusions and re-use of needles and syringes that have not been adequately sterilised.
- Prevention and control measures for hepatitis B and C include transfusion safety, safe and appropriate use of injections and vaccination (hepatitis B).
- There is no specific treatment for acute viral hepatitis A, B, C and D.

## Surveillance goal

- Detect hepatitis outbreaks.
- Identify areas/populations at high risk to target prevention and control measures.
- Estimate burden of disease.
- If countrywide surveillance is not possible, surveillance in sentinel areas or hospitals may provide useful information on potential sources of infection.

## Standard case definition

**Suspected case:** Any person with acute illness typically including acute jaundice, dark urine, anorexia, malaise, extreme fatigue, and right upper quadrant tenderness. (Note: infected children are often asymptomatic)

**Confirmed case:** A suspected case that is laboratory confirmed

## Acute viral hepatitis

<b>Respond to alert threshold</b>	
<p><b>If hepatitis cases are suspected:</b></p> <ul style="list-style-type: none"> <li>• Report case-based information to the appropriate levels.</li> <li>• As necessary, treat and manage the patient(s) with supportive care.</li> <li>• Collect specimens and send to laboratory to identify the aetiology of the illness.</li> </ul>	
<b>Respond to action threshold</b>	
<p><b>If hepatitis cases are confirmed</b></p> <ul style="list-style-type: none"> <li>• Determine mode of transmission</li> <li>• Identify population exposed to risk of infection</li> <li>• Eliminate common source(s) of infection</li> <li>• Implement appropriate prevention and control interventions</li> </ul>	
<b>Analyze and interpret data</b>	
<p><b>Time:</b> Analysis of suspected and confirmed cases by week. Graph cases and deaths weekly. Construct an epidemic curve during outbreaks.</p> <p><b>Place:</b> Plot location of case households.</p> <p><b>Person:</b> Analyze by age and gender. Assess risk factors to plan and monitor prevention and control measures</p>	
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<p><b>Hepatitis A:</b> IgM anti-HAV positive</p> <p><b>Hepatitis B:</b> +ve for Hepatitis B surface antigen (HbsAg) or IgM anti-HBc positive</p> <p><b>Hepatitis C:</b> Anti-HCV positive</p> <p><b>Hepatitis D:</b> HBsAg positive or IgM anti-HBc positive plus anti-HDV positive (only as co-infection or super-infection of hepatitis B)</p> <p><b>Hepatitis E:</b> IgM anti-HEV positive and/or IgG anti-HEV positive</p>
<b>Specimen</b>	Serum
<b>When to collect the specimen</b>	<p>Specimens should be collected from suspected patient.</p> <p>IgM anti-HAV becomes detectable 5-10 days after exposure.</p> <p>HBsAg can be detected in serum from several weeks before onset of symptoms to days, weeks or months after onset; it persists in chronic infections. IgM anti-HBc positive usually disappears within 6 months.</p>

## Acute viral hepatitis

<p><b>How to prepare, store and transport the specimen</b></p>	<p>Use universal precautions to minimize exposure to sharps and any body fluid.</p> <p>Collect 5-10 ml of venous blood.</p> <ul style="list-style-type: none"> <li>• Let clot retract for 30 to 60 minutes at room temperature or centrifuge to separate serum from red blood cells.</li> <li>• Aseptically pour off serum into sterile, screw capped tubes.</li> <li>• Store serum at 4°C.</li> <li>• For storage &gt;5 days, samples are held at -20°C.</li> <li>• Transport serum samples using appropriate packaging to prevent breakage or leakage.</li> </ul>
<p><b>Results</b></p>	<p>Results are usually available within one to 3 days from arrival in the laboratory.</p>
<p><b>Reference</b></p>	
<ul style="list-style-type: none"> <li>• <i>WHO Recommended Strategies for Prevention and Control of Communicable Diseases</i>; WHO/CDS/CPE/SMT/2001.13</li> <li>• <i>WHO Recommended Surveillance Standards</i> WHO/CDS/CSR/ISR/99.2</li> <li>• WHO Fact Sheet No 328, <i>Hepatitis A</i>, revised May 2008</li> <li>• WHO Fact Sheet No 204, <i>Hepatitis B</i>, revised August 2008</li> <li>• WHO Fact Sheet No 164, <i>Hepatitis C</i></li> <li>• WHO Fact Sheet No 280, <i>Hepatitis E</i>, revised January 2005</li> <li>• World Health Organization <a href="http://www.who.int/topics/hepatitis/en/">http://www.who.int/topics/hepatitis/en/</a></li> <li>• United States, Centers for Disease Control and Prevention <a href="http://www.cdc.gov/hepatitis/">http://www.cdc.gov/hepatitis/</a></li> <li>• <i>Control of Communicable Diseases Manual</i>, 18<sup>th</sup> Edition</li> </ul>	

## Adverse Events Following Immunization (AEFI)

<b>Background</b>
Reports of AEFIs have had negative effects on national immunization programmes. Most reports are “coincidental” events not related to vaccines. It is important to identify real events and determine their cause.
<b>Surveillance goal</b>
To determine the cause of an AEFI or cluster of AEFIs and correct it.
<b>Standard case definition</b>
A medical incident that takes place after immunization, causes concern, and is believed to be caused by the immunization.
<b>Respond to alert threshold</b>
<b>If a single case is suspected:</b> <ul style="list-style-type: none"><li>• Treat the patient</li><li>• Communicate with the parents and community</li><li>• Respond to rumours or public enquiries</li><li>• Complete case investigation form</li></ul>
<b>Respond to epidemic threshold</b>
<b>If a single case is confirmed:</b> <ul style="list-style-type: none"><li>• Monitor for a cluster</li><li>• Send report immediately to initiate investigation of cause</li><li>• Take remedial action to avoid another AEFI occurring from the same cause</li></ul>
<b>Analyze and interpret data</b>
Determine the cause of the event. Is it programme-related, Vaccine-induced, coincidental or unknown? Beware of mass psychological illness if a number of school-aged or older individuals are involved at the same time.
<b>Reference</b>
<ul style="list-style-type: none"><li>• <i>Surveillance of adverse events following immunization. Field guide for managers of immunization programmes.</i> WHO/EPI/93.02 Rev 1. <a href="http://www.who.int/vaccines-documents/DocsPDF/www9541.pdf">http://www.who.int/vaccines-documents/DocsPDF/www9541.pdf</a></li><li>• Kharabsheh S. <i>Mass psychogenic illness following Td vaccine in Jordan.</i> Bulletin of the WHO 2001. 79 (8); 764-770. <a href="http://www.who.int/bulletin/pdf/2001/issue8/vol79.no.8.764-770.pdf">http://www.who.int/bulletin/pdf/2001/issue8/vol79.no.8.764-770.pdf</a></li></ul>

# Anthrax (human)

## Background

- Anthrax is a widespread zoonotic disease caused by the spore-forming bacterium *Bacillus anthracis*, a Gram positive rod-shaped bacterium. A. It is transmitted from infected domestic livestock (cattle, sheep, goats, buffaloes, pigs and others) or wild game animals to humans by direct contact or indirect contact with animals or their products.
- The incubation period typically ranges from 1 to 7 days, but may be longer (up to two to three weeks for cutaneous anthrax and up to 42 days for inhalation anthrax). Persons exposed to occupational hazards include those handling infected carcasses and those employed in the processing of bones, hides, wool and other animal products. Persons may also become infected by handling or consuming meat from animals that are sick with or have died of the disease. Biting flies have been reported to transmit the disease from infected animals to humans however how readily or often this occurs is unknown.
- Human anthrax is a serious problem in several countries and has potential for explosive outbreaks (especially the gastrointestinal form that is contracted from eating infected meat); while pulmonary (inhalation) anthrax is mainly occupational, the threat of biological warfare attacks should not be forgotten. Anthrax has a serious impact on the trade of animal products.
- The control of anthrax is based on its prevention in livestock. Programmes based only on prevention in humans are costly and likely to be ineffective except for those industrially exposed.
- There is an effective vaccine for those persons considered at risk for occupational exposure, and successful vaccines are used for livestock, particularly for herds with ongoing exposure to contaminated soil or vegetation.
- In most countries anthrax is a notifiable disease.

## Surveillance goal

- To detect outbreaks
- To monitor control and prevention programmes

## Standard case definition

### **Suspected case**

Any person with acute onset characterized by several clinical forms which are:

- (e) **Cutaneous form:** Any person with skin lesion evolving over 1 to 6 days from a papular through a vesicular stage, to a depressed black eschar invariably accompanied by oedema that may be mild to extensive
- (f) **Gastro-intestinal:** Any person with abdominal distress characterized by nausea, vomiting, anorexia and followed by fever
- (g) **Pulmonary (inhalation):** any person with brief prodrome resembling acute viral respiratory illness, followed by rapid onset of hypoxia, dyspnoea and high temperature, with X-ray evidence of mediastinal widening
- (h) **Meningeal:** Any person with acute onset of high fever possibly with convulsions, loss of consciousness, meningeal signs and symptoms; commonly noted in all systemic infections, but may present without any other clinical symptoms of anthrax

**AND** has an epidemiological link to confirmed or suspected animal cases or contaminated animal products

## Anthrax (human)

### Confirmed case

A confirmed case of anthrax in a human can be defined as a clinically compatible case of cutaneous, inhalational or gastrointestinal illness that is laboratory-confirmed by:

- (c) isolation of *B. anthracis* from an affected tissue or site  
or
- (d) Other laboratory evidence of *B. anthracis* infection based on at least two supportive laboratory tests

Note: it may not be possible to demonstrate *B. anthracis* in clinical specimens if the patient has been treated with antimicrobial agents.

### Respond to alert threshold

#### If a single case is suspected:

- Report case-based information immediately to the appropriate levels (public health sector and animal health sector).
- Use standard barrier precautions for all forms. Use protective equipment and clothing (gloves, gowns, face shields), and respiratory protection if there is a risk of aerosols, disinfection and dressing any cuts and abrasion before putting on protective clothing.
- Perform environmental cleaning (disinfection) with hypochlorite.
- Treat and manage the patient with supportive care and using antibiotics such as Penicillin V, procaine penicillin (uncomplicated cases), or penicillin G (severe cases).
- Collect specimen safely to confirm the case.
- Conduct joint (public health and animal health sectors) investigation of cases/deaths.
- Vaccination is required for animals when exported/imported.
- In humans, selective preventive vaccination may be considered in case of occupational exposure.

### Respond to action threshold

#### If a single case is confirmed:

- Standard infection control precautions are sufficient and should be used when managing the patients
- Particular attention should be paid to body fluid spills which should be managed by the usual methods for cleaning and decontamination of any body fluid spills. This should be done promptly and thoroughly, because organisms which remain on surfaces may form spores which are infectious.
- As is usual practice, personal protective equipment should be used in situations where there is potential for splashes and inoculation injuries. Any incidents should be reported immediately.
- Mobilize the community for early detection and care.
- Proper burial or cremation (if practiced) of dead bodies (humans and animals).
- Conduct community education about the confirmed case, how the disease is transmitted, and how to use infection control in the home care setting.
- Conduct active searches for additional cases that may not come to the health care setting (older women or small children, for example) and provide information about prevention in the home and when to seek care.
- Request additional help from national levels as needed.

## Anthrax (human)

<b>Analyze and interpret data</b>	
<p><b>Time:</b> Graphs of number of suspected / probable / confirmed cases by date</p> <p><b>Place:</b> Map of suspected and confirmed human and animal cases by geographical area (district)</p> <p><b>Person:</b> Table showing the number of suspected / probable / confirmed cases by date, age and sex</p>	
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<p>Isolation of <i>Bacillus anthracis</i> from a clinical specimen (e.g. blood, lesions, discharges)</p> <p>Demonstration of <i>B.anthraxis</i> in a clinical specimen by microscopic examination of stained smears (vesicular fluid, blood, cerebrospinal fluid, pleural fluid, stools)</p> <p>Positive serology (ELISA, Western blot, toxin detection, chromatographic assay, fluorescent antibody test)</p>
<b>Specimen</b>	<p><b>Cutaneous</b></p> <ol style="list-style-type: none"> <li>1. For vesicular lesions, two swabs of vesicular fluid from an unopened vesicle.</li> <li>2. For eschars, the edge should be lifted and two swab samples rotated underneath.</li> <li>3. For ulcers, the base of the lesion should be sampled with two saline moistened swabs.</li> <li>4. Blood cultures obtained prior to antimicrobial therapy, if the patient has evidence of systemic symptoms.</li> <li>5. A full thickness punch biopsy of a papule or vesicle including adjacent skin should be obtained from all patients with a lesion being evaluated for cutaneous anthrax, to be submitted in 10 percent formalin for histopathology.</li> <li>6. In patients not on antibiotic therapy or on therapy for &lt;24 hours, a second biopsy specimen.</li> <li>7. Acute and convalescent serum samples for serologic testing.</li> </ol> <p><b>Gastro-intestinal</b></p> <ol style="list-style-type: none"> <li>1. Blood cultures obtained prior to antimicrobial therapy.</li> <li>2. Ascites fluid for culture and PCR.</li> <li>3. Stool or rectal swab for culture and PCR.</li> <li>4. Oropharyngeal lesion, if present, for culture and PCR.</li> <li>5. Acute and convalescent serum samples for serologic testing.</li> <li>6. Autopsy tissues from fatal cases for histopathology.</li> </ol> <p><b>Inhalation</b></p> <ol style="list-style-type: none"> <li>1. Blood cultures obtained prior to antimicrobial therapy.</li> <li>2. Pleural fluid, if present, for culture and PCR.</li> <li>3. CSF, in patients with meningeal signs, for culture and PCR.</li> </ol>

## Anthrax (human)

	<p>4. Pleural and/or bronchial biopsies for IHC.</p> <p>5. Acute and convalescent serum samples for serology.</p> <p>6. Autopsy tissues from fatal cases for histopathology.</p>
<p><b>When to collect the specimen</b></p>	<p>Specimens should be collected from any patient being evaluated for cutaneous <i>Bacillus anthracis</i> infection.</p> <p>It may not be possible to demonstrate <i>B.anthraxis</i> in clinical specimens if the patient has been treated with antimicrobial agents.</p> <p>Organism is best demonstrated in specimen taken at the Vesicular stage.</p> <p>Specimens for culture should be obtained prior to initiation of antimicrobial therapy.</p> <p>If available at reference laboratories specimens may be submitted for PCR.</p> <p>Caution: <i>B.anthraxis</i> is highly infectious</p>
<p><b>How to prepare, store and transport specimen</b></p>	<p><b>Vesicular stage:</b> collect fluid from intact vesicles on sterile swabs.</p> <p><b>Eschar stage:</b> without removing eschar, insert swab beneath the edge of eschar, rotate and collect lesion material. Store specimen for ≤24 h and transport for ≤2h at room temperature.</p> <p><b>Stool:</b> collect 5-10 g in a clean sterile leak-proof container. Store for ≤24 h at 4°C. Transport ≤1h at room temperature.</p> <p><b>Blood:</b> collect per institution's procedure for routine blood culture. Collect 10 ml of blood in EDTA for PCR. Transport ≤2h in room temperature.</p> <p><b>Sputum:</b> collect expectorated specimen into a sterile leak proof container. Store for ≤24 h at 4°C. Transport ≤2 h in room temperature.</p>
<p><b>Results</b></p>	<p><i>Diagnostic services for Anthrax are not routinely available. Advance arrangements are usually required for Anthrax diagnostic services. Contact the appropriate National authority or WHO.</i></p>

## Anthrax (human)

### Reference

- WHO. *Anthrax in humans and animals*. World Health Organization, Geneva. (2008) (Available on <http://www.who.int/csr/resources/publications/AnthraxGuidelines2008/en/index.html>)
- *WHO Recommended Surveillance Standards* WHO/CDS/CSR/ISR/99.2
- *WHO recommended Strategies for the Prevention and Control of Communicable Diseases*, WHO/CDS/CPE/SMT/2001.13
- 2003 WHO *Manual for Laboratory Diagnosis of Anthrax* (<http://www.searo.who.int/en/Section10/Section17/Section58/Section909.htm>)
- *Anthrax Information for Health Care Providers*, CDC (<http://emergency.cdc.gov/agent/anthrax/anthrax-hcp-factsheet.asp>)
- *Recommended Specimens for Microbiology and Pathology for Diagnosis: Inhalation, Cutaneous, and Gastrointestinal Anthrax*, CDC
- ([http://emergency.cdc.gov/agent/anthrax/lab-testing/recommended\\_specimens.asp](http://emergency.cdc.gov/agent/anthrax/lab-testing/recommended_specimens.asp))

## Buruli ulcer (*Mycobacterium ulcerans* disease)

### Background

- Skin infection caused by *Mycobacterium ulcerans* (an AFB).
- Occurring mainly as skin lesions (nodules, plaques and ulcers) than can be complicated by bone and joint involvement. Involvement of other organs like the eyes is rare.
- Spreading in inter-tropical areas, in swampy soils or water body surroundings, forestry or surface mining zones.
- Patients are classified into three categories:
  - **Category I:** patient with a single lesion which size is less than 5 cm of diameter (early lesion)
  - **Category II:** patient with single lesion which size is between 5 and 15 cm of diameter
  - **Category III:** patient single lesion which size is over 15 cm of diameter or with multiple lesions or lesion located in critical site (face, head & neck, breast, perineum, genitalia, lesion spanning over joints)
- BU case management has improved greatly through use of WHO recommended antibiotics (rifampicin and streptomycin) in 2004. Surgery is still needed for late cases (category III). Cumulative number of cases is over 60,000 in 2009.
- Mode of transmission is still unknown. *M. ulcerans* could penetrate the skin through insect bite (water bugs); micro trauma or small wounds.
- Confirmation of diagnosis is done by PCR, AFB search with ZN staining, culture or histology. Specimens of lesions are taken by swab in ulcer, fine needle aspiration (FNA) or biopsy in case of surgery.

### Surveillance goal

- Geographical distribution of the disease to locate endemic areas and districts and focus early case finding, proper management with WHO recommended antibiotics and prevention of disabilities.

### Standard case definition

**Suspected case:** A person presenting a painless skin nodule, plaque or ulcer, living or having visited a BU endemic area

**Confirmed case:** A suspected case confirmed by at least one laboratory test (ZN for AFB, PCR, culture or histology)

## Buruli ulcer (*Mycobacterium ulcerans* disease)

### Respond to alert threshold

#### If a single case is suspected:

- Report the suspected case to the appropriate level of the health system

#### At health facility level:

- Take a specimen for laboratory confirmation (Swab or FNA)
- Begin wound dressing and combined antibiotic treatment with:
  - Rifampicin 10 mg/kg daily oral intake for 8 weeks (56 days)
  - Streptomycin 15mg/Kg daily injection for 8 weeks (56 days)
- Refer category III patients to reference hospital/centre
- Fill in case report form (BU 01 or BU 02) with origin village GPS data and report to Health District, Regional and National levels
- Search other cases in origin village of confirmed case of BU

### Respond to action threshold

If a suspected case is confirmed (Not applicable to BU)

### Analyze and interpret data

**Time:** Graph of cases by year of diagnosis, graph of cumulative number of cases

**Place:** Plot cases by location of households and colour shade endemic districts

**Person:** Count newly detected cases monthly by category of patients (Cat I, II or III). Analyze age and disability distribution and treatment outcomes (cases cured, cured without limitation of movement or amputation, relapse after recommended antibiotic treatment)

### Laboratory Confirmation

#### Diagnostic test

*Mycobacterium ulcerans*: Smears and biopsy specimens can be sent to the laboratory for confirmation by:

- Ziehl-Neelsen stain for acid-fast bacilli
- Culture
- PCR
- Histopathology

#### Specimen

Smears  
Biopsy specimens

## Buruli ulcer (*Mycobacterium ulcerans* disease)

<b>When to collect the specimen</b>	<p>Specimens should be collected from suspected patient with clinical symptoms (nodule, plaque, ulcer, osteomyelitis ...)</p> <p>Specimen should be collected before any antibiotic is given. Another specimen should be collected at the end of the treatment (in case the treatment is not efficacious or surgery is indicated)</p>
<b>How to prepare, store, and transport the specimen</b>	<p>Collection of specimen: it is important to avoid cross contamination between the collection of samples</p> <p>Materials: Dry swabs and recipients</p> <p>Types of specimens: No ulcerative forms, Ulcerative forms, Bone</p> <p>Store at 4°C</p>
<b>Results</b>	<p>Buruli ulcer is usually diagnosed clinically and by finding acid fast bacilli (AFB) in smears from infected ulcers and tissue biopsies. It can also be identified using PCR.</p> <p><i>M. ulcerans</i> can be cultured in a reference lab using the same culture media used to grow <i>M. tuberculosis</i>.</p> <p>The organism grows very slowly, usually requiring several weeks to provide visible colonies.</p> <p>Diagnostic services are not routinely available. Contact the appropriate National authority or WHO.</p>

### References

- Resolution WHA 57.1 on surveillance and control of *Mycobacterium ulcerans* disease (Buruli ulcer). In: 57<sup>th</sup> World Health Assembly, Geneva, 17-22 May 2004; Resolutions and decisions, annexes. Geneva, WHO; 2004 (WHA57/2004/REC/1: 1-2)
- *Provisional guidance on the role of specific antibiotics in the management of Mycobacterium ulcerans disease (Buruli ulcer)* WHO/CDS/CPE/GBUI/2004.10
- Buruli ulcer: First programme review meeting for West Africa – Summary report. WHO, WER, 6; 2009 : 43-48
- *Control of Communicable Diseases Manual*, 18<sup>th</sup> Edition
- *District Laboratory Practice in Tropical Countries*, Cambridge
- Ulcère de Buruli, prise en charge de l'infection à *Mycobacterium ulcerans*

# Chikungunya

## Background

- Chikungunya fever is a viral illness that is spread by the bite of infected mosquitoes. The disease resembles dengue fever, and is characterized by severe, sometimes persistent, joint pain (arthritis), as well as fever and rash. It is rarely life-threatening. Nevertheless widespread occurrence of diseases causes substantial morbidity and economic loss.
- The word "Chikungunya" is Makonde for "that which bends up," in reference to the stooped posture of patients afflicted with the severe joint pain associated with the disease. Epidemics of fever, rash and arthritis, resembling Chikungunya fever were recorded as early as 1779. However, the virus was first isolated between 1952-1953 from both man and mosquitoes during an epidemic, in Tanzania.
- Chikungunya fever historically displayed interesting epidemiological profiles in that: major epidemics appeared and disappeared cyclically, usually with an inter-epidemic period of 7-8 years and sometimes as long as 20 years. After a long period of absence, outbreaks appeared in Indonesia in 1999 and have been virtually ongoing since 2004.

## Surveillance goal

- Detect Chikungunya sporadic cases and outbreaks promptly, and seek laboratory verification.
- Identify high risk areas in order to improve prevention of outbreaks by taking steps to avoid mosquito bites and elimination of breeding sites.

## Standard case definition

### **Suspected case:**

Any person with acute onset of fever  $>38.5^{\circ}\text{C}$  and severe arthralgia/arthritis not explained by other medical conditions.

### **Confirmed case:**

A suspected case with laboratory confirmation.

# Chikungunya

<b>Respond to alert threshold</b>	
<p><b>If Chikungunya cases are suspected:</b></p> <ul style="list-style-type: none"> <li>• Report case-based information immediately to the next level</li> <li>• Collect specimens for confirming the cases</li> <li>• Conduct an investigation to determine the risk factors for transmission</li> <li>• Manage and treat the cases using anti-inflammatory agents</li> </ul>	
<b>Respond to action threshold</b>	
<p><b>If Chikungunya cases are confirmed</b></p> <ul style="list-style-type: none"> <li>• Symptomatic treatment for mitigating pain and fever using anti-inflammatory drugs along with rest usually suffices. Persistent joint pain may require analgesic and long-term anti-inflammatory therapy.</li> <li>• Prevention is entirely dependent upon taking steps to avoid mosquito bites and elimination of mosquito breeding sites.</li> </ul> <p>To avoid mosquito bites:</p> <ul style="list-style-type: none"> <li>• Wear full sleeve clothes and long dresses to cover the limbs.</li> <li>• Use mosquito coils and repellents.</li> <li>• Use mosquito nets – to protect babies, old people and others, who may rest during the day. The effectiveness of such nets can be improved by treating them with permethrin (pyrethroid insecticide). Curtains (cloth or bamboo) can also be treated with insecticide and hung at windows or doorways, to repel or kill mosquitoes.</li> <li>• Mosquitoes become infected when they bite people who are sick with Chikungunya. Mosquito nets and mosquito coils will help prevent mosquitoes from biting sick people.</li> </ul>	
<b>Analyze and interpret data</b>	
<p><b>Time:</b> Graph cases and deaths weekly. Construct an epidemic curve during outbreaks.</p> <p><b>Place:</b> Plot location of case households with precise mapping.</p> <p><b>Person:</b> Report immediate case-based information for cases and deaths. Report summary totals monthly. During outbreak, count cases and deaths weekly. Analyze by age. Assess risk factors to improve prevention of outbreaks.</p>	
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	Serological tests show a rise in antibody titer to Chikungunya virus; the virus may be isolated from the blood of acutely ill patients in newborn mice, mosquitoes or cell culture or detected using IFA or Reverse Transcription Polymerase Chain Reaction (RT-PCR)
<b>Specimen</b>	Serum

## Chikungunya

<p><b>When to collect the specimen</b></p>	<p>Collect specimen from the first suspected case (s). Suspected CHIK cases occur in clusters.</p> <p>Collect representative specimens from suspected cases. If outbreak is confirmed, collect more specimens from cases and also mosquitoes from the affected homes for testing.</p> <p>Type of Specimen</p> <ul style="list-style-type: none"> <li>• Acute-phase blood (0-10 days after onset)</li> <li>• Convalescent-phase blood (7 - 21 days after onset)</li> </ul> <p>Time of collection:</p> <p>When patient presents; collect second sample during convalescence. Between days 7 and 21 after onset.</p>
<p><b>How to prepare, store, and transport the specimen</b></p>	<p>Transport of specimens should comply with the WHO guidelines for the safe transport of infectious substances and diagnostic specimens (WHO, 1997).</p> <p>For ELISA:</p> <ul style="list-style-type: none"> <li>• Refrigerate at 2° to 8° C serum or clot for testing within 24 hour. If kept for longer store at -80°</li> </ul> <p>For Isolation and RT_PCR</p> <ul style="list-style-type: none"> <li>• Store at -80° or transport in fully charged dry shipper</li> </ul> <p>Mosquitoes for testing should be transported in fully charged dry shipper. Focus on Aedes species.</p>
<p><b>Results</b></p>	<p>Diagnostic services for Chikungunya are not routinely available. Contact the appropriate National authority or WHO.</p> <ul style="list-style-type: none"> <li>• Ministry of Health, Disease Outbreak Management Unit should send samples to WHO reference labs e.g KEMRI.</li> <li>• Preliminary results are ready within 24 hours after samples arrive in the laboratory. Confirmatory results are ready within a week from sample reception.</li> </ul>

# Chikungunya

## Reference

- Weekly Epidemiological Record N° 1, 2005, 80, 1-8; <http://www.who.int/wer>
- World Health Organization <http://www.who.int/mediacentre/factsheets/fs327/en/>
- United States, Centers for Disease Control <http://www.cdc.gov/ncidod/dvbid/chikungunya/>
- Sergon et al. *Seroprevalence of Chikungunya Virus (CHIKV) Infection on Lamu Island, Kenya, October 2004*. Am J Trop Med Hyg. 2008 Feb;78(2):333-337
- Powers et al. *Evolutionary relationships and systematics of the alphaviruses*. J Virol. 2001 Nov;75(21):10118-31

# Cholera

## Background

- Acute illness with profuse watery diarrhoea caused by *Vibrio cholerae* serogroups O1 or O139. The disease is transmitted mainly through the faecal-oral route; that is through eating or drinking contaminated food or water.
- Cholera causes over 100 000 deaths per year. It may produce rapidly progressive epidemics or worldwide pandemics. In endemic areas, sporadic cases (less than 5% of all non-outbreak-related diarrhoea 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.
- 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 diarrhoea may cause watery diarrhoea, especially in children less than 5 years of age. Please see *Diarrhoea with dehydration* summary guidelines.

## Surveillance goal

- Detect and respond promptly and appropriately to cases and outbreaks of watery diarrhoea. To confirm an outbreak, collect and transport stool specimens transported in Cary-Blair medium.
- Do immediate case-based reporting of cases and deaths when an outbreak is suspected.

## Standard case definition

### **Suspected case:**

- In a patient age 5 years or more, severe dehydration or death from acute watery diarrhoea.
- If there is a cholera epidemic, a suspected case is any person age 5 years or more with acute watery diarrhoea, with or without vomiting.

### **Confirmed case:**

- A suspected case in which *Vibrio cholerae* O1 or O139 has been isolated in the stool.

# Cholera

## Respond to alert threshold

### If a single case is suspected:

- Report case-based information immediately.
- Manage and treat the case according to national guidelines.
- Enhance strict hand-washing and isolation procedures.
- Conduct case-based investigation to identify similar cases not previously reported.
- Obtain stool specimen from 5 patients within 5 days of onset of acute watery diarrhoea, and before antibiotic treatment is started. See laboratory guidelines for information on how to prepare, store and transport the specimens.

## Respond to action threshold

### If a suspected case is confirmed:

- Establish treatment centre in locality where cases occur. Treat cases onsite rather than asking patients to go to standing treatment centres elsewhere.
- Strengthen case management including treatment.
- Mobilize community early to enable rapid case detection and treatment. Survey the availability of clean drinking water.
- Work with community leaders to limit the number of funerals or other large gatherings for ceremonies or other reasons, especially during an epidemic.
- Reduce sporadic and outbreak-related cases through continuous access to safe water. Promote safe preparation of food (especially seafood, fruits, and vegetables). Promote safe disposal of human waste.

## Analyze and interpret data

**Time:** Graph weekly cases and deaths and construct an epidemic curve during outbreaks. Report case-based information immediately and summary information monthly for routine surveillance.

**Place:** Plot the location of case households.

**Person:** Count weekly total cases and deaths for sporadic cases and during outbreaks. Analyze distribution of cases by age and according to sources of drinking water. Assess risk factors to improve control of sporadic cases and outbreaks.

## Laboratory confirmation

### Diagnostic test

Isolate *V. cholerae* from stool culture and determine O1 serotype using polyvalent antisera for *V. cholerae* O1.

If desired, confirm identification with Inaba and Ogawa antisera.

If specimen is not serotypable, consider, *V. cholerae* O139 (see note in Results column).

## Cholera

<b>Specimen</b>	Liquid stool or rectal swab
<b>When to collect the specimen</b>	<p>For each new area affected by the outbreak, a laboratory confirmation should be done.</p> <p>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"> <li>• Onset within last 5 days, and</li> <li>• Before antibiotics treatment has started</li> </ul> <p><i>Do not delay treatment of dehydrated patients.</i> 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>
<b>How to prepare, store, and transport the specimen</b>	<ul style="list-style-type: none"> <li>• Place specimen (stool or rectal swab) in a clean, leak proof container and transport to lab within 2 hours.</li> <li>• If more than 2- hour delay is expected, place stool-soaked swab into Cary-Blair transport medium.</li> </ul> <p>If Cary-Blair transport medium is not available and specimen will not reach the lab within 2 hours:</p> <ul style="list-style-type: none"> <li>• Store at 4°C to 8°C</li> <li>• Do not allow specimen to dry. Add small amount of 0.85% NaCl if necessary</li> <li>• To transport, transport in well-marked, leak proof container</li> <li>• Transport container in cold box at 4°C to 8°C</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• Cholera tests may not be routinely performed in all laboratories.</li> <li>• Culture results usually take 2 to 4 days after specimen arrives at the laboratory.</li> <li>• 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.</li> <li>• The O139 serotype has not been reported in Africa and only in a few places in southwest Asia.</li> </ul> <p>Serological determination of Ogawa or Inaba is not clinically required. It is also not required if polyvalent antisera results are clearly positive.</p>

# Cholera

## Reference

- *Management of the patient with cholera*, World Health Organization, 1992. WHO/CDD/SER/91.15 Rev1 (1992)
- *Epidemic diarrhoeal 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

# Dengue Fever

*Including Dengue haemorrhagic fever (DHF) and Dengue shock syndrome (DSS)*

## Background

- Dengue fever is an arbovirus transmitted by aedes mosquitoes (both *Ae. aegypti* and *Ae. albopictus*). Dengue is caused by four serologically distinct, but closely related viruses: dengue virus (DENV) 1, 2, 3, and 4 of the Flaviviridae family.
- Dengue fever is an emerging pandemic that has spread globally during the past 30 years as a result of changes in human ecology. Dengue is found in tropical and sub-tropical regions around the world, predominately in urban and semi-urban areas. During dengue epidemics, infection rates among those who have not been previously exposed to the virus are often 40% to 50%, but can reach 80% to 90%.
- Dengue fever is a severe, influenza-like illness that affects infants, young children and adults, but seldom causes death. Dengue haemorrhagic fever (DHF) is a potentially deadly complication that has become a leading cause of hospitalization and death among children in Asia. There is good evidence that sequential infection with the different serotypes of dengue virus increases the risk of more severe disease that can result in shock syndrome (DSS) and death.
- Epidemic dengue activity in Africa has mostly been classical dengue fever caused by DENV-1 and DENV-2 without associated mortality. The first major outbreak of DENV-3 in Africa was documented in Mozambique in 1984-1985. During this outbreak, most patients experienced secondary infections and 2 deaths were attributed to DHF and shock. In 2008, yellow fever and DENV-3 were found to be co-circulating in Abidjan, Cote d'Ivoire, however, no severe dengue cases or deaths attributable to dengue were identified.
- There is no specific treatment for dengue, but appropriate medical care frequently saves the lives of patients with dengue haemorrhagic fever.
- Infected humans are the main carriers and multipliers of the virus, serving a source of the virus for uninfected *Aedes aegypti* mosquitoes which maintain the urban dengue transmission cycle. The virus circulates in the blood of infected human for 2-7 days, at approximately the same time that they have a fever. A sylvatic transmission cycle has been documented in West Africa where DENV-2 has been found in monkeys. There is no evidence of person-to-person transmission.
- At present, the only method of controlling or preventing dengue virus transmission is to combat the vector mosquitoes using environmental management and chemical methods.

# Dengue Fever

*Including Dengue haemorrhagic fever (DHF) and Dengue shock syndrome (DSS)*

## Surveillance goal

- Surveillance for suspected cases and investigation of clusters of suspected cases in areas with *Ae. aegypti* and *Ae. albopiticus* mosquitoes.

## Standard case definition

**Dengue Fever Suspected case:** Any person with acute febrile illness of 2-7 days duration with 2 or more of the following: headache, retro-orbital pain, myalgia, arthralgia, rash, haemorrhagic manifestations, leucopenia.

**Dengue Fever Confirmed case:** A suspected case with laboratory confirmation (positive IgM antibody, rise in IgG antibody titres, positive PCR or viral isolation).

**Dengue Haemorrhagic Fever :** A probable or confirmed case of dengue with bleeding tendencies as evidenced by one or more of the following: positive tourniquet test; petechiae, ecchymoses or purpura; bleeding: mucosa, gastrointestinal tract, injection sites or other; haematemesis or melaena; and thrombocytopenia (100 000 cells or less per mm<sup>3</sup>) and evidence of plasma leakage due to increased vascular permeability, manifested by one or more of the following: 20% rise in average haematocrit for age and sex, 20% drop in haematocrit following volume replacement therapy compared to baseline, signs of plasma leakage (pleural effusion, ascites, hypo-proteinaemia).

**Dengue Shock Syndrome:** All the above criteria, plus evidence of circulatory failure manifested by rapid and weak pulse, and narrow pulse pressure ( $\leq 20$  mm Hg) or hypotension for age, cold, clammy skin and altered mental status.

## Respond to alert threshold

**If a single case is suspected:**

- Report case-based information immediately to the next level
- Conduct active search for additional cases
- Collect specimens for confirming the cases

# Dengue Fever

*Including Dengue haemorrhagic fever (DHF) and Dengue shock syndrome (DSS)*

## Respond to action threshold

### If a single case is confirmed:

- Report case-based information immediately to the next level.
- Conduct active search for additional cases.
- Collect specimens for confirming the cases.
- Survey the community to determine the abundance of vector mosquitoes, identify the most productive larval habitats, promote and implement plans for their elimination, management or treatment with appropriate larvicides.
- Educate the public and promote behaviors to remove, destroy or manage mosquito vector larval habitats.
- Manage and provide supportive treatment to dengue fever cases. Implement standard infection control precautions. Prevent access of mosquitoes to patients by using mosquito bed nets.
- Refer suspected DHF/DSS cases to more advanced facilities.

## Analyze and interpret data

**Time:** Graph cases and deaths weekly/monthly. Construct an epidemic curve during the outbreak.

**Place:** Plot location of case households and work sites using precise mapping.

**Person:** Case-fatality rate. Analyze age and sex distribution. Percentage of DHF / DSS cases and of hospitalizations.

## Laboratory confirmation

### Diagnostic test

Demonstration of IgM and IgG by Antibody Assays.  
Detection of viral genomic sequences by PCR.  
Isolation of the dengue virus using cell culture.  
Antigen detection Assays for acute phase samples when PCR or isolation is negative.

Demonstration of dengue virus antigen in autopsy tissue by immunohistochemistry or immunofluorescence or in serum samples by EIA.

*Note: there are several diagnostic techniques available to document an infection by the dengue virus. The IgM ELISA is the basic test for serologic diagnosis.*

## Dengue Fever

*Including Dengue haemorrhagic fever (DHF) and Dengue shock syndrome (DSS)*

<p><b>Specimen</b></p>	<p>ELISA: Whole blood, serum or plasma from acute (0-5 days) and convalescent 6 or more days) depending on each case.</p> <p>PCR: Whole blood or blood clot, serum/ plasma or tissue preferably from acute specimens (0-5 days).</p> <p>The samples should be collected for diagnosing a suspected dengue fatality: A blood sample to attempt PCR, virus isolation and serology. If an autopsy is performed, blood from the heart should be collected.</p>
<p><b>When to collect the specimen</b></p>	<p>Collect specimen from the first suspected case.</p> <p>If more than one suspected case, collect until specimens have been collected from 5 to 10 suspected cases.</p> <p>Type of Specimen</p> <ul style="list-style-type: none"> <li>• Acute-phase blood (0-5 days after onset of symptoms)</li> <li>• Convalescent-phase blood (<math>\geq 6</math> days after onset)</li> </ul> <p>Time of collection</p> <ul style="list-style-type: none"> <li>• Collect 2nd sample during convalescence. Between days 6 and 21 after onset.</li> </ul> <p>Lab diagnosis of fatal cases is indispensable for understanding the risk factors for severe cases.</p>
<p><b>How to prepare, store, and transport the specimen</b></p>	<p>Transport of specimens should comply with the WHO guidelines for the safe transport of infectious substances and diagnostic specimens.</p> <p><i>For ELISA or PCR:</i></p> <ul style="list-style-type: none"> <li>• Refrigerate serum or clot. For long term storage freeze -20C</li> <li>• Freeze (-20C or colder) tissue specimens for virus isolation</li> </ul> <p>If an autopsy has been performed and no fresh tissues are available, tissues fixed in formalin should be submitted for immunohistochemical studies.</p>
<p><b>Results</b></p>	<p><b>Diagnostic services for Dengue fever and Dengue hemorrhagic fever are not routinely available.</b> Advance arrangements are usually required for VHF diagnostic services. Contact the appropriate National authority or WHO.</p>

# Dengue Fever

*Including Dengue haemorrhagic fever (DHF) and Dengue shock syndrome (DSS)*

## Reference

- *WHO Recommended Surveillance Standards WHO/CDS/CSR/ISR/99.2*
- *Dengue: Clinical and Public Health Aspects, CDC*

# Diabetes

## Background

- Diabetes mellitus (DM) is a widespread chronic disease that occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. Diabetes can cause serious health complications including heart disease, blindness, kidney failure, and lower-extremity amputations.
- The most common form is Type 2 diabetes that represents more than 85% of the cases. Other forms are less common such as Type 1 (10% of cases), specific diabetes and gestational diabetes (5% of cases).
- The risk factors that affect the onset of diabetes are well-known. They comprise non-modifiable factors like old age (over 45 years of age), family history, and the causes of diabetes in pregnancy. Modifiable risk factors for diabetes are obesity, physical inactivity and excessive alcohol consumption.
- The global prevalence in 2000 was estimated at 2.8%, with projections of 4.8% by 2030. The total number of persons affected will rise from 171 million in 2000 to 366 million in 2030 if no action is taken. Annual mortality linked to diabetes worldwide is estimated at more than one million.
- Diabetes is no longer considered rare in Africa. Recent estimates based on the WHO STEP-wise approach for monitoring the risk factors of non-communicable diseases indicate prevalence of between 1% and 20%. In some countries such as Mauritius, it reaches 20%.
- The rate of limb amputations due to diabetes varies from 1.4% to 6.7% of diabetic foot cases. In some African countries, the mortality rate is higher than 40 per 10,000 inhabitants.
- In the African Region, efforts made to create an environment that enhances the fight against diabetes include adoption of resolutions on non communicable diseases in 2000, cardiovascular diseases strategy in 2005, and diabetes mellitus strategy in 2007. The World Health Organization and the International Diabetes Federation (IDF) have also jointly carried out actions to contribute to promoting diabetes awareness in Africa.

## Surveillance goal

- Estimate the magnitude of the disease
- Monitor trends and risk factors
- Identify populations at highest risk (e.g.; age groups, urban vs. rural)
- Monitor prevention and control program activities

## Standard case definition

### Suspected new case:

Any person presenting with the following symptoms:

- Increased thirst
- Increased hunger
- Frequent urination

# Diabetes

## **Confirmed new case:**

Any person with a fasting venous plasma glucose measurement of  $\geq 7$  mmol/L (126 mg/dl) or capillary glucose  $\geq 6.1$  mmol/L (110 mg/dl)

Or

Any person with a non-fasting venous plasma glucose measurement of  $\geq 11.1$  mmol/L (200 mg/dl) or capillary glucose  $\geq 11.1$  mmol/L (200 mg/dl)

*\*Report only the first lab-confirmed diagnosis of the patient*

## **Recommended public health action**

### **For people with diabetes:**

- Treat confirmed cases according to the standardized case management guidelines (WHOPEN).

### **District-level Prevention:**

- Implement an integrated prevention and control programme for non-communicable diseases focusing on diabetes through community awareness and education activities conducted in accordance with national prevention and control programmes for non-communicable diseases. These activities would include multi-sectoral strategies and plans of action on diet, weight-reduction, and physical activity.
- Implement clinical preventive measures and treatment interventions using evidence-based guidelines (screening high risk patients, for example).

## **Analyze and interpret data**

**Time:** Graph cases quarterly to analyze trends.

**Place:** Compare district trends with national and regional trends.

**Person:** Analyze the distribution of cases by age and other demographic factors.

*\*Data for non-communicable diseases is analyzed for long term trends*

## **Laboratory confirmation**

### **Diagnostic test**

Measuring glucose in capillary blood using a reagent strip test and reference meter  
Measuring glucose in plasma using a glucose-oxidase colorimetric test method  
Lab case definition (see section 8.0)

### **Specimen**

Plasma  
Capillary blood

## Diabetes

<b>When to collect</b>	<p>Blood glucose measurements must be carried out on the day and at the time requested.</p> <p>Fasting specimen: for adult the fasting time is usually 10 to 16 hours. For children the fasting time is 6 hours.</p> <p>Post-prandial specimen: 2h post-prandial specimen.</p>
<b>How to prepare, store, and transport</b>	Specimen should be examined as soon as possible (before 2 hours) at health facility where the specimen is taken.
<b>Results</b>	Results are ready within a few hours.
<b>Reference</b>	
<ul style="list-style-type: none"> <li>• <i>Non communicable Diseases: A strategy for the African Region</i>, AFR/RC50/10</li> <li>• <i>Cardiovascular Diseases in the African Region: Current situation and perspectives</i>, AFR/RC55/12</li> <li>• <i>Diabetes prevention and control: a strategy for the African Region</i>, AFR/RC57/7</li> <li>• Steps manual: <a href="http://www.who.int/chp/steps/en/">http://www.who.int/chp/steps/en/</a></li> <li>• Gojka R et al, <i>Global prevalence of diabetes</i>, Diabetes Care 27(5): 1047–1053, 2004</li> <li>• IDF, <i>Diabetes Atlas</i>, 2nd Edition, Brussels, International Diabetes Federation, 2003</li> <li>• WHO, <i>Preventing chronic diseases: A vital investment</i>, Geneva, World Health Organization, 2005</li> <li>• WHO, <i>The burden of mortality attributable to diabetes</i>, Geneva, World Health Organization, 2004</li> <li>• WHO-PEN: Protocols for health promotion, prevention and management of NCDs at primary care level <a href="http://www.afro.who.int/en/divisions-a-programmes/ddc/division/2257-who-pen-protocols.html">http://www.afro.who.int/en/divisions-a-programmes/ddc/division/2257-who-pen-protocols.html</a></li> <li>• <i>District Laboratory Practice in Tropical Countries</i>, Cambridge</li> </ul>	

## Diarrhoea with blood (Shigella)

### Background

- *Shigella dysenteriae* type 1 (SD1) is the most common cause of enteric infections and is transmitted from person-to-person through faecal-oral spread.
- Large scale outbreaks may be caused by *Shigella dysenteriae* type 1 (SD1) with up to 30% of populations infected. The case fatality rate may approach 20% among young children and elderly persons with severe dehydration.
- The incubation period is from 1 to 4 days.
- Clinical illness is characterized by acute fever and bloody diarrhoea, 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.
- Enterohaemorrhagic and enteroinvasive *E. coli* and other bacteria or parasites such as *Entamoeba histolytica* may also cause bloody diarrhoea.

### Surveillance goal

- Detect and respond to dysentery outbreaks promptly.
- Improve percentage of laboratory-confirmed cases and evaluate proportion verified as type 1 (SD1).
- Determine antibiotic sensitivity pattern of the agents isolated (especially SD1) both for routine surveillance and during outbreaks.

### Standard case definition

#### **Suspected case:**

A person with diarrhoea with visible blood in stool.

#### **Confirmed case:**

Suspected case with stool culture positive for *Shigella dysenteriae* type 1.

### Respond to alert threshold

#### **If you observe that the number of cases or deaths is increasing over a period of time:**

- 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.

## Diarrhoea with blood (Shigella)

<b>Respond to action threshold</b>	
<p><b>If a suspected outbreak is confirmed:</b></p> <ul style="list-style-type: none"> <li>• Search for additional cases in locality of confirmed cases.</li> <li>• Strengthen case management and treatment.</li> <li>• Mobilize community to enable rapid case detection and treatment.</li> <li>• Identify high risk populations using person, place, and time data.</li> <li>• Reduce sporadic and outbreak-related cases by promoting hand-washing with soap or ash and water after defecating and before handling food. Strengthening access to safe water supply and storage, and use of latrines and safe disposal of human waste.</li> </ul>	
<b>Analyze and interpret data</b>	
<p><b>Time:</b> Graph monthly trends in cases and deaths. Construct an epidemic curve for outbreak cases.</p> <p><b>Place:</b> Plot location of case households.</p> <p><b>Person:</b> 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>	
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	Isolate <i>Shigella dysenteriae</i> type 1 (SD1) in culture to confirm shigella outbreak. If SD1 is confirmed, perform antibiotic sensitivity tests with appropriate drugs.
<b>Specimen</b>	Stool or rectal swab.
<b>When to collect the specimen</b>	<p>For each new area affected by the outbreak, a laboratory confirmation should be done.</p> <p>Collect sample when an outbreak is suspected. Collect stool from 5-10 patients who have bloody diarrhoea and:</p> <ul style="list-style-type: none"> <li>·Onset within last 4 days, and</li> <li>·Before antibiotic treatment has started.</li> </ul> <p>Preferably, collect stool in a clean, dry container. Do not contaminate with urine. Sample stool with a swab, selecting portions of the specimen with blood or mucus. If stool cannot be collected, obtain a rectal swab sample with a clean, cotton swab.</p>

## Diarrhoea with blood (Shigella)

<b>How to prepare, store, and transport the specimen</b>	<p>Place stool swab or rectal swab in Cary-Blair transport medium. Transport to laboratory refrigerated.</p> <p>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 <i>shigellae</i> after 24 hours.</p> <p>If storage is required, hold specimens at 4°C to 8°C, and do not freeze.</p>
<b>Results</b>	<p>Culture results are usually available 2 to 4 days after receipt by the laboratory.</p> <p>SD1 isolates should be characterized by antibiotic susceptibility.</p> <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>Refer to disease specific guidelines in Section 8.0 for additional information about the epidemic potential of <i>Shigella dysenteriae</i> 1</p>
<b>Reference</b>	
<ul style="list-style-type: none"><li>• <i>Guidelines for the control of epidemics due to Shigella dysenteriae type 1</i>. WHO/CDR/95.4</li><li>• <i>Safe Water Systems for the Developing World: A Handbook for Implementing Household-based Water Treatment and Safe Storage Projects</i>. Department of Health &amp; Human Services. Centers for Disease Control and Prevention. Atlanta. 2000</li><li>• <i>Laboratory Methods for the Diagnosis of Epidemic Dysentery and Cholera</i>. CDC/WHO, 1999 CDC, Atlanta, GA, USA</li></ul>	

# Diarrhoea with dehydration in children less than 5 years of age

## Background

- Diarrhoea with dehydration in children less than 5 years of age is due to infections of the gastrointestinal tract caused by viruses (especially *Rotavirus*), bacteria (*E. Coli*, *Salmonellae*, *shigellae*, *Campylobacter*, *Yersinia*, and others), and parasites (*Giardia*, *Entamoeba*, cryptosporidia, and cyclospora). These diseases are transmitted through eating contaminated food or water, or through faecal-oral spread.
- Diarrhoeal diseases represent the second leading cause of death among children less than 5 years of age in many African countries, with more than 3 million deaths per year.
- Different epidemiological patterns (for example, seasonality) are observed for different pathogens.
- The WHO and UNICEF advocate that each district team use the Integrated Management of Childhood Illnesses (IMCI) strategy to reduce morbidity and mortality of childhood diarrhoea.

## Surveillance goal

- Detect diarrhoea outbreaks promptly. Laboratory confirmation can confirm specific pathogenic agent outbreak, but laboratory confirmation is not necessary for routine surveillance of diarrhoea with dehydration.
- Monitor antimicrobial resistance during outbreaks of bacterial origin.

## Standard case definition

### **Suspected case:**

Passage of 3 or more loose or watery stools in the past 24 hours with or without dehydration and:

*Some dehydration* -- two or more of the following signs: restlessness, irritability; sunken eyes; thirsty; skin pinch goes back slowly, or

*Severe dehydration* -- two or more of the following signs: lethargy or unconsciousness; sunken eyes; not able to drink or drinking poorly; skin pinch goes back very slowly.

### **Confirmed case:**

Suspected case confirmed with stool culture for a known enteric pathogen. *Note:* Laboratory confirmation of specific agent causing outbreak is not routinely recommended for surveillance purposes.

## Respond to alert threshold

**If you observe that the number of cases or deaths is increasing over a period of time:**

- Report the problem to the next level.
- Investigate the cause for the increased number of cases or deaths and identify the problem.
- Make sure that cases are managed according to IMCI guidelines.
- Encourage home-based therapy with oral rehydration.

# Diarrhoea with dehydration in children less than 5 years of age

## Respond to action threshold

If the number of cases or deaths increase to two times the number usually seen in a similar period in the past:

- Assess health worker practice of IMCI guidelines for managing cases and improve performance for classifying diarrhoea with dehydration in children less than 5 years of age.
- Teach mothers about home treatment with oral rehydration.
- Conduct community education about boiling and chlorinating water, and safe water storage and preparation of foods.

## Analyze and interpret data

**Time:** Graph cases and deaths to compare with same period in previous years. Prepare graphs for outpatient diarrhoea with some dehydration and for diarrhoea with severe dehydration. Construct an epidemic curve when outbreaks are detected.

**Place:** Plot location of case households.

**Person:** Report monthly totals due to diarrhoea with some dehydration and also for diarrhoea with severe dehydration from outpatient services. Also report monthly inpatient total cases and deaths due to diarrhoea with severe dehydration.

## Laboratory confirmation

Laboratory culture of stools may be used to confirm possible outbreaks of specific agents, but is not necessary for case definition.

## Reference

- *Management of childhood illness: Clinical skills training course for first level health facilities.* World Health Organization. WHO/CDR/95.14
- *Integrated Management of Childhood Illness: A WHO/UNICEF Initiative Bulletin of the World Health Organization.* Vol. 75, 1997, Supplement 1, 1997. ISBN 92 4 068750 5

# Dracunculiasis

## Background

- Dracunculiasis is commonly known as Guinea worm disease. It is caused by a large nematode, a disabling parasite that emerges through the skin of the infected person.
- This is an old disease, known since antiquity, leaving many patients with unfortunate socio-economic consequences. It is transmitted through ingestion of water containing a crustacean (cyclops) which is infested by an immature form (larvae) of the nematode. The Cyclops is found in stagnant surface water sources (ponds, traditional shallow wells) in rural areas. The female nematode discharges from the host's skin when there is contact with water. The incubation period is between 9 to 12 months. There is no treatment or vaccine against the disease.
- Successful disease control strategies conducted by the endemic countries and an international coalition of partners has pushed Dracunculiasis towards eradication. By December 2008, 4619 cases of Guinea worm were reported to WHO, worldwide, compared to 892 000 that were reported in 1989, showing a reduction of 99.47%.
- In 1989, the disease was endemic in 20 countries, worldwide: Benin, Burkina Faso, Cameroon, Central African Republic, Côte d'Ivoire, Chad, Ghana, Ethiopia, India, Pakistan, Kenya, Mali, Mauritania, Niger, Nigeria, Sudan, Senegal, Togo, Uganda and Yemen.
- Currently, solely Africa remains affected where 6 countries are still endemic in 2009: Sudan, Ghana, Mali, Ethiopia, Nigeria, and Niger.

## Surveillance goal

- Active detection and investigation of each case at the community level. Monthly reporting of cases to the next level.
- In zones where local transmission of the Guinea worm disease has been interrupted, maintain active searches for additional cases or rumors of case.
- Report all imported cases to countries or areas of origin.
- Integrate into surveillance to confirm absence of transmission.

## Standard case definition

### **Suspected case:**

- A person presenting a skin lesion with itching or blister living in endemic area of Guinea worm.
- **Confirmed case:** at the last phase of the programme, confirmation of last cases by knowledgeable health staff is required. Follow national guidelines for definition of confirmed case.

# Dracunculiasis

## Respond to alert threshold

### If a single case is suspected:

- Report the case according to national program guidelines for eradication of Dracunculiasis.
- Treat the wound (if any) to decrease disability associated with painful leg lesions.
- Conduct case investigation to confirm risk factors.
- Improve access to safe water according to national guidelines.

## Analyze and interpret data

**Time:** Graph cases monthly.

**Place:** Plot distribution of households and work sites for cases from which cases have been reported.

**Person:** Count monthly cases, and analyze age distribution. Report monthly to next levels.

## Laboratory confirmation

*Routine laboratory confirmation for surveillance is not required.* Diagnosis is made by visual recognition of the adult worm protruding from a skin lesion (see section 8.0) or by microscopic identification of larvae. Laboratory tests to investigate dracunculiasis are limited because the larvae of *D. medinensis* are normally washed into water. A diagnosis 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

- *Dracunculiasis or guinea-worm*, Geneva, World Health Organization, WHO/CDS/CEE/DRA/99.2, 1999 and WHO/WER N°37 September 2003
- *Control of Communicable Diseases Manual*, 18<sup>th</sup> Edition
- *District Laboratory Practice in Tropical Countries*, Cambridge

# Ebola or Marburg viral hemorrhagic fevers

## Background

- The Ebola and Marburg viruses are both filoviruses.
  - Almost 3,000 cases of Ebola with over 1,900 deaths have been documented since the Ebola virus was discovered in 1976. Major Ebola outbreaks have occurred in Sudan, DRC, Cote d'Ivoire, Gabon, Uganda and Congo.
  - More than 500 cases of Marburg with over 400 deaths were reported during outbreaks of Marburg virus that occurred in DRC (1998-2000), Angola (2004-2005) and Uganda (3 cases in 2007).
- These two viruses are transmitted by direct contact with the blood, secretions, organs or other body fluids of infected persons. The infection of humans with Ebola virus through the handling of infected chimpanzees, gorillas, and forest antelopes (alive and dead) has been documented.
- Ecological studies are in progress to identify the natural reservoirs of both Marburg and Ebola. There is evidence that bats are involved.
- Epidemics can be dramatically amplified in health care facilities with inadequate infection control precautions/barrier nursing procedures.
- Incubation period for Ebola and Marburg is 2 to 21 days.
- Between 20% and 80% of patients have haemorrhagic manifestations depending on the Ebola or Marburg virus strain. Patients 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%).
- 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.
- Close contact with a severely ill patient, during care at home or in hospital, and certain burial practices are common routes of infection. Transmission via contaminated injection equipment or through needle-stick injuries is associated with more severe disease. Infection may also be spread through contact with soiled clothing or bed linens from an infected patient.

# Ebola or Marburg viral hemorrhagic fevers

## Surveillance goals

- Early detection of cases and outbreaks, rapid investigation, and early laboratory verification of the aetiology of all suspected cases.
- Investigation of all suspected cases with contact tracing.
- During epidemics, most infected patients do not show haemorrhagic symptoms and a specific case definition according to the suspected or confirmed disease should be used.

## Standard case definition

**Suspected case:** Illness with onset of fever and no response to usual causes of fever in the area, and at least one of the following signs: bloody diarrhoea, bleeding from gums, bleeding into skin (purpura), bleeding into eyes and urine.

**Confirmed case:** A suspected case with laboratory confirmation (positive IgM antibody, positive PCR or viral isolation), or epidemiologic link to confirmed cases or outbreak.

**Note:** During an outbreak, these case definitions may be changed to correspond to the local event.

## Respond to alert threshold

### If a single case is suspected:

- Report case-based information immediately to the appropriate levels.
- Suspected cases should be isolated from other patients and strict barrier nursing techniques implemented.
- Standard precautions should be enhanced throughout the healthcare setting.
- Treat and manage the patient with supportive care.
- Collect specimen to confirm the case(s).
- Conduct case-contact follow-up and active case search for additional cases.

## Respond to action threshold

### If a single case is confirmed:

- Maintain strict VHF infection control practices\* throughout the outbreak.
- Mobilize the community for early detection and care 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.
- Conduct case contact follow-up and active searches for additional cases that may not come to the health care setting.
- Request additional help from other levels as needed.
- Establish isolation ward to handle additional cases that may come to the health centre.

## Ebola or Marburg viral hemorrhagic fevers

<b>Analyze and interpret data</b>	
<p><b>Person:</b> 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><b>Time:</b> Graph cases and deaths daily/weekly. Construct an epidemic curve during the outbreak.</p> <p><b>Place:</b> Map locations of cases' households.</p>	
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<p>Presence of IgM antibodies against Ebola, Marburg, CCHF, Lassa or West Nile Fever</p> <p style="text-align: center;"><i>or</i></p> <p>Presence of Ebola in post-mortem skin necropsy</p>
<b>Specimen</b>	<p><i>For ELISA:</i> Whole blood, serum or plasma</p> <p><i>For PCR:</i> Whole blood or blood clot, serum/plasma or tissue</p> <p><i>For immunohisto-chemistry:</i> Skin or tissue specimens from <i>fatal</i> cases.</p>
<b>When to collect</b>	<p>Collect specimen from the first suspected case.</p> <p>If more than one suspected case, collect until specimens have been collected from 5 to 10 suspected cases.</p>

## Ebola or Marburg viral hemorrhagic fevers

<b>How to prepare, store, and transport</b>	<p>HANDLE AND TRANSPORT SPECIMENS FROM SUSPECTED VHF PATIENTS WITH EXTREME CAUTION. WEAR PROTECTIVE CLOTHING AND USE BARRIER PRECAUTIONS.</p> <p><i>For ELISA or PCR:</i></p> <ul style="list-style-type: none"> <li>• Refrigerate serum or clot</li> <li>• Freeze (-20C or colder) tissue specimens for virus isolation</li> </ul> <p><i>For Immunohistochemistry:</i></p> <ul style="list-style-type: none"> <li>• Fix skin snip specimen in formalin. Specimen can be stored up to 6 weeks. The specimen is not infectious once it is in formalin.</li> <li>• Store at room temperature. Formalin-fixed specimens may be transported at room temperature.</li> </ul>
<b>Results</b>	<p>Diagnostic services for VHF are not routinely available. Advance arrangements are usually required for VHF diagnostic services. Contact the appropriate National authority or WHO.</p>
<b>Reference</b>	
<ul style="list-style-type: none"> <li>• <i>Interim Infection Control Recommendations for Care of Patients with Suspected or Confirmed Filovirus (Ebola, Marburg) Hemorrhagic Fever. BDP/EPR/WHO, Geneva March 2008</i></li> <li>• <i>Infection control for VHF in the African health care setting, WHO, 1998. WHO/EMC</i></li> <li>• <i>WHO Recommended Surveillance Standards WHO/CDS/CSR/ISR/99.2</i></li> <li>• <i>WHO Fact Sheet No 103, Ebola haemorrhagic fever, revised December 2008</i></li> <li>• <i>WHO Fact Sheet, Marburg haemorrhagic fever, revised July 2008</i></li> <li>• <i>Interim Infection Control Recommendations for Care of Patients with Suspected or Confirmed Filovirus (Ebola, Marburg) Hemorrhagic Fever. BDP/EPR/WHO, Geneva March 2008</i></li> <li>• <i>WHO recommended Guidelines for Epidemic Preparedness and Response: Ebola Haemorrhagic Fever (EHF). WO/EMC/DIS/97.7</i></li> <li>• <i>Dengue haemorrhagic fever: diagnosis, treatment, prevention and control. 2nd edition. Geneva: World Health Organization. 1997.</i></li> </ul>	

# Foodborne Illnesses

## Background

- Foodborne illnesses are caused by a variety of bacterial, viral, parasitic and bacterial or fungal pathogens or their toxins that enter the body through consumption of food or water. In addition to diseases listed elsewhere in this guideline such as cholera, and shigellosis, surveillance for foodborne illnesses may involve other causes such as salmonellosis, hepatitis A or chemical contamination.
- A foodborne illness occurs when two or more people have shared common food or drink followed by an onset of symptoms within a short time period.
- Most people with a foodborne illness do not seek medical care, so cases and outbreaks of foodborne illness usually are neither recognized nor reported.
- The first symptoms often occur in gastrointestinal tract. Nausea, vomiting, abdominal cramps and diarrhoea are frequent symptoms of foodborne diseases.
- Outbreaks may be localized affecting as few as 2 individuals who ate a common meal or product, but large and geographically widespread outbreaks may also occur. Large outbreaks occur when food is contaminated prior to distribution and is widely consumed by many people in many areas.
- Surveillance for foodborne illnesses is needed to monitor food safety and target health promotion actions aimed at food handlers for safer food practices and improved personal hygiene.

## Surveillance Goal

- To promptly identify any unusual cluster of disease potentially transmitted through food, which may need a public health investigation or response.
- Monitor the magnitude of foodborne illnesses.
- Identify high risk foods or food practices.
- Monitor risk factors to inform public health interventions and health promotion for targeted foods or food practices.

## Standard case definition

A foodborne illness is suspected when 2 or more people present with similar symptoms and who consumed common food or drink.

A foodborne illness is defined according to the specific agent causing the disease (for example, cholera, hepatitis A, salmonellosis, shigellosis).

A confirmed foodborne illness is a laboratory confirmed case of a specific agent with a link to a common food or drink source.

# Foodborne Illnesses

## Respond to alert threshold

**If observed that  $\geq 2$  people are ill and have eaten food from a common source:**

- Immediately report the illness to the next level of the health system.
- From patients and from the suspected food items and drinks, collect specimens for laboratory confirmation.
- Treat suspected cases.

## Respond to action threshold

**If an outbreak of a foodborne illness is confirmed:**

- Search for additional cases in locality of confirmed cases
- Strengthen case management and treatment
- Mobilise community for rapid case detection and treatment
- Identify high risk groups
- Remove from the restaurant menu or the supermarkets shelves, food items from which evidence of unsafe food may be obtained
- Eventually call for in-depth investigation of the food chains that may be associated with the outbreak
- Reduce sporadic and outbreak-related cases by promoting hand washing with soap and water after defecating/urinating and before food handling/meals; strengthen access to safe water supply and storage, use of latrines and safe human waste disposal
- Scale-up food safety health promotion activities using the *WHO Five Keys to Safer Food* (see reference below) and the Hazard Analysis Critical Control Point (HACCP) system
- Scale-up food inspection activities

## Analyse and interpret data

- **Time:** Graph monthly trends in cases and deaths; Construct an epidemic curve for outbreak cases.
- **Place:** Plot location of households for cases and deaths.
- **Person:** Count cases and deaths each month. During an outbreak, count outbreak-related cases by week.
- Routinely review clinical data and laboratory results from food and human analyses to identify clusters of cases in time, place or person. Investigate any suspected foodborne outbreaks detected in the data.
- Investigate all suspected outbreaks of foodborne illnesses.

# Foodborne Illnesses

## Reference

- Guidelines for Strengthening Foodborne Disease Surveillance in the WHO African Region
- WHO Five Keys to Safer Food at [www.who.int/fsf/Documents/5keys-ID-eng.pdf](http://www.who.int/fsf/Documents/5keys-ID-eng.pdf)
- WHO Foodborne disease outbreaks: Guidelines for investigation and control  
[http://whqlibdoc.who.int/publications/2008/9789241547222\\_eng.pdf](http://whqlibdoc.who.int/publications/2008/9789241547222_eng.pdf)

# Human influenza caused by a new subtype

## Background

- An influenza pandemic occurs when a new influenza A virus emerges with efficient and sustained human-to-human transmission in populations with limited immunity. Influenza pandemics occurred in 1918, 1957 and 1968. The 1918 pandemic killed an estimated 40–50 million people. It is predicted that a pandemic of equivalent magnitude could kill 62 million people, 96% of them in developing countries.
- Successful containment or control of pandemic influenza is dependent on early recognition of sustained human-to-human transmission. Countries have been encouraged as part of pandemic preparedness planning to enhance surveillance to (i) detect the emergence of new disease; (ii) characterize the disease (epidemiology, clinical manifestations, severity); and (iii) monitor its evolution.
- **Influenza A (H1N1) 2009:** On 11 June 2009, WHO declared a global pandemic due to influenza A (H1N1) 2009 virus and of 8 October 2009, 195 countries, territories and areas had reported cases and/or outbreaks of pandemic (H1N1) virus. The spectrum of disease ranges from non-febrile, mild upper respiratory tract illness to severe or fatal pneumonia.
- **Influenza A (H5N1):** Another influenza subtype, H5N1 has been circulating among birds for more than 10 years. In 2003, infections in people exposed to sick birds were identified. Since 2003, H5N1 has been confirmed in poultry and/or wild birds in 62 countries and 442 confirmed human H5N1 cases with 262 deaths have been reported from 15 countries. One confirmed death from human infection with A (H5N1) was reported from Nigeria in January 2007. Most patients with H5N1 present with symptoms of fever, cough and shortness of breath and radiological evidence of pneumonia. The large majority of cases for which risk factor data are available indicate that direct contact with live or recently dead poultry is the most important risk factor for human H5N1 infection. However, the continued geographical spread of this highly pathogenic avian influenza virus among birds in Asia, Europe, the Middle East and Africa has heightened concerns about the possibility of a global human pandemic of influenza H5N1.
- Under the IHR (2005), a State Party is required to notify WHO of the first occurrence of human influenza caused by a new subtype, including pandemic (H1N1) 2009 virus.

## Surveillance goals

- 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.

# Human influenza caused by a new subtype

## Standard case definition

### **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:

1. 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.
2. 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 faeces in an area where H5N1 infections in animals or humans have been suspected or confirmed in the last month.
3. 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.
4. Close contact with a confirmed H5N1 infected animal other than poultry or wild birds.
5. Handling samples (animal or human) suspected of containing H5N1 virus in a laboratory or other setting.

**Confirmed H5N1 case:** A person meeting the criteria for a suspected case **AND** positive laboratory results from a laboratory whose H5N1 test results are accepted by WHO as confirmatory.

**Suspected pandemic (H1N1) 2009 virus infection:** An individual presenting with influenza-like-illness (sudden onset of fever > 38 °C and cough or sore throat in the absence of another diagnosis) with a history of exposure to a pandemic (H1N1) 2009 virus.

**Confirmed pandemic (H1N1) 2009 virus infection:** An individual with a laboratory-confirmed pandemic (H1N1) 2009 virus infection by one or more of the following tests: PCR; viral culture; 4-fold rise in pandemic (H1N1) 2009 virus-specific neutralizing antibodies.

## Respond to alert threshold

**Respond to a suspected case of human influenza caused by a new subtype or to an unusual event of severe acute respiratory infection:**

- Report case-based information immediately to the appropriate levels.
- Implement acute respiratory disease infection control precautions immediately and enhance Standard Precautions throughout the health care setting.
- Treat and manage the patient according to national guidelines.
- Collect laboratory specimens from case-patient and from symptomatic contacts and arrange for laboratory testing<sup>\*\*\*</sup>.
- Review clinical and 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.

## Human influenza caused by a new subtype

<b>Respond to action threshold</b>	
<p><b>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:</b></p> <ul style="list-style-type: none"> <li>• Maintain strict acute respiratory disease infection control precautions and establish an isolation ward to manage additional cases who may present for care.</li> <li>• Treat and manage the patient according to national guidelines.</li> <li>• Implement active surveillance of case-patient contacts.</li> <li>• Conduct active searches for additional cases.</li> <li>• Distribute laboratory specimen collection kits to health care facilities.</li> <li>• Identify high risk populations.</li> <li>• Mobilize the community to enable rapid case detection and treatment.</li> <li>• Conduct community education on how influenza is transmitted and on how to implement infection measures in home and community settings.</li> </ul>	
<b>Analyze and interpret data</b>	
<b>Time:</b>	Graph weekly cases and deaths, construct an epidemic curve.
<b>Place:</b>	Plot location of case households and work sites using precise mapping.
<b>Person:</b>	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/blood relation.
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<p>Identification of human influenza virus infections by:</p> <ol style="list-style-type: none"> <li>1) Detection of influenza-specific RNA by reverse transcriptase-polymerase chain reaction</li> <li>2) Isolation in cell culture (BSL3 lab required for suspected new subtype)</li> <li>3) Direct antigen detection (low sensitivity)</li> <li>4)</li> </ol>
<b>Specimen</b>	<p>A variety of specimens are suitable for the diagnosis:</p> <ul style="list-style-type: none"> <li>• Throat swab</li> <li>• Nasopharyngeal swab</li> <li>• Nasal swab</li> <li>• Nasopharyngeal aspirate</li> <li>• Intubated patients: tracheal swab or broncholavage fluid</li> <li>• Blood</li> </ul> <p>Specimens should be collected in the following order of priority:</p> <ul style="list-style-type: none"> <li>• Throat swab/Nasopharyngeal aspirate</li> <li>• Acute serum</li> <li>• Convalescent serum</li> </ul>

## Human influenza caused by a new subtype

<p><b>When to collect the specimen</b></p>	<p>Obtained 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.</p> <p>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.</p> <p>Specimens should be collected from deceased patients as soon as possible after death.</p>
<p><b>How to prepare, store, and transport the specimen</b></p>	<p>Respiratory specimens should be transported in virus transport media. Media that could be used for a variety of viruses are commercially available.</p> <p>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.</p> <p>Sera may be stored at 4°C for approximately one week, but thereafter should be frozen at -20°C.</p> <p>Transport of specimens should comply with the WHO guidelines for the safe transport of infectious substances and diagnostic specimens.</p>
<p><b>Results</b></p>	<ul style="list-style-type: none"> <li>• Laboratory results should be confirmed by an approved laboratory.</li> <li>• 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:             <ul style="list-style-type: none"> <li>○ Forward specimens or virus isolates to a National Influenza Centre or to a WHO CC/WHO H5 Reference Laboratory for further identification or characterisation.</li> <li>○ Inform the WHO Office in the country that specimens or virus isolates are being forwarded to other laboratories for further identification or further characterization.</li> </ul> </li> </ul>

## Human influenza caused by a new subtype

### References

- *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 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
- *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

# Hypertension

## Background

- **Hypertension or high blood pressure (HBP)** is a chronic condition in which the blood pressure in the arteries is elevated. It is classified as either primary (essential) or secondary. 'Primary' Hypertension is elevated blood pressure where no medical cause is found. 'Secondary' Hypertension is caused by other conditions that affect the arteries, heart, endocrine system or kidneys.
- Hypertension is a major risk factor for cardiovascular diseases such as heart attack or stroke. According to The World Health Report 2001, cardiovascular disease related deaths are increasing in the African Region, and in 2000 accounted for 9.2% of the total deaths in the African Region. Prevalence ranges from 25% to 35% in adults aged 25 to 64 years.
- Hypertension affects approximately 1 billion worldwide and it is estimated that more than 20 million people in the African Region are affected.
- Major risk factors for hypertension are ageing, lack of physical activity, obesity, and a diet high in salt and fat. Other risk factors include; tobacco and alcohol use.
- Lifestyle modifications shown to lower BP include; weight reduction for individuals who are overweight or obese, reducing the amount of fat and salt in the diet, and eating more fresh fruits and vegetables, increased physical activity, and reduction of alcohol and tobacco consumption.

## Surveillance goal

- Prevention of secondary illness by early detection and standardized treatment
- Estimation of disease burden and reduction of identified risk factors
- Monitor control and prevention activities

## Standard case definition

### **Suspected new case at first visit:**

Any individual presenting with a resting blood pressure measurement (based on the average of 3 readings) at or above 140 mm Hg for systolic pressure, or greater than or equal to 90 mm Hg for diastolic pressure.

### **Confirmed case:**

Any individual presenting on at least two occasions with a resting blood pressure measurement (based on the average of 3 readings) at or above 140 mm Hg for systolic pressure, or greater than or equal to 90 mm Hg for diastolic pressure.

***\* Report only the first diagnostic of the case in the health centre***

# Hypertension

## Recommended public health action

- Health promotion for non-communicable diseases focusing on HBP should be established, including community-based education on behavior change and adoption of healthy lifestyles.
- Promote secondary prevention and treatment interventions at health facilities according to national guidelines.

## Analyze and interpret data

**Time:** Graph cases quarterly to analyze trends.

**Place:** Compare district trends with national and regional trends.

**Person:** Analyze the distribution of cases by age and other demographic factors.

*\*Data for non-communicable diseases is often analyzed for long term trends*

## Laboratory confirmation

Diagnostic is clinical.

## Reference

- WHO, *Atlas of heart disease and stroke*, Geneva, World Health Organization, 2004
- *Non communicable Diseases: A strategy for the African Region*, AFR/RC50/10
- *Cardiovascular Diseases in the African Region: Current situation and perspectives*, AFR/RC55/12
- <http://www.who.int/chp/steps/en/>
- [http://www.afro.who.int/dnc/databases/afro\\_infobase/index.html](http://www.afro.who.int/dnc/databases/afro_infobase/index.html)
- WHO CVD-risk management package for low-and medium resource settings
- *The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute, NIH Publication No. 03-5233, December 2003
- *Handbook of Hypertension*, Vol 20. Editor; C.J. Bulpitt, 2000
- <http://www.cdc.gov/bloodpressure/>

# Influenza-like Illness (ILI)

## Background

- Respiratory infections are a significant cause of infectious disease morbidity and mortality in the world. The mortality rates are particularly high among infants, children and the elderly. However, the burden of disease is not well characterized in Africa.
- The most common pathogens causing respiratory infections are; Streptococcus pneumoniae, Haemophilus influenzae type b (Hib), Staphylococcus aureus and other bacterial species, Respiratory Syncytial Virus (RSV), measles virus, human parainfluenza viruses type 1, 2, and 3 (PIV-1, PIV-2 and PIV-3), influenza virus and varicella virus.
- An improved understanding of the epidemiology and seasonality of respiratory infections in Africa is essential for optimizing public health strategies for their prevention and control (e.g., vaccines and antivirals for prophylaxis and treatment, infection control).
- The threat of respiratory infections due to novel organisms that have epidemic or pandemic potential warrants special precautions and preparedness. Respiratory disease events that may constitute a public health emergency of international concern include; Severe Acute Respiratory Syndrome (SARS); human influenza caused by a new subtype, including human episodes of avian influenza; pneumonic plague; and novel agents that can cause large-scale SARI outbreaks with high morbidity and mortality.
- Surveillance for respiratory infections is based on the Influenza-like Illness (ILI) case definition. Lab-based surveillance or investigations using the ILI case definition is used to identify the disease causing pathogen.

## Surveillance goals

- Early detection of unusual events that might indicate a shift in the severity or pattern of disease associated with influenza, or emergence of a new influenza strain.
- Establish and monitor baseline rates of severe respiratory disease, including monitoring the severity and impact of influenza,
- Describe and monitor vulnerable groups at highest risk of severe disease.
- Detection of antigenic or genetic changes in circulating viruses or the appearance of antiviral resistance.

## Standard case definition

### Influenza-like Illness

A person child or adult with:

- Sudden onset of fever  $> 38^{\circ}\text{C}$  AND
- Cough or sore throat in the absence of other diagnoses

**A confirmed case of influenza** is a case that meets the clinical case definition and is laboratory confirmed (laboratory results must be positive for influenza virus).

# Influenza-like Illness (ILI)

## Respond to an alert threshold

**If there is an unusual event (a cluster of deaths, for example) of respiratory infection, or if a single case of pandemic-prone acute respiratory disease is suspected:**

- Unusual cases of influenza-like illness.
- Health-care workers with only occupational exposure risks develop ILI after providing care to patients with ILI.
- Two or more children and/or adults presenting with a respiratory infection or who died from a respiratory infection with onset of illness in a two-week period and in the same geographical area and/or are epidemiologically linked.
- Persons who have contact with birds/animals present with ILI.
- Any rumor of clusters of acute respiratory infections or of atypical respiratory infections.

**Respond to a suspected case of an epidemic- or pandemic-prone acute respiratory disease or to an unusual event of severe acute respiratory infections:**

- Report case-based information immediately to the appropriate levels.
- Practice infection control precautions for an acute respiratory disease with epidemic/pandemic potential (e.g., Standard plus Contact plus Droplet Precautions) 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 7 days before disease onset.
- Identify and follow-up close contacts of case-patient.
- Conduct active searches for additional cases.
- Conduct risk assessment to guide decision-making.
- Public health measures related to international border and travel should be implemented under the framework of the international health regulations (2005).

## Analyze and interpret data

**Time:** Graph cases and deaths weekly. Describe changes in the level of respiratory activity compared to the previous week. Construct an epidemic curve throughout the year and describe transmission patterns.

**Person:** Characterize the illness in terms of clinical presentation, the spectrum of disease including severity of illness, count and report cases and deaths, the proportion of cases requiring hospitalization, clinical outcomes, case fatality ratio, attack rates by age/occupation/blood relation, laboratory confirmed cases. Describe the overall level of respiratory disease activity. Immediate case-based reporting of cases and deaths. During the outbreak, Analyze age and sex distribution. Assess risk factors immediately.

**Place:** Describe the degree of disruption of schools, health care infrastructure, workplace and point of entry (PoE). Ascertain whether any evidence exists that the virus may have increased its ability to cause human disease or improved its transmissibility. Also use trends of flu remedies and painkillers sales.

## Influenza-like Illness (ILI)

### Laboratory confirmation

Further technical information on the role of laboratory can be found in the WHO guideline on sentinel surveillance of influenza viruses

### Reference

- World Health Organization – Acute Respiratory Infections  
[http://www.who.int/vaccine\\_research/diseases/ari/en/index.html](http://www.who.int/vaccine_research/diseases/ari/en/index.html)
- World Health Organization – Influenza resources  
<http://www.who.int/csr/disease/influenza/inforesources/en/index.html>
- World Health Organization – Influenza Fact Sheet <http://www.who.int/mediacentre/factsheets/2003/fs211/en/>
- World Health Organization - Interim guidelines on infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care, June 2007  
[http://www.who.int/csr/resources/publications/WHO\\_CD\\_EPR\\_2007\\_6/en/index.html](http://www.who.int/csr/resources/publications/WHO_CD_EPR_2007_6/en/index.html)
- World Health Organization - Guidelines for investigation of human cases of avian influenza A (H5N1), January 2007.  
[http://www.who.int/csr/resources/publications/influenza/WHO\\_CDS\\_EPR\\_GIP\\_2006\\_4/en/index.html](http://www.who.int/csr/resources/publications/influenza/WHO_CDS_EPR_GIP_2006_4/en/index.html)
- World Health Organization - Collecting, preserving and shipping specimens for the diagnosis of avian influenza A (H5N1) virus infection. Guide for field operations, October 2006.  
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- World Health Organization - Guidelines for the collection of human specimens for laboratory diagnosis of avian influenza infection, 12 January 2005.  
[http://www.who.int/csr/disease/avian\\_influenza/guidelines/humanspecimens/en/](http://www.who.int/csr/disease/avian_influenza/guidelines/humanspecimens/en/)

## Injuries (Road traffic accidents)

### Background

- Injury is a physical damage resulting when the human body is briefly or suddenly subjected to levels of energy exceeding its physiological tolerance or the impairment in function resulting from the lack of one or more vital elements (water, air, warmth) .The energy causing the injury can be mechanical, electrical, thermal, radiant or chemical. Injury is classified as intentional and unintentional.
- All injuries account for 10% of the world's deaths. 5.8 million People die each year as a result of different types of injuries. Of the all systems that people have to deal with on a daily basis; road transport is the most complex and the most dangerous.
- Road traffic accidents result in unintentional injury.
- A traffic collision (motor vehicle collision, motor vehicle accident, car accident, or car crash) occurs when a road vehicle collides with another vehicle, pedestrian, animal, road debris, or other geographical or architectural obstacle. Traffic collisions can result in injury, property damage, and death.
- Worldwide, the number of people killed in road traffic crashes each year is estimated at 1.2 million, while the number of injured could be as high as 50 million.
- Road traffic injuries are a major but neglected global public health problem, requiring concerted efforts for effective and sustainable prevention.
- Road traffic injuries continue to be among the leading causes of death and disability among young people aged between 5 and 44 years and the leading cause of death in the category of people between 15-29 years. The majority of such deaths are currently among "vulnerable road users"-pedestrians, pedal cyclists and motorcyclists.
- Without increased efforts and new initiatives, the total number of road traffic deaths worldwide and injuries is forecast to rise by some 67% by 2020, and in low income and middle-income countries deaths are expected to increase by as much as 83%.
- The African region has the highest fatality rate for road traffic crashes at 32/100 000 population.
- Road traffic injuries are preventable. Very substantial reductions in injuries can be achieved by implementing measures which address risk factors (excessive and inappropriate speed, driving under the influence of alcohol, non-use of seat belts and child restraints, non- use of helmets for cyclists).

### Surveillance goal

- Estimate and monitor incidence of road traffic injuries and related outcomes
- Identify risk factors and high risk areas to inform prevention policy and programs
- Evaluate programmes aimed at preventing road traffic injuries
- Establish alert thresholds for fatalities to allow health facility personnel review care and services provided to injured persons
- Establish incidence alert thresholds and monitor trends to enable district health personnel inform relevant stakeholders

## Injuries (Road traffic accidents)

### Standard case definition

**Road traffic injury:** Any person who has sustained an injury as a result of a road traffic crash presenting for the first time.

**Road traffic fatality:** Any person killed immediately or dying within 30 days as a result of an injury crash.

### Respond to alert threshold

- Promote primary prevention by supporting interventions to address risk factors
- Review and monitor care and services provided to injured persons
- Review arrangements for mass casualty management

### Respond to action threshold

- Step up enforcement of measures to address risk factors
- Activate mass casualty management system

### Analyze and interpret data

**Person:** Analyze the distribution of cases by sex, age and other demographic factors

**Time:** Graphs to show monthly figures of cases and deaths, curves for the year to depict trends

**Place:** Plot location of cases and identify high risk areas

### Laboratory confirmation

Imaging of the injured person - when required

### Reference

- *World Health Report*, 2004, WHO
- WHO- 2010 Status report on Road Safety in Africa, 2010, WHO
- 2004Peden,M.; et al (eds), *World Report on Road Traffic Injury Prevention*, 2004, WHO
- Holder Y., Peden M., Krug E. et al (eds), *Injury Surveillance Guidelines*, 2001, Geneva WHO
- Harvey A, (Ed). *Data systems*, Geneva, World Health Organisation, 2010

# Lassa and Crimean-Congo Haemorrhagic Fevers

## Background

- Crimean-Congo haemorrhagic fever (CCHF) belongs to the Bunyaviridae virus family and Lassa fever belongs to the Arenaviridae virus family.
  - CCHF is endemic in Africa and outbreaks have been reported from Uganda, Mauritania, and South Africa. Mauritania reports a few cases each year and South Africa reported 165 laboratory-confirmed cases between 1981 and March 2006.
  - Lassa fever 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.
- CCHF spreads to humans either by tick-bites, or through contact with viraemic animal tissue immediately post-slaughter.
- The animal reservoir of the Lassa virus is a rodent of the genus *Mastomys*. *Mastomys* infected with Lassa virus do not become ill but shed the virus in their excreta (urine and 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 both CCHF and Lassa fever has occurred in health care settings after exposure to blood and secretions of infected patients.
- The incubation period for CCHF following a tick bite is usually 1-3 days (max 9 days) and following contact with blood or tissues is usually 5-6 days (max 13 days). The incubation period for Lassa fever ranges from 6-21 days.
- The onset of symptoms among CCHF patients is sudden with fever, myalgia and other signs and symptoms. The reported case fatality ratio for CCHF is between 3% and 30%.
- About 80% of human Lassa fever infections are mild or asymptomatic; the remaining cases have severe multi-system disease. The onset of disease in symptomatic patients is usually gradual starting with fever, general weakness and malaise. Lassa fever is difficult to distinguish from many other diseases which cause fever, including malaria, shigellosis, typhoid fever, yellow fever and other VHF's. The overall case fatality ratio is 1-15% among hospitalized patients.
- General supportive therapy is the mainstay of patient management in CCHF. Intensive monitoring to guide volume and blood component replacement is required. The antiviral drug, ribavirin, has been used in the treatment of established CCHF infection. Both oral and intravenous formulations seem to be effective. Ribavirin is effective treatment for Lassa fever is given early in the course of clinical illness.

# Lassa and Crimean-Congo Haemorrhagic Fevers

<b>Surveillance goal</b>
<ul style="list-style-type: none"><li>▪ Early detection of cases and outbreaks, rapid investigation, and early laboratory verification of the aetiology of all suspected cases.</li><li>▪ Investigation of all suspected cases with contact tracing.</li><li>▪ Assess and monitor the spread and progress of epidemics and the effectiveness of control measures.</li></ul>
<b>Standard case definitions</b>
<p><b>Suspected case of CCHF:</b> Illness with sudden onset of fever, malaise, weakness, irritability, headache, severe pain in limbs and loins and marked anorexia. Early development of flush on face and chest and conjunctival infection, haemorrhagic enanthem of soft palate, uvula and pharynx, and often fine petechial rash spreading from the chest and abdomen to the rest of the body, sometimes with large purpuric areas.</p> <p><b>Confirmed case of CCHF:</b> A suspected case with laboratory confirmation (positive IgM antibody, PCR, viral isolation or IgG seroconversion by ELISA or IFA) or epidemiologic link to confirmed cases or outbreak.</p> <p><b>Suspected case of Lassa Fever:</b> Illness with gradual onset with one or more of the following: malaise, fever, headache, sore throat, cough, nausea, vomiting, diarrhoea, myalgia, chest pain hearing loss and a history of contact with excreta of rodents or with a case of Lassa Fever.</p> <p><b>Confirmed case of Lassa Fever:</b> A suspected case that is laboratory confirmed (positive IgM antibody, PCR or virus isolation) or epidemiologically linked to a laboratory confirmed case.</p>
<b>Respond to alert threshold</b>
<p><b>If a single case is suspected:</b></p> <ul style="list-style-type: none"><li>▪ Report case-based information immediately to the appropriate levels.</li><li>▪ Suspected cases should be isolated from other patients and strict barrier nursing techniques implemented.</li><li>▪ Standard infection control precautions should be enhanced throughout the healthcare setting.</li><li>▪ Treat and manage the patient with supportive care.</li><li>▪ Collect specimen to confirm the case(s).</li><li>▪ Case-contact follow-up and active case search for additional cases.</li></ul>
<b>Respond to action threshold</b>
<p><b>If a single case is confirmed:</b></p> <ul style="list-style-type: none"><li>▪ Maintain strict VHF infection control practices* throughout the outbreak.</li><li>▪ 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 CCHF, educate the public about the mode of tick transmission and enhance rodent control activities for Lassa fever.</li><li>▪ Conduct active searches for additional cases.</li><li>▪ Request additional help from other levels as needed.</li><li>▪ Establish an isolation ward to handle additional cases that may come to the health centre.</li></ul>

## Lassa and Crimean-Congo Haemorrhagic Fevers

<b>Analyze and interpret data</b>	
<p><b>Person:</b> 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><b>Time:</b> Graph cases and deaths daily/weekly. Construct an epidemic curve during the outbreak.</p> <p><b>Place:</b> Map locations of cases' households.</p>	
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	Presence of IgM antibodies against CCHF, or Lassa Fever
<b>Specimen</b>	<p><i>For ELISA:</i> Whole blood, serum or plasma</p> <p><i>For PCR:</i> Whole blood or blood clot, serum/plasma or tissue</p> <p><i>For immunohisto-chemistry:</i> Skin or tissue specimens from <i>fatal</i> cases</p>
<b>When to collect the specimen</b>	<p>Collect specimen from the first suspected case.</p> <p>If more than one suspected case, collect until specimens have been collected from 5 to 10 suspected cases.</p>
<b>How to prepare, store, and transport the specimen</b>	<p>HANDLE AND TRANSPORT SPECIMENS FROM SUSPECTED VHF PATIENTS WITH EXTREME CAUTION. WEAR PROTECTIVE CLOTHING AND USE BARRIER PRECAUTIONS.</p> <p><i>For ELISA or PCR:</i></p> <ul style="list-style-type: none"> <li>▪ Refrigerate serum or clot</li> <li>▪ Freeze (-20C or colder) tissue specimens for virus isolation</li> </ul> <p><i>For Immunohistochemistry:</i></p> <ul style="list-style-type: none"> <li>▪ Fix skin snip specimen in formalin. Specimen can be stored up to 6 weeks. The specimen is not infectious once it is in formalin.</li> <li>▪ Store at room temperature. Formalin-fixed specimens may be transported at room temperature.</li> </ul>

## Lassa and Crimean-Congo Haemorrhagic Fevers

<b>Results</b>	Diagnostic services for VHF are not routinely available. Advance arrangements are usually required for VHF diagnostic services. Contact the appropriate National authority or WHO.
<b>References</b>	
<ul style="list-style-type: none"><li>▪ <i>Interim Infection Control Recommendations for Care of Patients with Suspected or Confirmed Filovirus (Ebola, Marburg) Hemorrhagic Fever</i>. BDP/EPR/WHO, 2008</li><li>▪ <i>Infection control for VHF in the African health care setting</i>, WHO, 1998. WHO/EMC</li><li>▪ Ergonul O. <i>Crimean-Congo Haemorrhagic Fever</i>. Lancet Infect Dis 2006;6:203-14</li><li>▪ <i>WHO Recommended Surveillance Standards</i> WHO/CDS/CSR/ISR/99.2</li><li>▪ WHO Fact Sheet No 208, <i>Crimean-Congo Haemorrhagic Fever</i>, revised November 2001</li><li>▪ WHO Fact Sheet No 179, <i>Lassa Fever</i>, revised April 2005</li></ul>	

# Leprosy

## Background

- Leprosy is a chronic mycobacterial disease of the skin, the peripheral nerves and upper airway mucous membranes. The disease is transmitted mainly through airborne spread from nasal secretions of patients infected by Hansen's bacillus and also through inoculation into broken skin. Leprosy is endemic in several tropical areas around the world, including Africa.
- Patients are classified into two groups, depending on presence of skin and nerve signs:
  - Multibacillary patients (MB) with more than 5 skin patches and several nerve enlargements.
  - Paucibacillary patients (PB) with one to five skin patches and a single nerve enlargement.
- Leprosy control has improved greatly through use of WHO recommended multidrug therapy (MDT). Multiple drug therapy combining two or three drugs (rifampicin, clofazimine and dapsone) is very effective in curing leprosy. At the end of 1999, leprosy point prevalence in African countries was 1.6 cases per 10 000 population with about 70 000 registered cases.
- Incubation period is 6 months to 20 years or more. Infection is probably frequent but clinical disease is rare, even among the closest contacts of patients. Multibacillary patients are most contagious, but infectiousness is reduced rapidly as soon as multiple drug therapy begins. Leprosy can be complicated by neuritis and leprosy reactions, resulting in impairment and disabilities of hands, feet, and eyes.
- Leprosy has historically been associated with social isolation and psychosocial consequences. This social stigma still persists in some countries in Africa.
- Some skin diseases such as tinea versicolor, mycosis, vitiligo, Scleroderma, psoriasis, systemic lupus erythematosus and Von Recklinghausen disease may be mistaken for leprosy.

## Surveillance goal

- Observe national trends towards the leprosy elimination target, defined as a reduction in prevalence to less than 1 case per 10 000 population.
- Monitor resistance of Hansen's bacillus to drugs used for multi-drug therapy (MDT) on an ongoing basis.
- As leprosy nears elimination, supplement routine surveillance with community-based surveillance.

## Standard case definition

### **Suspected case:**

A person showing one of three cardinal signs of leprosy: hypo-pigmented or reddish skin lesion, loss or decrease of sensations in skin patch, enlargement or peripheral nerve.

**Confirmed case:** A person showing at least two cardinal signs of leprosy and who has not completed a full course of treatment with multidrug therapy (MDT).

# Leprosy

## Respond to alert threshold

### If a single case is suspected:

- Report the suspected case to the appropriate level of the health system.
- Investigate case for risk factors.
- Begin appropriate case management:
  - MB patients must be treated for 12 months with a three-drug regimen (12 MB blister packs to be taken in a period of 18 months).
  - PB patients must be treated for 6 months with a two drugs MDT regimen (6 PB blister packs to be taken in a period of 9 months).

## Respond to action threshold

### If a suspected case is confirmed:

- Examine patients for skin and nerve signs at each contact patient has with a health worker to diagnose and care for leprosy reactions and impairments.
- Examine risk factors for treatment interruption (for example, inadequate supplies of MDT in the health centre, poor accessibility of patients' villages, and so on). Give sufficient blister packs for a full course of treatment to patients unable to attend a health centre monthly.
- Identify any fast increase or decrease of new cases during a period. Assess adequacy of surveillance in areas where under- or over-reporting is suspected. Monitor distribution of MDT drugs.

## Analyze and interpret data

- Time:** Graph cases by date diagnosed and treatment begun.
- Place:** Plot cases by location of households and disease classification (MB or PB).
- Person:** Count newly detected cases monthly by the type of leprosy (MB or PB). Analyze age and disability distribution and treatment outcomes (cases cured, defaulted, relapsed).

## Laboratory confirmation

Routine laboratory confirmation for surveillance is not required.

## Reference

- *Enhanced global Strategy for Further Reducing the Disease Burden due to Leprosy (SEA-GLP-2009.3)*
- WHO Recommended Surveillance Standards WHO/CDS/CSR/ISR/99.2

# Lymphatic Filariasis

## Background

- Lymphatic filariasis is the second leading cause of permanent and long-term disability worldwide. It affects over 120 million persons in 80 countries, and over 40 million persons are seriously incapacitated by the disease; 20% of the world population is at risk of infection. Of those infected, roughly 1/3 are in India, 1/3 in Africa, and the rest in the Americas, Asia, and the Pacific. In 1997, resolution WHA50.29 called for the elimination of lymphatic filariasis as a global public health problem. The strategy adopted is based on:
  - Reducing transmission below a threshold where new infection ceases to occur.
  - Treatment of the problems associated with disability control and prevention.
- Causal agents: in Africa only the filariae *Wuchereria bancrofti*, *Brugia malayi*, and *Brugia timori*
- Modes of transmission: transmitted by various species of mosquitoes, these parasitic filarial worms lodge in the human lymphatic system, producing millions of immature microfilariae that circulate in the blood. Microfilariae appear in the peripheral blood after 3 to 6 months for *Brugia malayi*, 6 to 12 months for *Wuchereria bancrofti*, often with nocturnal periodicity. When a mosquito thereafter bites the infected person, the microfilariae are picked up and the infection may be transmitted to others after about 2 weeks.
- Clinical description:
  - Filarial infection may be clinically asymptomatic (even in the presence of laboratory evidence of lymphatic and kidney damage); the disease may also present as one or more acute manifestations (fever, local swellings, tropical pulmonary eosinophilia syndrome, lymphangitis).
- Chronic complications include:
  - Lymphoedema or elephantiasis of the limbs
  - Damage to the genital organs (including hydrocoele in men)
  - Damage to the kidney (including chyluria) and lymphatic system

## Surveillance goal

There are currently 3 options and the choice will depend on the local situation:

1. Routine monthly reporting of aggregated data on probable and confirmed cases from periphery to intermediate level and to central level.
2. Sentinel population surveys (standardized and periodical).
3. Active case-finding through surveys of selected groups or through mass surveys. International: Annual reporting from central level to WHO (for a limited number of countries).

## Standard case definition

### Suspected case:

Resident of an endemic area with a clinical sign of hydrocoele or lymphoedema for which other causes of these findings have been excluded.

### Confirmed case:

A person with positive laboratory diagnosis of microfilaremia in blood smear, filarial antigenaemia or positive ultrasound test.

# Lymphatic Filariasis

## Respond to alert threshold

Confirm community prevalence of infection by surveys

## Respond to action threshold

### Case management

Hygiene measures for the affected body parts (and, when necessary, antibiotics and antifungal agents) can decrease the risk of adenolymphangitis:

- Washing the affected parts twice daily with soap and water
- Raising the affected limb at night
- Exercising to promote lymph flow
- Keeping nails short and clean
- Wearing comfortable footwear
- Using antiseptic or antibiotic creams to treat small wounds or abrasions, or in severe cases systemic antibiotics.

For the treatment of filarial carriers, the regimen recommended by the country is to be followed:

- In areas where there is neither Onchocerciasis nor loiasis: DEC 6 mg/kg single dose.
- In areas where Onchocerciasis has been excluded but not loiasis: individual clinical decision.

The current strategy for Filariasis control rests essentially on anti-parasitic measures. To interrupt transmission, the entire at risk population must be given a yearly, 1-dose regimen of the following:

#### *Areas with concurrent onchocerciasis:*

- 400 mg of albendazole + ivermectin 150 micrograms per kg of body weight once a year for 4-6 years

#### *Areas with no concurrent Onchocerciasis*

- Diethylcarbamazine 6 milligrams per kg of body weight + albendazole 400 mg once a year, or
- Diethylcarbamazine fortified salt for daily use for at least 6-12 months.

NOTE: In areas with *concurrent loiasis* (sub-Saharan Africa rain forest), mass interventions cannot at present be envisaged systematically (unless Onchocerciasis is a severe public health problem), because of the risk of severe adverse reactions in patients with high-density *Loa* infections (about 1 in 10,000 treatments).

It is important to educate the population on the importance of compliance during mass chemotherapy. Special efforts for vector control are not required as regards Lymphatic Filariasis. They should be carried out under other existing vector control programmes such as anti-malaria vector control operations.

## Lymphatic Filariasis

<b>Analyze and interpret data</b>	
<ul style="list-style-type: none"> <li>▪ Map the distribution of Lymphatic Filariasis and identify implementation units that will require mass drug administration.</li> <li>▪ Analyze the drug coverage in implementation units.</li> <li>▪ Assess the decline of parasitological indices microfilaraemia before starting MDA and after at least four rounds of MDA till the criteria of less than 1% microfilaraemia in the population and less than 0.1% antigenaemia in school entry children is achieved.</li> </ul>	
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<ul style="list-style-type: none"> <li>• Night blood smear</li> <li>• Filarial antigen test</li> </ul>
<b>Specimen</b>	<p>Blood smear</p> <p>Blood</p>
<b>When to collect</b>	<p>Night between 10pm and 2am</p> <p>Any time of the day</p>
<b>How to prepare, store, and transport</b>	<p>Spread three drops of blood on a glass slide and spread across the slide to make three lines. After fixing with heat stain with Geimsa stain and examine under microscope</p> <p>Either a rapid ICT card test or by an lab based ELISA test</p>
<b>Results</b>	<p>Positive test is when microfilariae of <i>W. bancrofti</i> is seen under the microscope</p> <p>Positive if filarial antigen is detected</p>

# Lymphatic Filariasis

## Reference

- WHO. *Monitoring and epidemiological assessment of the programme to eliminate lymphatic filariasis at implementation unit level* WHO/CDS/CPE/CEE/2005.50
- WHO. *Lymphatic filariasis*. WHO/CDS/CPE/SMT/2001.7
- WHO. *Training module on lymphatic filariasis for drug distributors (in countries where onchoerciasis is not co-endemic)*. WHO/CDS/CPE/CEE/2000.10 (Parts 1 & 2)
- WHO. *Training module on lymphatic filariasis for drug distributors (in countries where onchoerciasis is co-endemic)*. WHO/CDS/CPE/CEE/2000.11 (Parts 1 & 2)
- WHO. *The programme to eliminate lymphatic filariasis – essential elements for medical personnel (in countries where onchoerciasis is not co-endemic)*. WHO/CDS/CPE/CEE/2000.12
- WHO. *The programme to eliminate lymphatic filariasis – essential elements for medical personnel (in countries where onchoerciasis is co-endemic)*. WHO/CDS/CPE/CEE/2000.13
- WHO. *Preparing and implementing a national plan to eliminate filariasis (in countries where onchoerciasis is not co-endemic)*. WHO/CDS/CPE/CEE/2000.15
- WHO. *The programme to eliminate lymphatic filariasis (in onchoerciasis co-endemic countries)*. WHO//CDS/CPE/CEE/2000.16 Webpage: [www.who.int/lymphatic filariasis](http://www.who.int/lymphatic_filariasis)

# Malaria

## Background

- Malaria is a highly prevalent tropical illness with fever following the bite of infected female Anopheles mosquitoes which transmit a parasite, *Plasmodium falciparum*, *P. ovale*, *P. vivax*, or *P. malariae*. Serious malarial infections are usually due to *P. falciparum* which may result in severe anaemia and vital organ involvement.
- Malaria is one of the leading causes of illness and death in many African countries. There are 900 000 deaths per year in Africa mainly in children less than 5 years of age and pregnant women.
- Incubation period from the time of being bitten to onset of symptoms is 7 to 30 days. The incubation period may be longer, especially with non- *P. falciparum* species.
- Transmission of malaria is highly seasonal in some areas in African countries but is perennial in the rest of the region.

## Surveillance goal

- Detect malaria epidemics promptly, especially in areas with seasonal epidemic transmission or with a large population at risk.

## Standard case definition

### ***Uncomplicated malaria***

Any person living in area at risk of malaria with fever or history of fever within 24 hours; without signs of severe disease (vital organ dysfunction) is diagnosed clinically as malaria.

### ***Confirmed uncomplicated malaria***

Any person with fever or history of fever within 24 hours; and with laboratory confirmation of diagnosis by malaria blood film or other diagnostic test for malaria parasites.

### ***Unconfirmed severe malaria***

Any patient living in area at risk of malaria hospitalized with severe febrile disease with accompanying vital organ dysfunction diagnosed clinically.

### ***Confirmed Severe malaria***

Any patient hospitalized with *P. falciparum* asexual parasitaemia as confirmed by laboratory tests with accompanying symptoms and signs of severe disease (vital organ dysfunction) diagnosed through laboratory.

# Malaria

<b>Respond to alert threshold</b>	
<p><b>If there is an unusual increase in the number of new malaria cases or deaths as compared to the same period in previous non-epidemic years:</b></p> <ul style="list-style-type: none"> <li>• Report suspected epidemic to the next level.</li> <li>• Treat with appropriate anti-malarial drugs according to national program recommendations.</li> <li>• Investigate the cause for the increase in new cases.</li> <li>• Make sure new cases in children age 2 months up to 5 years are managed according to IMCI guidelines.</li> <li>• Conduct community education for prompt detection of cases and access to health facilities.</li> </ul>	
<b>Respond to action threshold</b>	
<p><b>If the number of new cases exceeds the upper limit of cases seen in a previous non-epidemic period in previous years:</b>          Evaluate and improve, as needed, prevention strategies, such as use of ITNs and IRS for all at risk of malaria.</p>	
<b>Analyze and interpret data</b>	
<b>Time:</b>	Graph the number of cases by month/week. Construct an epidemic curve during epidemics.
<b>Place:</b>	Plot location of households for new cases and deaths.
<b>Person:</b>	Count the number of new malaria cases and deaths by month and analyze age groups and time of onset.
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<ul style="list-style-type: none"> <li>• Microscopy: Presence of malarial parasites in blood films for suspected cases</li> <li>• Malaria Rapid diagnostic test: Positive or negative test</li> </ul>
<b>Specimen</b>	<p>Blood</p> <p>Usually finger-stick sample for all ages or other accepted method for collecting blood from very young children</p>
<b>When to collect</b>	<i>For blood smear:</i> prepare blood film for all suspected cases admitted to inpatient facility, or according to national malaria case management guidelines

## Malaria

<p><b>How to prepare, store, and transport</b></p>	<p><i>Blood smear:</i></p> <ul style="list-style-type: none"> <li>▪ Collect blood directly onto correctly cleaned and labeled microscope slides and prepare thick and thin smears</li> <li>▪ Allow smears to dry thoroughly</li> <li>▪ Stain using the appropriate stain and technique</li> <li>▪ Store stained and thoroughly dried slides at room temperature out of direct sunlight</li> </ul> <p><i>For rapid diagnostic test:</i></p> <ul style="list-style-type: none"> <li>▪ <i>Collect specimen and perform test according to manufacturers' instructions</i></li> </ul>
<p><b>Results</b></p>	<p>Thick and thin smear results can be available the same day as preparation.</p> <p>Microscopic examination of malarial slides may also reveal the presence of other blood-borne parasites.</p> <p>RDT result is obtained immediately.</p> <p>Note: In the inpatient setting, perform a hemoglobin estimation laboratory test to confirm severe anaemia, in children 2 months to 5 years in age.</p>
<p><b>Reference</b></p>	
<ul style="list-style-type: none"> <li>▪ <i>Malaria epidemics: Detection and control, forecasting and prevention.</i> Geneva. World Health Organization. WHO/MAL/98.1084</li> <li>▪ <i>Basic Laboratory Methods in Medical Parasitology,</i> WHO, Geneva, 1991</li> </ul>	

## Malaria Continued...

### Note: Setting an epidemic threshold:

The national Malaria Control Program can assist districts and health centers with determining appropriate thresholds for detecting possible epidemics. In the absence of a threshold set by the national program, the following method can be used to determine the threshold level for a malaria epidemic. The threshold is determined using the median and the 3rd Quartile of a period of time (for example, 5-year data from a health facility or district by month/week):

1. Look at the number of malaria cases at a specific health facility or district by month/week for the past 5 years.
2. Determine the median for each month/week (for example, each January for the last 5 years). Rank the monthly/weekly data for each month/week for the five years in ascending order. Identify the number in the middle of each month's/week's series for the five years. This is the median. Repeat this process for each month/week in the five years.
3. Determine the 3rd Quartile for the monthly/weekly series by identifying the 4th highest number from the bottom in each data series (since data is ranked in ascending order). This is the 3rd Quartile representing the upper limit of the expected normal number of malaria cases.
4. Plot the 3rd Quartile for each data series by month/week for the five year period and join the points with a line. The line represents the upper limit of the expected number of cases.
5. Plot the median for each data series by month/week for the five year period and join the points with a line. This line represents the lowest limit of expected number of cases.
6. The area between the two lines (the median and the 3rd Quartile) represents the "normal channel". If the number of currently observed cases of malaria falls between the two lines, the number of new cases for that month/week is assumed to be "normal". If the number is above the 3rd Quartile (upper limit), this is an indication of a possible malaria epidemic.

Please note that to ensure early detection and control of malaria epidemics, it is preferable to use weekly surveillance data in Malaria epidemic prone areas.

*Source: WHO/AFRO Regional Malaria Program*

# Malnutrition

## Background

- Globally, maternal and child under-nutrition are underlying causes for 3·5 million deaths, including 35% of the disease burden in children younger than 5 years. Of the 40 countries with a child stunting prevalence of 40% or more, 23 are in Africa.
- Severe malnutrition may act as a direct cause of death or an indirect cause by increasing dramatically the number of deaths in children suffering from common childhood illnesses such as diarrhea and pneumonia.
- Despite the above, the burden of child mortality due to severe malnutrition remains largely absent from the international health agenda and few countries, even in high prevalence areas, have specific national policies aimed at addressing it comprehensively.
- The most vulnerable are children under five and pregnant and lactating women. The poor nutritional status and nutritional intake of pregnant women may contribute to newborns with low birth weight (a weight measured immediately after birth). A newborn weighing less than 2500 grams (2.5 kilos or 5.5 pounds) is considered a newborn with low birth weight (LBW). LBW is a major determinant of death, illness and disability in infancy and childhood and also impacts health outcomes in adult life.
- Socio-economic conditions, poor water and sanitation, mothers' nutritional education on how to feed babies and young children, and repeated infections are the main causes of malnutrition.
- Programmes elaborated to eradicate malnutrition are on food security, water and sanitation, promotion of infant and young children feeding practices, micronutrient supplementation programmes, management of severe cases of malnutrition in the communities and in the health facilities, management of infections mainly diarrhoeal disease.
- Many sporadic surveys are being organized, but nutrition surveillance is currently poorly implemented and does not allow for interventions related to prevention and management of malnutrition.

## Surveillance goal

- Early warning and problem identification.
- Policy-making and planning.
- Programme management and evaluation.
- Assess effectiveness of public health response that address causes of low birth weight, malnutrition in children and malnutrition in pregnant women

## Standard case definition

### Low birth weight newborns:

Any new born with a birth weight less than 2500 grams (or 5.5 lbs)

# Malnutrition

## Malnutrition in children:

- Children under five who are underweight (indicator: weight for age < -2 ZScore)
- Children 6 to 59 months with MUAC < 11.5 cm (high risk of mortality)
- Bilateral pitting oedema

## Malnutrition in pregnant women:

Pregnant women given birth to low birth weight babies (birth weight < 2.5 Kg) (poor nutritional and health status of the women, can predict which population groups may benefit from improved antenatal care of women and neonatal care for infants).

## Response to alert threshold

### If more than 20% of children are underweight:

Programme emphasis on

- Breastfeeding support
- Nutrition education
- Supplementation of child and mother
- Prevention and treatment of diarrhoea
- Prevention and treatment of severe malnutrition
- Socio-economic support

### As soon as one case with MUAC less than 11.5 cm is detected or presence of bilateral oedema identified:

Alert, further investigation should be conducted. In addition, referral of the child to a therapeutic feeding programme.

### If more or equal than 15% of low birth weight are less than 2.5 Kg:

Targeting interventions for improved antenatal care for women and neonatal care of infants including nutritional care (anti-smoking and anti-alcohol campaigns, nutritional care for women before and during antenatal and during lactating period, malaria prophylaxis, new-born care facilities, etc.) to those at risk of poor pregnancy outcomes and treat new born to prevent morbidity and death.

## Analyze and interpret data

**Time:** Graph cases monthly to analyze trends and weekly in emergency

**Place:** Plot location of households/community with cases

**Person:** Count monthly/weekly cases and analyze age and gender distribution

## Laboratory confirmation

Routine laboratory confirmation for surveillance is not required.

# Malnutrition

## Reference

- Black R.E. et al. *Maternal and Child Undernutrition: global and regional exposures and health consequences*. The Lancet, Volume 371, Issue 9608, Pages 243 – 260
- Gross R, Webb P, *Wasting time for wasted children: severe child undernutrition must be resolved in non-emergency settings*. Lancet 2006; 367: 1209-1211
- *Physical status: the use and interpretation of anthropometry*. Report of a WHO Expert Committee. WHO Technical Report Series, 1995, No 854: 81, 128-130, 198-208
- WHO child growth standards and the identification of severe acute malnutrition in infants and children. A Joint Statement by the World Health Organization and the United Nations Children's Fund

# Maternal Deaths

## Background

- Deaths during pregnancy, childbirth or termination of pregnancy, and deaths up to 6 weeks (42 days) after childbirth or termination of pregnancy related to pregnancy are considered Maternal Deaths.
- Globally, about 80% of maternal deaths are due to; severe bleeding (mostly bleeding postpartum), infections (also mostly soon after delivery), hypertensive disorders in pregnancy (eclampsia) and obstructed labor. Complications after unsafe abortion cause 13% of maternal deaths.
- Across the developing world, maternal mortality levels remain too 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.
- Hemorrhage is the leading cause of maternal death in sub-Saharan Africa, and unattended births are a particular risk, especially in rural areas where transport to health care facilities is a problem.

## Surveillance goal

- Estimate and monitor maternal mortality rates.
- Identify risk factors and high risk areas for maternal mortality to inform program decisions.
- Evaluate programs aimed at reducing maternal mortality.

## Standard case definition

The death of a woman while pregnant or within 42 days of the delivery or termination of the pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

## Recommended public health action

- Establish alert thresholds to allow health facility or district health personnel determine when special targeted interventions are necessary.
- Monitor trends and respond to alert thresholds.
- Increase availability and use of antenatal care.
- Provide specialized training to traditional and profession birth attendants.
- Support interventions to improve recognition and response to high-risk pregnancies at the community level.

## Analyze and interpret data

**Time:** Graph cases to construct an epidemic curve throughout the year in order to identify trends.

**Place:** Plot the location of cases and analyze the distribution.

**Person:** Analyze the distribution of cases by age and other demographic factors.

## Maternal Deaths

### Laboratory confirmation

Routine laboratory confirmation for surveillance is not required.

### Reference

- WHO Maternal Mortality  
[http://www.who.int/making\\_pregnancy\\_safer/topics/maternal\\_mortality/en/index.html](http://www.who.int/making_pregnancy_safer/topics/maternal_mortality/en/index.html)
- UNICEF <http://www.unicef.org/index.php>

# Measles

## Background

- Measles is a febrile rash illness due to paramyxovirus (*Morbillivirus*) transmitted human-to-human via airborne droplet spread. It is the fourth leading cause of death in children less than 5 years of age in many African countries.
- The incubation period is 7 to 18 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%) 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.

## Surveillance goal

- Detect outbreaks of fever with rash illness promptly:

*In countries with a measles elimination target:* immediate case-based reporting of suspected cases and deaths of fever with rash illness; confirm all suspected measles cases with laboratory test (usually serum IgM)

*In countries with accelerated measles control programs:* Summary reporting of cases and deaths for routine surveillance and outbreaks; confirm the first five cases of suspected measles in a health facility per week with laboratory test (usually serum IgM)

## Standard case definition

### **Suspected case:**

Any person with fever and maculopapular (non-vesicular) generalized rash and cough, coryza or conjunctivitis (red eyes) or any person in whom a clinician suspects measles.

### **Confirmed case:**

A suspected case with laboratory confirmation (positive IgM antibody) or epidemiological link to confirmed cases in an outbreak.

# Measles

## Respond to alert threshold

### If an outbreak is suspected:

- Report suspected case to the next level.
- Collect blood sample for confirming the outbreak.
- Treat cases with oral rehydration, vitamin A, and antibiotics for prevention of bacterial super-infection. Use airborne isolation precautions where feasible.
- Investigate the case or outbreak to identify causes for outbreak.

## Respond to action threshold

### If an outbreak is confirmed:

- 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.

## Analyze and interpret data

**Time:** Graph weekly cases and deaths. Construct epidemic curve for outbreak cases.

**Place:** Plot location of case households.

**Person:** Count total cases and analyze by age group and immunization status.

## Laboratory confirmation

<b>Diagnostic test</b>	Presence of IgM antibodies to measles virus in serum.
<b>Specimen</b>	Serum Whole blood
<b>When to collect the specimen</b>	<p>Collect specimens between the 3<sup>rd</sup> day of the rash and 28<sup>th</sup> day after onset of rash.</p> <p>Collect blood samples on 5 suspected measles cases when the number of cases exceeds the measles outbreak threshold (usually more than 5 cases in a district in a month).</p> <p>In countries with an elimination target:</p> <ul style="list-style-type: none"> <li>▪ Collect specimen from every suspected case of measles</li> <li>▪ Collect serum for antibody testing at first opportunity or first visit to the health facility.</li> </ul>

# Measles

<p><b>How to prepare, store, and transport the specimen</b></p>	<ul style="list-style-type: none"> <li>▪ For children, collect 1 to 5 ml of venous blood depending on size of child. Collect into a test tube, capillary tube or microtainer.</li> <li>▪ 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.</li> <li>▪ If no centrifuge, put sample in refrigerator overnight (4 to 6 hours) until clot retracts. Pour off serum the next morning.</li> <li>▪ 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.</li> <li>▪ Store serum at 4°C.</li> <li>▪ Transport serum samples using appropriate packaging to prevent breaking or leaks during transport.</li> </ul>
<p><b>Results</b></p>	<p>The specimen should arrive at the laboratory within 3 days of being collected.</p> <p>Results are usually available after 7 days.</p> <p>If as few as 2 out of 5 suspected measles cases are laboratory confirmed, the outbreak is confirmed.</p> <p>Avoid shaking of specimen before serum has been collected.</p> <p>To prevent bacterial overgrowth, ensure that the serum is poured into a clean glass test tube. The test tube does not need to be sterile, just clean.</p> <p>Transport the serum in an EPI hand vaccine carrier to 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.</p>
<p><b>Reference</b></p>	
<ul style="list-style-type: none"> <li>▪ <i>Using surveillance data and outbreak investigations to strengthen measles immunization programs</i>, Geneva, World Health Organization. WHO/EPI/GEN/96.02</li> <li>▪ <i>WHO Guidelines for Epidemic Preparedness and Response to Measles Outbreaks</i> WHO/CDS/CSR/ISR/99.1</li> </ul>	

# Meningococcal Meningitis

## Background

- *Neisseria meningitidis*, *Haemophilus influenzae* type b (Hib), and *Streptococcus pneumoniae* constitute the majority of all cases of bacterial meningitis and 90% of bacterial meningitis in children.
- Meningococcal meningitis is the main form of meningitis to cause epidemics and remains a major public health challenge in the African meningitis belt, an area that extends from Senegal to Ethiopia. In these countries, large outbreaks may occur during the dry season (e.g., November through May). Outside of the meningitis belt, smaller outbreaks may occur year-round.
- Epidemics in the meningitis belt are traditionally associated with *Neisseria meningitidis* serogroup A although in 2002 an epidemic due to Nm serogroup W135 occurred in Burkina and in 2006 Nm 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 and only provide protection for up to three years resulting in repetitive meningitis outbreaks.
- A meningococcal A conjugate vaccine has been developed which is immunogenic in both infants and adults and is expected to confer long-term protection. It is expected that introduction of this conjugate vaccine into meningitis belt countries is likely to dramatically reduce the circulation of Nm A and eliminate Nm A epidemics.

## Surveillance goals

- To promptly detect meningitis outbreaks and to confirm aetiology 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.

# Meningococcal Meningitis

## Standard case definition

**Suspected case:** Any person with sudden onset of fever ( $>38.5^{\circ}\text{C}$  rectal or  $38.0^{\circ}\text{C}$  axillary) and one of the following signs: neck stiffness, altered consciousness or other meningeal signs.

**Confirmed case:** A suspected case confirmed by isolation of *N. meningitidis* from CSF or blood.

## Respond to alert threshold

### Alert threshold:

- For populations between 30 000 and 100 000 inhabitants, an attack rate of 5 cases per 100 000 inhabitants per week.
- For populations less than 30 000 inhabitants, 2 cases in 1 week or an increase in the number compared to the same time in previous non-epidemic years.

### Respond to alert threshold:

- 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 National protocol
- Intensify surveillance for additional cases in the area
- Prepare to conduct a mass vaccination campaign

## Respond to action threshold

### Epidemic threshold:

- For populations between 30 000 and 100,000: an attack rate of 15 cases per 100 000 inhabitants per week. When the risk of an epidemic is high (no epidemic during last 3 years, alert threshold reached in dry season), epidemic threshold is 10 cases per 100 000 inhabitants per week.
- For populations less than 30 000 inhabitants: 5 cases in 1 week or the doubling of the number of cases over a 3-week period.

### Respond to epidemic threshold:

- 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.

## Meningococcal Meningitis

<b>Analyze and interpret data</b>	
<b>Time:</b>	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.
<b>Place:</b>	In epidemics (not in endemic situations), plot location of case households and estimate distance to the nearest health facility.
<b>Person:</b>	Count total sporadic and outbreak cases. Analyze age distribution.
<b>Target case fatality rate:</b> <10%	
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	Microscopic examination of CSF for Gram negative diplococci Culture and isolation of <i>N. meningitidis</i> from CSF
<b>Specimen</b>	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.
<b>When to collect the specimen</b>	Collect specimens from 5 to 10 cases once the alert or epidemic threshold (see "Meningitis" in Section 8.0) has been reached.
<b>How to prepare, store, and transport the specimen</b>	<ul style="list-style-type: none"> <li>▪ Prepare the patient and aseptically collect CSF into sterile test tubes with tops.</li> <li>▪ Immediately place 1 ml of CSF into a pre-warmed bottle of trans-isolate medium.</li> <li>▪ Incubate at body temperature (36C to 37C).</li> <li>▪ Never refrigerate specimens that will be cultured.</li> </ul> <p>Keep CSF for microscopic exam and chemistry in the original syringe (replace cap). Refrigerate the capped syringe and send it to the laboratory as soon as possible.</p>

## Meningococcal Meningitis

<b>Results</b>	<p>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.</p> <p>Initial specimens in an outbreak or for singly occurring isolates of <i>N. meningitidis</i> should be serotyped and an antibiogram performed to ensure appropriate treatment.</p> <p>Trans Isolate medium (TI) is stable. If properly stored at temperature (4°C) it can be kept for up to two years after preparation. In the refrigerator, the liquid phase turns gelatinous but reliquifies at room temperature. Unused TI bottles should be kept tightly sealed. If there is any colour change (yellowing or clouding of the liquid medium) or drying or shrinkage of the agar slant, the medium should not be used.</p>
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<b>Reference</b>	
<ul style="list-style-type: none"><li>▪ Weekly Epidemiological Record N 38, September 2000 (<a href="http://www.who.int/wer/pdf/2000/wer7538.pdf">http://www.who.int/wer/pdf/2000/wer7538.pdf</a>)</li><li>▪ WHO Regional Office for Africa Standard Operating Procedures for Enhanced Meningitis Surveillance in Africa, August 2009</li><li>▪ Control of epidemic meningococcal disease. WHO Practical Guidelines, 2<sup>nd</sup> Edition. WHO/EMC/BAC/98.3</li><li>▪ Laboratory Methods for the Diagnosis of Meningitis Caused by <i>Neisseria meningitidis</i>, <i>Streptococcus pneumoniae</i> and <i>Haemophilus influenzae</i>. WHO document WHO/CDS/EDC/99.7 WHO, Geneva</li></ul>	

# Mental Illness (Epilepsy)

## Background

- Epilepsy is defined as the recurrence of, at least, two epileptic seizures with sudden occurrence of abnormal signs which could be: motor, tonic, sensitive, sensorial, neuro-vegetative, or psycho-behavioral. These symptoms could or could not be associated to a loss of conscience. It can appear at any age.
- Epilepsy is the most common result of brain cells disturbance that lead to excessive nerve-cell discharges. According to the disturbance on some or many groups of cells, seizures could be partial or generalized.
- Seizures with tonic-clonic muscle movements are named convulsion or fit or attack. Convulsion can appear at any age; all convulsions are not systematically epilepsy.
- Epilepsy is frequent in the Region and its prevalence rate range from 2.2 to 58 per 1000. Studies from five sub-Saharan African countries showed an incidence ranging from 64 to 156 per 100,000 person/year.
- This higher incidence may be a consequence of many risk factors which are related with predisposing factors such as poor perinatal care, head trauma, consanguinity.
- Many etiological factors are related with communicable diseases (malaria, tuberculosis, meningitis, neurocysticercosis and HIV), non-communicable diseases (high blood pressure, diabetes, alcoholism and illicit drug use), poorer medical facilities, poorer general health and a lower standard of living. Misunderstanding linked to cultural beliefs, stigma and exclusion do not facilitate appropriate care.
- Epilepsy substantially increases mortality risk, particularly in conditions of later detection due to lack of well trained health workers to diagnose and treat neurological disorders.
- Death and injury occur primarily due to status epilepticus (especially in the case of abrupt medication withdrawal), burns and drowning.
- It has been estimated that in developing countries, up to 80% of people with epilepsy are not receiving treatment, or are often not even identified. While the etiological diagnosis of the epilepsies may be more difficult in developing countries, due to limited investigative resources, many can be diagnosed on the basis of simple clinical and epidemiological knowledge.

## Surveillance goal

- Early detection and immediate intervention to prevent morbidity and mortality rates associated with epilepsy
- Register and monitor epilepsy cases

# Mental Illness (Epilepsy)

## Standard case definition

**Suspected case:** Any person with one epileptic seizure

**Suspected new case:** Report only the first diagnostic of the case in the health centre

**Confirmed case:**

Any person with recurrence of, at least, two epileptic seizures. A positive response to treatment with any AED strengthens the hypothesis of a confirmed case. Epileptic seizures can last for 30 seconds to 3 minutes. When they are intricate without a pause, they can lead to *status epilepticus*.

## Respond to alert threshold

### Suspected cases

- All health personnel should check for early signs of epilepsy. Diagnosis should include good interviews (describing as precisely as possible the seizure type) and clinical examination.
- Once diagnosed, search for underlying and associated causes. Check for abnormal increases on number of cases and propose appropriate environmental measures if needed.

### Confirmed cases

- Immediate treatment should be ensured starting with low doses of any anti epileptic drug then increasing progressively until an effective steady state. In case of poor seizure control management strategies must be: increase the dose or try an alternative drug, refer to an upper level health structure.
- Referral to higher level health structure should be done if seizures continue regardless of pharmacological treatment or if first seizure occurs in an adult aged 30 and above.

## Respond to action threshold

**All cases:** Information and education measures on epilepsy and risk factors at community level

## Analyze and interpret data

**Person:** Analyse sex and age distribution (by age group from 6 years onwards)

**Time:** Graph quarterly cases

**Place:** Plot the distribution by area of residence

## Mental Illness (Epilepsy)

<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<ul style="list-style-type: none"> <li>▪ Blood glucose (random capillary blood, and venous blood sugar), electrolytes to exclude other conditions such as diabetes, kidney pathology.</li> <li>▪ Exclude other conditions such as Cerebral Malaria, meningitis, toxoplasmosis; cerebro calcifications follow tuberculosis (tuberculoma), parasitic diseases and others by conducting appropriate medical investigations.</li> </ul>
<b>Specimen</b>	Blood, and cerebro-spinal fluid
<b>When to collect the specimen</b>	<p>Glucose – During the emergency admission of the patient (random blood glucose)</p> <p>Confirmed subsequently (fasting blood glucose)</p>
<b>How to prepare, store, and transport the specimen</b>	Use universal precautions to minimize exposure to sharps and any body fluid
<b>Results</b>	Results are always available within 1 to 3 hours from arrival in the laboratory
<b>References:</b>	
<ul style="list-style-type: none"> <li>▪ WHO, <i>Epilepsy in the WHO African Region: Bridging the Gap</i>, WHO Regional Office for Africa, Congo, 2004</li> <li>▪ WHO, <i>Epilepsy: a manual for medical and clinical officers in Africa</i>, WHO, Geneva 2002</li> </ul>	

# Neonatal tetanus

## Background

- A neuromuscular toxin-mediated illness caused by the anaerobic spore-forming soil bacterium *Clostridium tetani*. The disease is transmitted when spores enter open wounds (injections, cutting the umbilical cord) or breaks in the skin.
- While tetanus may occur in adults, infection primarily affects newborns. Neonatal tetanus has decreased dramatically in countries with improved maternal tetanus immunization rates. 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 cord care practices during delivery for neonates. Lack of antibody protection in incompletely immunized mothers.

## Surveillance goal

- Detect cases of neonatal tetanus immediately to confirm the case and prevent additional cases by immunizing at least pregnant women in area around the confirmed case.
- Identify high risk areas and target tetanus toxoid campaigns to women of childbearing age.

## Standard case definition

### **Suspected case:**

Any newborn with a normal ability to suck and cry during the first two days of life, and who, between the 3rd and 28th day of age, cannot suck normally, and becomes stiff or has convulsions or both.

### **Confirmed case:**

No laboratory confirmation recommended.

## Respond to alert threshold

### **If a single case is suspected:**

- Report case-based information immediately to the next level.
- Conduct an investigation to determine the risk for transmission.
- Treat and manage the case according to national recommendations, usually with supportive care and, if feasible, in intensive care. No routine isolation precautions are needed.

## Respond to action threshold

### **If a case is confirmed through investigation:**

- Immunize the mother and other pregnant women in the same locality as the case with at least 2 doses of tetanus toxoid.
- Conduct a supplemental immunization activity for women of childbearing age in the locality.
- Improve routine vaccine coverage through EPI and maternal immunization program activities.
- Educate birth attendants and women of childbearing age on the need for clean cord cutting and care. Increase the number of trained birth attendants.

## Neonatal tetanus

### Analyze and interpret data

**Time:** Graph cases and deaths monthly. Target should reflect elimination target for each district.

**Place:** Plot location of case households and location of birth attendants.

**Person:** Count monthly cases and deaths. Analyze each case of NNT by cord care practices.

### Laboratory confirmation

Laboratory confirmation is not required.

### Reference

- *Field manual for neonatal tetanus elimination.* Geneva, World Health Organization. WHO/V&B/99.14

## New AIDS Cases

### Background

- AIDS is an infection of human lymphocytes (types of white blood cells) and other organs. It is caused by a retrovirus, human immunodeficiency virus (HIV). Sexual intercourse, needle injections, transfusions, trans-placental or trans-vaginal routes, breast milk or other direct contact with infected human body fluids transmits the virus from human to human.
- Acquired immunodeficiency syndrome (AIDS) results in late-stage HIV infection and immuno-suppression, with reduced numbers and function to T-lymphocytes. Primary HIV-related organ involvement and a variety of opportunistic infections result in death unless the growth of the virus is stopped by drugs that can kill the virus (antiretroviral therapy). When HIV infection progresses to illness, the symptoms are usually due to the failure of the immune system to resist other infectious diseases called opportunistic infections (OI). These include tuberculosis, bacterial pneumonia or sepsis, oro-pharyngeal candidiasis, chronic diarrhoea, chronic skin infections, recurrent herpes zoster, and others.
- Twenty-four million Africans, close to one in ten adults between the ages of 15 and 49 years of age, are living with HIV/AIDS. The impact of the epidemic is already measurable in greatly increased adult and child morbidity and mortality. HIV/AIDS is now the leading cause of adult mortality in the African Region.
- Incubation period is approximately 1 to 3 months from the time of infection to the time that antibodies can be detected in a laboratory process. The time from HIV infection to the onset of AIDS is generally 7 to 9 years.
- Risk factors: populations at high risk of acquiring HIV are commercial sex workers with or without other sexually transmitted infections (STIs). Some STIs may increase HIV transmission. Others at risk include intravenous drug users (IDU), recipients of unscreened blood products and neonates born to HIV-infected mothers.
- Tuberculosis, visceral leishmaniasis, trypanosomiasis, and other subacute or chronic bacterial, parasitic, and viral infections may cause similar syndromes.

### Surveillance goal

- Monitor the impact of HIV/AIDS interventions in trends of incidence and prevalence of HIV infections, AIDS and STIs through sentinel sites, surveys and special studies (according to guidelines for second generation surveillance of HIV/AIDS).
- Estimate the burden of HIV/AIDS in the district using available information from HIV sentinel populations so that each new AIDS case is counted.
- Monitor local STI epidemiology as possible cofactor for HIV transmission.
- Monitor local opportunistic infection epidemiology, including TB.
- Improve percentage of suspected HIV/AIDS cases confirmed via serology.
- Improve HIV/AIDS screening.

## New AIDS Cases

### Standard case definition

WHO/AFRO recommends that countries use either Bangui or Abidjan HIV/AIDS case definitions. A positive ELISA for confirming HIV and a rapid test for confirming the positive results are sufficient for an epidemiologic case definition for HIV infection.

### Public health actions

- Monitor local STI and opportunistic infections, including TB, as possible cofactor for HIV.
- Improve percentage of suspected HIV/AIDS cases confirmed via serology.
- Monitor use of condoms by commercial sex workers.
- Provide voluntary counselling and testing services at district and sub-district levels.
- Treatment of individual cases with antiretroviral therapy is not yet widely available in most African countries. Rapid diagnosis and treatment of AIDS-related opportunistic infection (OI) may prolong life expectancy but this has not been widely evaluated in developing countries.
- Promote condom use, especially among high-risk individuals.
- Treat STIs, especially syphilis, chancroid diseases, and other ulcerative processes.
- Mobilize non-paid blood donors and promote appropriate use of blood.
- Promote good infection control practices within health facilities in the district.
- Educate patients and their sexual partners to refrain from donating blood, tissues, semen or breast milk.

### Analyze and interpret data

**Time:** Count new AIDS cases and report monthly. Analyze by number of cases confirmed with serology. At the end of the year, calculate the total number of cases and include trends for HIV sero-surveillance, STI surveillance and results of any special studies (socio-behavioural studies, drug sensitivity to antimicrobial agents, and so on).

## New AIDS Cases

<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<p><b>Adults and children 18 months or older:</b> HIV infection is diagnosed based on:</p> <ul style="list-style-type: none"> <li>▪ Positive HIV antibody testing (rapid or laboratory- based enzyme immunoassay). This is confirmed by a second HIV antibody test (rapid or laboratory-based enzyme immunoassay) relying on different antigens or of different operating characteristics. AND/OR</li> <li>▪ Positive virological test for HIV or its components (HIV-RNA or HIV-DNA or ultrasensitive HIV p24 antigen) confirmed by a second virological test obtained from a separate determination.</li> </ul> <p><b>Children younger than 18 months:</b> HIV infection is diagnosed based on positive virological test for HIV or its components (HIV-RNA or HIV-DNA or ultrasensitive HIV p24 antigen) confirmed by a second virological test obtained from a separate determination taken more than four weeks after birth. Positive HIV antibody testing is not recommended for definitive or confirmatory diagnosis of HIV infection in children until 18 months of age.</p>
<b>Specimen</b>	Serum
<b>When to collect the specimen</b>	Obtain specimens according to national HIV/AIDS program strategy for clinical or epidemiological sampling.
<b>How to prepare, store, and transport the specimen</b>	<p>Use universal precautions to minimize exposure to sharps and any body fluid. <i>ELISA:</i> Collect 10 ml of venous blood.</p> <ul style="list-style-type: none"> <li>▪ Let clot retract for 30 to 60 minutes at room temperature or centrifuge to separate serum from red blood cells.</li> <li>▪ Aseptically pour off serum into sterile, screw capped tubes.</li> <li>▪ Store serum at 4°C.</li> <li>▪ Transport serum samples using appropriate packaging to prevent breakage or leakage.</li> </ul>
<b>Results</b>	HIV testing is highly regulated with strict controls on release of information. Results are usually available within one week from arrival in the laboratory.

## New AIDS Cases

### Reference

- *Guidelines for Sexually Transmitted Infections Surveillance*. Geneva. UNAIDS and World Health Organization. WHO/CDS/CSR/EDC/99.3. UNAIDS/99.33E
- WHO Case definitions of HIV for surveillance and revised clinical staging and immunological classification of HIV-Related disease in adults and children
- *WHO Recommended Surveillance Standards* WHO/CDS/CSR/ISR/99.2
- *Guidelines for Second Generation HIV Surveillance*, WHO and UNAIDS, 2000 WHO/CDC/CSR/EDC/2000.5
- *Consultation on technical and operational recommendations for clinical laboratory testing harmonization and standardization*, Jan 2008, WHO, CDC

# Noma

## Background

- Noma (*cancrum oris*, *stomatitis gangrenosa*) is an opportunistic bacterial infection affecting children 1–4 years characterized by quickly spreading orofacial gangrene, evolving from a gingival inflammation.
- Noma results from complex interactions between risk factors such as poor sanitation, malnutrition, recurrent illnesses, and compromised immunity. Diseases that commonly precede noma include measles, malaria, severe diarrhea, and necrotizing ulcerative gingivitis.
- Noma occurs worldwide, but is most common in sub-Saharan Africa. In 1998, WHO estimated that worldwide 140 000 children contract noma each year, and 79% of them die from the disease and associated complications.
- In Africa the highest prevalence of Noma occurs in countries bordering the Sahara desert, where a recent report estimates an annual incidence of 25,000. However, Noma can occur wherever there is extreme poverty.
- Early detection and treatment with antibiotics is key to preventing severe disfigurement or death. In the acute stage, death can be prevented with high doses of penicillin; however disfigurement can only be treated with costly surgery.
- Prevention should focus on education and awareness of the disease, improved nutrition and household hygiene, promotion of exclusive breastfeeding in the first 3–6 months of life, access to prenatal care, and immunizations against common childhood diseases.
- Clinical features include soreness of the mouth, pronounced halitosis (bad smelling breath), fetid taste, tenderness of the lip or cheek, cervical lymphadenopathy, a foul-smelling purulent oral discharge, and a blue-black discoloration of the skin and swelling in the affected area.
- Health workers should recognize risk factors for Noma:
  - Severe growth failure in first 6 months of life
  - Evidence of malnutrition and poor dietary habits
  - Persistent diarrhea
  - Oral ulcers in children from high risk areas
  - Prominent bad smelling breath

## Surveillance goal

- Early detection and treatment of cases
- Identification of high risk communities and families
- Estimation of disease incidence and identification of risk factors

# Noma

## Standard case definition

### Suspected new case:

Any child with a mouth ulcer and other warning signs such as; malnutrition, poor hygiene, recent illness from; measles, persistent diarrhoea, or malaria should be regarded as a potential noma case.

### Confirmed new case:

Any person with a gangrenous disease which starts as gingival ulceration and spreads rapidly through the tissues of the mouth and face, destroying the soft and hard tissues.

## Recommended public health action

When a suspected case is detected:

- Treat the case with nationally recommended antibiotic
  
- Conduct health promotion activities in the community for:
  - Awareness of Noma among the community and in the household
  - Improved environmental sanitation and personal hygiene
  - Separation of livestock from areas where humans live
  - Exclusive breast feeding for the first 6 months of life
  - Improved nutrition and food preparation techniques
  
- Increase vaccination coverage in the district
- Improve sources of drinking water in at-risk communities
- Train public health personnel on early recognition of oral lesions that can lead to Noma

## Analyze and interpret data

**Time:** Monitor number of cases detected in time for treatment and use of standardized treatment. Monitor cases over time to estimate burden of disease and identify trends.

**Place:** Plot the location of case households and analyze the distribution.

**Person:** Analyze the distribution of cases by age and other demographic factors.

## Laboratory confirmation

Routine laboratory confirmation for surveillance is not required.

# Noma

## Reference

- Enwonwu, C. (2006). *Noma--the ulcer of extreme poverty*. New England Journal of Medicine, The **354**(3): 221-224
- Enwonwu, C., W. Falkler, et al. (2006). *Noma (cancrum oris)*. The Lancet **368**(9530): 147-156
- Fieger, A., K. Marck, et al. (2003). *An estimation of the incidence of noma in north-west Nigeria*. Tropical medicine & international health **8**(5): 402-407
- Enwonwu, C. O. (1995). *Noma: a neglected scourge of children in sub-Saharan Africa*. Bulletin of the World Health Organization **73**(4): 541-545
- Enwonwu, C. O., W. A. Falkler, et al. (1999). *Pathogenesis of cancrum oris (noma): confounding interactions of malnutrition with infection*. The American journal of tropical medicine and hygiene **60**(2): 223-232

# Onchocerciasis

## Background

- Filarial infection of the skin and eye caused by *Onchocerca volvulus* transmitted by the bite of female *Simulium* black flies.
- Nearly all of the world's estimated 18 million infected persons (of whom more than 250 000 are blind) live within 26 African countries. Onchocerciasis is the second leading infectious cause of blindness worldwide. It causes debilitating skin problems, leading to significant decreases in productivity in areas where it is endemic. Entire villages have relocated away from the fertile lands near rivers where black flies breed.
- Incubation period is years to decades since repeated infection is necessary for disease manifestations. Clinical illness is unusual in children even in endemic areas.
- Other filaria (for example, *Loa loa* and *Mansonella*) and other chronic skin and eye disease can produce similar clinical findings.

## Surveillance goal

- Early detection with goal of reducing the recurrence of transmission of the parasite in areas where it has been eradicated (zones covered by the Onchocerciasis Program).
- Conduct periodic surveillance in sentinel villages: screen using diethylcarbamazine (DEC); in case of a positive reaction to DEC, confirm with a microscopic examination of a skin biopsy from each suspected case.

## Standard case definition

**Suspected case:** In an endemic area, any person with fibrous nodules in subcutaneous tissues.

**Confirmed case:** A suspected case that is laboratory confirmed by presence of one or more of the following: microfilariae in skin snips, adult worms in excised nodules, or typical ocular manifestations (such as slit-lamp observations of microfilariae in the cornea, the anterior chamber, or the vitreous body).

## Respond to alert threshold

### If a suspected case is detected:

- Report the case according to national guidelines
- Collect specimen for confirming the case
- Investigate the case to determine the cause of the case
- Treat the case according to national guidelines

# Onchocerciasis

<b>Respond to action threshold</b>	
<p><b>If a case is confirmed:</b></p> <ul style="list-style-type: none"> <li>• Conduct a migration investigation to identify the origins of infection and initiate control activities.</li> <li>• Carry out vector control activities according to OCP guidelines.</li> <li>• Conduct periodic mass treatment with ivermectin in areas with endemic onchocerciasis during the last 10 years.</li> <li>• Conduct active case finding via population-based surveys and skin snips.</li> </ul>	
<b>Analyze and interpret data</b>	
<p><b>Time:</b> Graph cases quarterly</p> <p><b>Place:</b> Plot distribution of patients' household and workplaces</p> <p><b>Person:</b> Count quarterly cases and analyze age distribution</p>	
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<p>Microscopy</p> <p>Laboratory criteria for confirmation: One or more of the following:</p> <ul style="list-style-type: none"> <li>• presence of microfilariae in skin snips taken from the iliac crest</li> <li>• presence of adult worms in excised nodules</li> </ul> <p>presence of typical ocular manifestations, such as slit-lamp observations of microfilariae in the cornea, the anterior chamber, or the vitreous body.</p>
<b>Specimen</b>	<p>Skin snips from:</p> <ul style="list-style-type: none"> <li>• Nodule fluids</li> <li>• Iliac crests</li> <li>• Scapula area</li> </ul>
<b>When to collect</b>	Take snips and nodule fluids from suspected cases 1 hour after administration of Diethyl carbomazine.
<b>How to prepare, store, and transport the specimen</b>	Put the sample in a general container. Add a few drops of normal saline. Close it tightly before transporting it to the laboratory. Transported at ambient temperature.
<b>Results</b>	Result should be ready within 1 day.

# Onchocerciasis

## Reference

- *WHO Recommended Surveillance Standards. Second edition. WHO/CDS/CSR/ISR/99.2*
- *WHO Recommended Surveillance Standards WHO/CDS/CSR/ISR/99.2*

# Plague

## Background

- Zoonotic systemic bacterial infection caused by *Yersinia pestis* (plague bacillus) usually transmitted to humans by rodents and their fleas.
- Main disease forms: bubonic, pneumonic, and septicemic; large-scale epidemics may occur in urban or rural settings.
- Incubation period is 1 to 7 days.
- Case fatality rate (CFR) may exceed 50-60% in untreated bubonic plague and approaches 100% in untreated pneumonic or septicemic plague, but is usually <1% with appropriate treatment.
- Risk factor: rural residence. Exposure to infected populations of wild or domesticated rodents and their fleas.

## Surveillance goal

- Detect outbreaks of plague promptly. Verify aetiology of all suspected non-outbreak-related cases and the first 5 to 10 outbreak-related cases.

## Standard case definition

### **Suspected case:**

Any person with sudden onset of fever, chills, headache, severe malaise, prostration and very painful swelling of lymph nodes, or cough with blood stained sputum, chest pain, and difficulty in breathing.

### **Confirmed case:**

Suspected case confirmed by isolation of *Yersinia pestis* from blood or aspiration of buboes, or epidemiologic link to confirmed cases or outbreak.

## Respond to alert threshold

### **If a single case is suspected:**

- Report case-based information to the next level.
- Collect specimen for confirming the case.
- Investigate the case.
- Treat the patient with streptomycin, gentamicin or chloramphenicol, and administer chemoprophylaxis of close contacts with tetracycline for seven days from time of last exposure.

# Plague

<b>Respond to action threshold</b>	
<p><b>If the suspected case is confirmed:</b></p> <ul style="list-style-type: none"> <li>• Isolate patients and contacts of pneumonic plague with precautions against airborne spread (wear masks, for example) until at least after 48 hours of appropriate antibiotic therapy.</li> <li>• Mobilize community to enable rapid case detection and treatment, and to recognize mass rodent die-off as a sign of possible impending epidemic.</li> <li>• Identify high risk population groups through person, place, and time analysis.</li> <li>• Reduce sporadic and outbreak-related cases via improved control of rodent populations (remove trash, food sources, and rat harbourages) and protect against fleas with insect repellent on skin and clothing and environmental flea control (especially in homes and seaports and airports).</li> </ul>	
<b>Analyze and interpret data</b>	
<p><b>Time:</b> Graph monthly trends in cases and deaths. Construct epidemic curve for outbreak cases.</p> <p><b>Place:</b> Plot the location of case households.</p> <p><b>Person:</b> Immediate case-based reporting of cases and deaths for routine surveillance. Count weekly cases and deaths for outbreaks. Analyze age distribution and assess risk factors to improve control of sporadic disease and outbreaks.</p>	
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	Isolation of <i>Yersinia pestis</i> from bubo aspirate or from culture of blood, CSF or sputum. Identification of antibodies to the <i>Y. pestis</i> F1 antigen from serum.
<b>Specimen</b>	Aspirate of buboes, blood, CSF, sputum, tracheal washes or autopsy materials for culture  Blood for serological tests
<b>When to collect the specimen</b>	Collect specimen from the first suspected plague case. If more than one suspected case, collect until specimens have been collected on 5 to 10 suspected cases before the administration of antibiotics. With buboes, a small amount of sterile saline (1-2 ml) may be injected into the bubo to obtain an adequate specimen.  If antibiotics have been started, plague can be confirmed by seroconversion (4-fold or greater rise in titer) to the F1 antigen by passive haemagglutination using paired sera. Serum should be drawn within 5 days of onset then again after 2-3 weeks.

# Plague

<b>How to prepare, store, and transport the specimen</b>	<ul style="list-style-type: none"><li>• Specimens should be collected using aseptic techniques. Materials for culture should be sent to the laboratory in Cary Blair transport media or frozen (preferably with dry ice (frozen CO<sub>2</sub>). Unpreserved specimens should reach the laboratory the same day.</li><li>• Liquid specimens (aspirates) should be absorbed with a sterile cotton swab and placed into Cary-Blair transport medium. Refrigerate.</li><li>• If transport will require 24 or more hours and Cary Blair transport is not available, freeze the specimen and transport it frozen with cool packs.</li></ul>
<b>Results</b>	<p>Cultures should only be sent to a laboratory with known plague diagnostic capabilities or to a WHO Collaborating Centre for Plague.</p> <p>Plague culture results will take a minimum of 3 to 5 working days from reception in the laboratory.</p> <p>Antibiotic treatment should be initiated before culture results are obtained.</p> <p>Plague patients seroconvert to the F1 <i>Y. pestis</i> antigen 7-10 days after onset.</p>
<b>Reference</b>	
<ul style="list-style-type: none"><li>• <i>Plague Manual: Epidemiology, Distribution, Surveillance and Control/ Manuel de la Peste: Épidémiologie, Répartition, Surveillance et Lutte.</i> WHO/CDS/CSR/EDC/99.2</li><li>• <i>Laboratory Manual of Plague Diagnostic tests.</i> CDC/WHO publication, 2000, Atlanta, GA</li></ul>	

## Poliomyelitis (Acute flaccid paralysis)

### Background

- Poliovirus (genus Enterovirus) serotypes 1, 2, and 3 are transmitted from person-to-person via faecal-oral spread.
- Incubation period is 7 to 14 days for paralytic cases and the range is approximately 3 to 35 days. The virus may be shed for several years by immuno-compromised persons.
- Infection is usually asymptomatic, but may cause a febrile syndrome with or without meningitis. In less than 5% of infections paralysis results, often of a single leg.
- Polio infection occurs almost exclusively among children. Infection may occur with any of 3 serotypes of Poliovirus. Immunity is serotype-specific and lifelong.
- Paralytic polio, though not fatal, has devastating social and economic consequences among affected individuals.
- The Polio Eradication Program has nearly halted ongoing wild-type polio transmission worldwide through use of oral poliovirus (OPV) vaccine. Globally, poliovirus type 2 appears to have been eliminated. Serotypes 1 and 3 polioviruses still circulate in several African countries, and surveillance is not yet adequate to assure eradication in many countries.
- Areas with low vaccine coverage may allow ongoing wild-type transmission.
- Other neurological illnesses may cause AFP, for example, Guillain-Barré syndrome and transverse myelitis.

### Surveillance goal

- Immediate case-based reporting of all poliomyelitis cases. Weekly summary reporting of cases for routine surveillance and outbreaks.
- Detect cases of acute flaccid paralysis (AFP) and obtain laboratory confirmation of the aetiology of all suspected AFP cases. Obtain two or more stool specimens within 14 days of the onset of paralysis for viral isolation.
- 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

#### **Suspected case:**

Any child under 15 years of age with acute flaccid paralysis or any person with paralytic illness at any age in whom the clinician suspects poliomyelitis.

**Confirmed case:** A suspected case with virus isolation in stool.

## Poliomyelitis (Acute flaccid paralysis)

### Respond to alert threshold

**If a single case is suspected:**

- Report the suspected case immediately according to the national polio eradication program guidelines.
- 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 or VAPP.

### Respond to action threshold

**If a case is confirmed:**

- If wild polio virus is isolated from stool specimen, refer to national polio eradication program guidelines for recommended response actions. The national level will decide which actions to take. They may include the following:
  - Specify reasons for non-vaccination of each unvaccinated case and address the identified deficiencies.
  - Immediately conduct “mopping-up” vaccination campaign around the vicinity of the case.
  - Conduct surveys to identify areas of low OPV coverage during routine EPI activities, 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

- Time:** Graph monthly cases (which should be zero to very few cases per area per year), or weekly cases during an outbreak. Evaluate the percent of suspected cases reported within 48 hours and the percentage with adequate laboratory evaluation.
- Place:** Plot location of case households. Investigate the circumstances of poliovirus transmission in each case thoroughly. Examine the possibility of other potential areas of transmission.
- Person:** Count monthly routine and outbreak-related cases. Analyze age distribution. Assess risk factors for low vaccine coverage.

### Laboratory confirmation

**Diagnostic test**

Isolation of polio virus from stool

## Poliomyelitis (Acute flaccid paralysis)

<b>Specimen</b>	<p>Stool</p> <p><i>Note: If no specimen is collected, re-evaluate patient after 60 days to confirm clinical diagnosis of polio (AFP).</i></p>
<b>When to collect the specimen</b>	<p>Collect a sample from every suspected AFP case.</p> <p>Collect the first specimen when the case is investigated.</p> <p>Collect a second specimen on the same patient 24 to 48 hours later.</p>
<b>How to prepare, store, and transport the specimen</b>	<ul style="list-style-type: none"> <li>• Place stool in clean, leak-proof container and label clearly.</li> <li>• Immediately place in refrigerator or cold box not used for storing vaccines or other medicines.</li> <li>• Transport specimens so they will arrive at designated polio laboratory within 72 hours of collection.</li> </ul> <p>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>
<b>Results</b>	<p>Confirmed results are usually available within 21 after receipt of specimen by the laboratory.</p> <p>If wild or vaccine derived polio virus is detected, the national program will plan appropriate response actions</p>
<b>Reference</b>	
<ul style="list-style-type: none"> <li>• <i>Field Guide for Supplementary Activities Aimed at Achieving Polio Eradication.</i> World Health Organization</li> <li>• <i>WHO global action plan for laboratory containment of wild polio viruses.</i> WHO/V&amp;B/99.32, Geneva, 1999</li> <li>• <i>Manual for the virological investigation of polio,</i> WHO/ EPI/GEN/97.01, Geneva, 2004</li> <li>• <i>Supplement to the Manual for the virological investigation of Polio.</i> WHO/EPI 2007</li> </ul>	

# Rabies

## Background

- Rabies is a zoonotic disease (a disease that is transmitted to humans from animals) that is caused by a virus. Rabies infects domestic and wild animals, and is spread to people through close contact with infected saliva (via bites or scratches).
- The rabies virus infects the central nervous system, causing disease in the brain and, eventually, death. Early symptoms in people include: fever, headache, and general weakness or discomfort. As the disease progresses, symptoms include; insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, increase in saliva, difficulty swallowing, and fear of water.
- In unvaccinated humans, rabies is almost always fatal if post-exposure prophylaxis is not administered before the onset of severe symptoms. Death usually occurs within days of the onset of neurological symptoms.
- Dogs are the main carrier of rabies in Africa and are responsible for most (approximately 97%) of the human rabies deaths worldwide.
- 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 children are at highest risk of dog rabies. About 30% to 60% of the victims of dog bites (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.
- Control of rabies in dog populations and access to human rabies post exposure prophylaxis can substantially reduce the burden of rabies in human populations.
- Rapid and accurate laboratory diagnosis of rabies in humans and other animals is essential for timely administration of post-exposure prophylaxis. Within a few hours, a diagnostic laboratory can determine whether or not an animal is rabid and inform the responsible medical personnel.

## Surveillance goal

- Detect and respond promptly and appropriately to cases and outbreaks of rabies
- Identify high-risk areas
- Estimation of disease burden
- Immediate reporting of cases and routine monthly summary reports

## Standard case definition

### ***Suspected***

A person with one or more of the following: headache, neck pain, nausea, fever, fear of water, anxiety, agitation, abnormal tingling sensations or pain at the wound site, when contact with a rabid animal is suspected.

### ***Confirmed***

A suspected case that is laboratory confirmed

# Rabies

## Recommended Public Health Action

### For a single case:

- Post exposure prophylaxis to prevent rabies
- Isolate patient if rabies develops to prevent infection of others
- Immunize contacts if patient develops rabies
- Vaccinate local dogs and cats to prevent outbreaks

### General preventive measures:

- Promote public awareness of rabies
- Target immunization campaign for domestic or wild animals in high-risk areas
- Maintain active surveillance of rabies in animals

## Analyze and interpret data

**Time:** Plot cases monthly

**Place:** Plot the location of case households and animal exposures

**Person:** Analyze distribution of cases by age, exposing animal, and circumstances of infection. Assess risk factors to improve control of cases

## Laboratory confirmation

### Diagnostic test

Detection of rabies viral antigens by direct fluorescent antibody (FA) in clinical specimens, preferably brain tissue (collected post mortem)

- Detection by FA on skin or corneal smear (collected ante mortem)
- FA positive after inoculation or brain tissue, saliva or CSF in cell culture, in mice or in suckling mice
- Detectable rabies-neutralizing antibody titre in the CSF of an unvaccinated person
- Identification of viral antigens by PCR on fixed tissue collected post mortem or in a clinical specimen (brain tissue or skin, cornea or saliva)
- Isolation of rabies virus from clinical specimens and confirmation of rabies viral antigens by direct fluorescent antibody testing

### Specimen

- Brain tissue (collected post mortem)
- Skin biopsy (usually from the neck)
- corneal
- Saliva
- CSF
- Head of suspected rabid animal (dogs)

## Rabies

<p><b>When to collect the specimen</b></p>	<p>When a person is bitten by a pet that appears sick or by a wild animal, the biggest concern is rabies. No test can determine whether the rabies virus has been transmitted to the person immediately after the bite. So the animal is evaluated to determine whether the person requires treatment. A wild animal that has bitten a person is killed if possible, so that its brain can be examined.</p> <p>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.</p> <p>Post mortem: within 4-6hrs after death of patient, as soon as the suspected animal dies or is killed.</p>
<p><b>How to prepare, store, and transport the specimen</b></p>	<p>Safety precautions in handling rabies virus should be taken to avoid infection.</p> <p>Remove the head of the suspected animal, wrap head completely such that no blood is oozing out. Where possible, request a veterinarian to assist in the collection and preservation of the specimen.</p> <p>Sample should be sent to Reference Lab for Rabies virus.</p>
<p><b>Results</b></p>	<p>The treatment should never await the results of laboratory diagnosis. A laboratory diagnosis may be delayed for a variety of reasons. Results can be obtained from the reference lab within 1-2days.</p>
<p><b>Reference</b></p>	
<ul style="list-style-type: none"> <li>• <i>WHO Recommended Surveillance Standards WHO/CDS/CSR/ISR/99.2</i></li> <li>• <i>Laboratory techniques in rabies, Fourth Edition. WHO, edited by F.-X. Meslin and all</i></li> <li>• World Health Organization, Rabies Fact Sheet <a href="http://www.who.int/mediacentre/factsheets/fs099/en/">http://www.who.int/mediacentre/factsheets/fs099/en/</a></li> <li>• Council of State and Territorial Epidemiologists (CSTE). National Surveillance for Human Rabies. CSTE position statement 09-ID-70. Atlanta: CSTE; June 2009. Available from: <a href="http://www.cste.org">http://www.cste.org</a></li> <li>• 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: <a href="http://www.cdc.gov/mmwr/">http://www.cdc.gov/mmwr/</a></li> <li>• Bleck TP, Rupprecht CE. Chapter 160 – Rhabdoviruses. In: Mandell GL, Bennett JE, Dolin R, editors. <i>Principles and Practice of Infectious Diseases, 6th edition</i>. Philadelphia: Churchill Livingstone; 2005</li> </ul>	

# Rift Valley Fever (RVF)

## Background

- Rift Valley Fever (RVF) is a viral disease that affects mainly animals and occasionally humans. The virus is a member of the *Phlebovirus* genus, one of the five genera in the family *Bunyaviridae*. The disease is frequently reported following heavy rainfall and floods. It was first isolated in Rift Valley Province of Kenya in 1930. The disease was reported in Kenya after the El Nino flooding of 1997/98 and more recently in 2006 to 2007. In 2007 and 2010, Tanzania and South Africa respectively were also affected. Other outbreaks have previously been reported in Somalia, Egypt, Saudi Arabia and Yemen.
- RVF is mainly transmitted from animals (sheep, cattle, goats, camels) to humans through close contact with infected animals (such as handling meat and body fluids and consumption of raw milk). During established RVF outbreaks in animals humans can also get infected through bites of infected mosquitoes and other biting insects.
- The incubation period of RVF varies from 2 to 6 days. The clinical symptoms include an influenza-like illness, with sudden onset of fever, headache, myalgia and backache. These symptoms usually last from 4 to 7 days. Most of the infected people recover on their own. However a small proportion (about 1%) get complications such as vomiting blood, nose bleeding and passing bloody stool. Other severe types of the disease are eye disease and meningo-encephalitis.
- Management of RVF in humans is mainly supportive as there is no definitive treatment for RVF. Early detection and management of the disease is important. Human control of RVF is through control of the disease in animals through a sustained vaccination program and limiting human-animal contact. Use of insecticide treated nets and mosquito repellants can also reduce infections in human. In addition to human suffering and death, RVF has far reaching economic implications to the Livestock industry. In outbreak settings, the disease manifestation includes non-hemorrhagic febrile syndromes, and laboratory testing should be considered among persons with milder symptoms suggestive of viral illness.
- Immediate Notification to WHO is formally required by IHR (Annex).

## Surveillance goal

Detect, confirm aetiology and respond to outbreaks promptly of all cases of suspected VHF.

# Rift Valley Fever (RVF)

## Standard case definition

### Suspected case:

#### Early disease :

- Acute febrile illness (axillary temperature  $>37.5^{\circ}\text{C}$  or oral temperature of  $>38.0^{\circ}\text{C}$ ) of more than 48 hours duration that does not respond to antibiotic or antimalarial therapy, and is associated with:

- Direct contact with sick or dead animal or its products

#### AND / OR:

- Recent travel (during last week) to, or living in an area where, after heavy rains, livestock die or abort, and where RVF virus activity is suspected/confirmed

#### AND / OR:

- Abrupt onset of any 1 or more of the following: exhaustion, backache, muscle pains, headache (often severe), discomfort when exposed to light, and nausea/vomiting

#### AND / OR:

- Nausea/vomiting, diarrhoea OR abdominal pain with 1 or more of the following:
  - Severe pallor (or Hb  $< 8$  gm/dL)
  - Low platelets (thrombocytopenia) as evidence by presence of small skin and mucous membrane haemorrhages (petechiae) (or platelet count  $< 100 \times 10^9 / \text{dL}$ )
  - Evidence of kidney failure (edema, reduced urine output) (or creatinine  $> 150$  mol/L)

#### AND / OR:

- Evidence of bleeding into skin, bleeding from puncture wounds, from mucous membranes or nose, from gastrointestinal tract and unnatural bleeding from vagina

#### AND / OR:

- Clinical jaundice (3-fold increase above normal of transaminases)

### Late stages of diseases or complications (2-3 weeks after onset)

- Patients who have experienced, in the preceding month a flu-like illness, with clinical criteria, who additionally develop the following:
  - CNS manifestations which resemble meningo-encephalitis **AND/OR:**
  - Unexplained visual loss **OR:**
  - Unexplained death following sudden onset of acute flu-like illness with haemorrhage, meningo-encephalitis, or visual loss during the preceding month

### Confirmed case

Any patient who, after clinical screening, is positive for anti-RVF IgM ELISA antibodies (typically appear from fourth to sixth day after onset of symptoms) or tests positive on Reverse Transcriptase Polymerase Chain Reaction (RT-PCR).

## Rift Valley Fever (RVF)

<b>Respond to alert threshold</b>	
<p><b>If a single case is suspected:</b></p> <ul style="list-style-type: none"> <li>• Report case-based information immediately to the appropriate levels.</li> <li>• Enhance the usual standard precautions throughout the health care setting.</li> <li>• Treat and manage the patient with supportive care.</li> <li>• Collect specimen safely to confirm the case.</li> </ul>	
<b>Respond to action threshold</b>	
<p><b>If a single case is confirmed:</b></p> <ul style="list-style-type: none"> <li>• Mobilize the community for early detection and care.</li> <li>• Conduct community education about the confirmed case, how the disease is transmitted, and how to prevent contact with tissues of infected animals and avoid mosquito bites.</li> <li>• Provide information about prevention in the home and when to seek care.</li> <li>• Provide supportive treatment to all cases identified.</li> <li>• Request additional help from national levels as needed.</li> <li>• Collaborate with the animal health specialists to search and document cases among animals as well.</li> </ul>	
<b>Analyze and interpret data</b>	
<b>Time:</b>	Graph cases and deaths monthly. Construct an epidemic curve during the outbreak.
<b>Place:</b>	Plot location of case households and work sites using precise mapping.
<b>Person:</b>	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 and consider request for assistance to improve outbreak control.
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<p>Acute RVF can be diagnosed using several different methods. Serological tests such as ELISA may confirm the presence of specific IgM antibodies to the virus. The virus itself may be detected in blood during the early phase of illness or in post-mortem tissue using a variety of techniques including, antigen detection tests by ELISA, RT-PCR, virus propagation (in cell cultures), Immunohistochemistry in formalin-fixed tissues. ELISA IgG can be used for retrospective diagnostic.</p> <p>Same test can be used for animal diagnosis</p>

## Rift Valley Fever (RVF)

<p><b>Specimen</b></p>	<p>ELISA (serology)</p> <ul style="list-style-type: none"> <li>• Whole blood</li> <li>• Serum or plasma</li> <li>• Whole blood or clot</li> <li>• Tissues (fresh frozen)</li> </ul> <p>RT-PCR – Virus isolation</p> <ul style="list-style-type: none"> <li>• Blood</li> <li>• Serum/plasma</li> <li>• Liver biopsy from fatal cases</li> </ul> <p>Pathology</p> <ul style="list-style-type: none"> <li>• Tissue biopsy from fatal cases</li> </ul> <p>Identical specimen can be collected from animal</p>
<p><b>When to collect the specimen</b></p>	<p>Collect specimen from the first suspected case.</p> <p>If more than one suspected case, collect until specimens have been collected from 5 to 10 suspected cases.</p>
<p><b>How to prepare, store, and transport the specimen</b></p>	<p>Laboratory workers are at risk. Samples taken from suspected human cases of RVF for diagnosis should be handled by trained staff and processed in suitably equipped laboratories.</p> <p>ELISA/PCR/ISOLATION</p> <ul style="list-style-type: none"> <li>• Preparation and storage (freeze of refrigerate/as cold as possible)</li> <li>• Shipping : frozen on dry ice or ice packs or both</li> </ul> <p><i>Note: if dry ice or ice packs are not available, sample may be shipped at room temperature and still provide valid results in most cases.</i></p> <p><b>Immunohistochemistry:</b></p> <ul style="list-style-type: none"> <li>• Preparation and storage :Fix in formalin (can be stored up to 6 wks)</li> <li>• Shipping: Room temperature (do not freeze).</li> </ul> <p><i>Same shipping conditions for animal specimens</i></p>
<p><b>Results</b></p>	<p>Diagnostic services for RVF are not routinely available. Advance arrangements are usually required for RVF diagnostic services. Contact the appropriate National authority or WHO. Contact national Veterinary Services for animal diagnostic.</p>

## Rift Valley Fever (RVF)

### Reference

- *WHO/EMC Infection control for VHF in the African health care setting, WHO, 1998*
- *WHO Recommended Surveillance Standards WHO/CDS/CSR/ISR/99.2*
- Fact sheet N°207 Revised September 2007
- Infection Control for VHF in the African Health Care Setting /CDC (Annexes 11-12)

# Severe Acute Respiratory Infections (SARIs)

## Background

- Severe acute respiratory infections (SARIs) are a significant cause of infectious disease morbidity and mortality in Africa. The mortality rates are particularly high among infants, children and the elderly.
- An improved understanding of the epidemiology and seasonality of SARIs in Africa is essential for optimizing public health strategies for their prevention and control (e.g., vaccines and antivirals for prophylaxis and treatment, infection control).
- The threat of SARIs due to novel organisms that have epidemic or pandemic potential warrants special precautions and preparedness. Respiratory disease events that may constitute a public health emergency of international concern<sup>1</sup> include severe acute respiratory syndrome (SARS); human influenza caused by a new subtype, including human episodes of avian influenza; pneumonic plague; and novel agents that can cause large-scale SARI outbreaks with high morbidity and mortality.

## Surveillance goals

- To detect, in a timely manner, unusually severe morbidity and mortality caused by both known and unknown respiratory pathogens that have the potential for large scale epidemics or pandemics.
- To characterize and monitor trends in illnesses and deaths attributable to SARIs.

## Standard case definition

### Severe acute respiratory infection (persons $\geq$ 5 years old)

Any severely ill person presenting with manifestations of acute lower respiratory infection with:

- Sudden onset of fever ( $>38^{\circ}\text{C}$ ) AND
- Cough or sore throat AND
- Shortness of breath, or difficulty breathing
- With or without Clinical or radiographic findings of pneumonia

OR

Any person who died of an unexplained respiratory illness.

## Respond to a alert threshold

**If a single case of an epidemic- or pandemic-prone acute respiratory disease is suspected. OR If there is an unusual event (deaths, outbreak) of severe acute respiratory infection:**

- Atypical cases of influenza-like illness (ILI) or severe acute respiratory infection (SARI).
- Two or more persons presenting with a SARI or who died from a SARI are detected with onset of illness in a two-week period and in the same geographical area and/or are epidemiologically linked.
- Health-care workers with only occupational exposure risks develop SARI after providing care to patients with SARI.
- Persons who have contact with birds/animals present with SARI.
- Any rumor of clusters of severe acute respiratory infections or of atypical respiratory infections.

## Severe Acute Respiratory Infections (SARIs)

**Respond to a suspected case of an epidemic- or pandemic-prone acute respiratory disease or to an unusual event of severe acute respiratory infections:**

- Report case-based information immediately to the appropriate levels.
- Practice infection control precautions for an acute respiratory disease with epidemic/pandemic potential<sup>4</sup> (e.g., Standard plus Contact plus Droplet Precautions) 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 7 days before disease onset.
- Identify and follow-up close contacts of case-patient.
- Conduct active searches for additional cases.

### Analyze and interpret data

**Time:** Estimate incubation period; describe transmission patterns.

**Person:** 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/blood relation.

**Place:** Describe risk factors, possible exposures. Ascertain whether any evidence exists that the virus may have increased its ability to cause human disease or improved its transmissibility.

### Laboratory confirmation

Routine laboratory confirmation for surveillance is not required.

### References

- International Health Regulations, IHR (2005)
- *Technical Guidelines for Integrated Disease Surveillance in the African Region*. WHO - AFRO May 2002
- *WHO guidelines for investigation of human cases of avian influenza A(H5N1)*, January 2007
- WHO interim guidelines on infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care, June 2007
- WHO guidelines for the collection of human specimens for laboratory diagnosis of avian influenza infection, 12 January 2005
- Collecting, preserving and shipping specimens for the diagnosis of avian influenza A (H5N1) virus infection. Guide for field operations, October 2006

# Severe Acute Respiratory Syndrome (SARS)

## Background

- Severe acute respiratory syndrome (SARS) was first recognized as a global threat in 2003 when international spread resulted in 8,098 SARS cases in 26 countries, with 774 deaths.
- Nosocomial transmission of SARS-CoV was a striking feature of the SARS outbreak.
- The majority of the cases were adults. The case fatality ratio of SARS is estimated to range from 0% to more than 50% depending on the age group affected and reporting centre, 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 diarrhoea 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 diarrhoea.
- 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, IHR).

## Surveillance goals

- Early detection and investigation of individuals with clinically apparent SARS-CoV.

## Standard case definition

**Suspected case of SARS** is an individual with:

1. A history of fever, or documented fever  $\geq 38^{\circ}\text{C}$  AND
2. One or more symptoms of lower respiratory tract illness (cough, difficulty breathing, shortness of breath) AND
3. 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
4. No alternative diagnosis can fully explain the illness.

**Confirmed case of SARS:** An individual who tests positive for SARS-CoV infection by the WHO recommended testing procedures.

# Severe Acute Respiratory Syndrome (SARS)

## Respond to suspected case

- Report case-based information immediately to the appropriate levels.
- Practice infection control precautions for an acute respiratory disease with epidemic/pandemic potential immediately and enhance Standard Precautions throughout the health care setting.
- Treat and manage the patient according to national guidelines.
- Collect and transport laboratory specimens from case-patient and from symptomatic contacts and arrange for laboratory testing.
- Review clinical history and exposure history during 2-10 days before disease onset.
- Identify and follow-up close contacts of case-patient.
- Conduct active searches for additional cases.
- Expedite the diagnosis. *(WHO will assist in the investigation of SARS alerts as appropriate, including facilitating access to laboratory services)*

## Respond to alert threshold

Response to SARS alert is same as response to suspected case (see above).

### **SARS ALERT:**

- 1) 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**
- 2) 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**
- 3 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.

## Analyze and interpret data

**Time:** Graph cases and deaths daily/weekly/monthly. Construct an epidemic curve during the outbreak.

**Place:** Plot locations of case households and work sites using precise mapping.

**Person:** Immediate case-based reporting of cases and deaths. During the outbreak, count and report cases and deaths. Analyze age and sex distribution. Assess risk factors immediately.

## Severe Acute Respiratory Syndrome (SARS)

<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<p>Confirmed positive PCR for SARS virus:</p> <ul style="list-style-type: none"> <li>• At least 2 different clinical specimens (e.g. nasopharyngeal and stool) OR</li> <li>• The same clinical specimen collected on 2 or more days during the course of the illness (e.g. 2 or more nasopharyngeal aspirates) OR</li> <li>• 2 different assays or repeat PCR using the original clinical sample on each occasion of testing</li> </ul> <p>Seronconversion by ELISA or IFA:</p> <ul style="list-style-type: none"> <li>• Negative antibody test on acute serum followed by positive antibody test on convalescent serum OR</li> <li>• Four-fold or greater rise in antibody titre between acute and convalescent phase sera tested in parallel.</li> </ul> <p>Virus isolation: Isolation in cell culture of SARS-Cov from any specimen; plus PCR confirmation using a validated method</p>
<b>Specimen</b>	<p>Nasopharyngeal wash/aspirate specimen of choice for respiratory viruses. Nasopharyngeal swabs or oropharyngeal swabs Stool Serum</p>
<b>When to collect</b>	<p>The respiratory tract specimen can be collected at any time, but are best taken during the acute phase of illness.</p> <p>The time collection of paired blood samples is very important:</p> <ul style="list-style-type: none"> <li>• Collect an acute illness sample at first contact with the patient at days 7, 14, 28 and 90 after onset where possible.</li> <li>• Collect blood on discharge if collection of a convalescent sample is unlikely.</li> </ul>

## Severe Acute Respiratory Syndrome (SARS)

<b>How to prepare, store, and transport</b>	<ul style="list-style-type: none"> <li>• SARS specimens should be handled according to appropriate biosafety practices in order to avoid laboratory-related infections and spread of disease to close contacts.</li> <li>• Clinical samples from patients should be collected by trained personnel.</li> </ul> <p>Nasopharyngeal wash/aspirate: have the patient sit with the head tilted slightly backward. Instil 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 tubings and discard in plastic bag.</p> <p>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).</p> <p>Serum collection: Collect 5-10 ml of whole blood in a serum separator tube. Allow blood to clot.</p> <p>Respiratory / stool / blood/serum specimens: Refrigerate immediately (4°C). If transport/shipping will be international or will occur &gt; 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.</p> <p>Fixed tissues (formalin fixed) from all major organs. Store and ship fixed tissue at room temperature.</p>
<b>Results</b>	<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>
<b>Reference</b>	
<ul style="list-style-type: none"> <li>• <i>WHO Guidelines for the Global Surveillance of SARS, Updated Recommendations, October 2004</i></li> <li>• <i>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</i></li> <li>• Use of laboratory methods for SARS diagnosis, WHO</li> <li>• WHO Biosafety guidelines for handling of SARS specimens</li> <li>• <i>A practical Guide for SARS laboratories: from samples collection to shipment. WHO, 29 Dec 2003</i></li> </ul>	

# Severe Pneumonia in Children under 5 years of age

## Background

- Infection of the lower airways caused by bacteria or viruses transmitted person-to-person via aerosolized respiratory droplet spread. The main bacterial causes of pneumonia among children are *Streptococcus pneumoniae* (the pneumococcus) and *Haemophilus influenzae* type b (Hib).
- Acute respiratory infections (ARIs) and pneumonia represent the number one cause of mortality among children less than 5 years of age.
- Incubation period is usually less than 7 days, depending on the aetiology.
- WHO and UNICEF recommend use of Integrated Management of Childhood Illness (IMCI) strategy to reduce morbidity and mortality attributable to childhood pneumonia. Early antimicrobial therapy has been shown to reduce mortality.
- Resistance of the pneumococcus and Hib to beta-lactams (for example, ampicillin), sulfonamides (for example, trimethoprim-sulfamethoxazole) and other antimicrobials is increasing.
- Viruses such as respiratory syncytial virus (RSV) may also cause ARI and pneumonia.

## Surveillance goal

- Early identification of pneumonia cases and epidemics using clinical definitions.
- Monitor antimicrobial resistance routinely and during outbreaks.
- Reducing the proportion of severe pneumonia cases compared to non-severe pneumonia cases to monitor quality of interventions.

## Standard case definition

### **Clinical case definition (IMCI) for pneumonia:**

A child presenting with cough or difficult breathing and:

- 50 or more breaths per minute for infant age 2 months up to 1 year
- 40 or more breaths per minute for young child 1 year up to 5 years

*(Note: A young infant age 0 up to 2 months with cough and fast breathing is classified in IMCI as "serious bacterial infection" and is referred for further evaluation.)*

### **Clinical case definition (IMCI) for severe pneumonia:**

A child presenting with cough or difficult breathing and any general danger sign, or chest indrawing or stridor in a calm child. General danger signs for children 2 months to 5 years are: unable to drink or breast feed, vomits everything, convulsions, lethargy, or unconsciousness.

### **Confirmed case:**

Radiographic or laboratory confirmation of pneumonia will not be feasible in most districts.

## Severe Pneumonia in Children under 5 years of age

### Respond to alert threshold

If you observe that the number of cases or deaths is increasing over a period of time:

- Report the problem to the next level.
- Investigate the cause for the increase and identify the problem.
- Make sure that cases are managed according to IMCI guidelines.
- Treat cases appropriately with recommended antimicrobial drugs.

### Respond to action threshold

If the number of case or deaths increases to two times the number usually seen during a similar period in the past:

- Assess health worker practices of IMCI guidelines for assessing, classifying and treating children with pneumonia and severe pneumonia.
- Identify high risk populations through analysis of person, place and time.
- Conduct community education about when to seek care for pneumonia.

### Analyze and interpret data

**Time:** Conduct month-to-month analysis for unexpected or unusual increases. Graph cases and deaths by month. Construct epidemic curve for outbreak cases. Plot month-to-month data and compare to previous periods.

**Place:** Plot location of case households.

**Person:** Count monthly pneumonia and severe pneumonia cases. Count pneumonia deaths. Analyze age distribution.

### Laboratory confirmation

Routine laboratory confirmation for surveillance is not required.

### Reference

- *Integrated Management of Childhood Illnesses*. World Health Organization. WHO/CDR/95.14.1

# Sexually transmitted infections

## Background

- Infections of the human genito-urinary and reproductive systems transmitted via human sexual contact (sexually transmitted disease, STIs). The most common causes of male urethral discharge are a) the gonococcus *Neisseria gonorrhoea* and b) *Chlamydia trachomatis*. The most common causes of male and female genital ulcer are c) syphilis (*Treponema pallidum*), d) herpes simplex virus (HSV1 or 2) and e) chancroid (*Haemophilus ducreyi*).
- STIs are endemic in most countries of the world, including countries in Africa. Multiple simultaneous STIs are common (for example, gonorrhoea plus *Chlamydia*). STIs may be most highly prevalent in areas where HIV occurs and may facilitate HIV transmission. STIs may be primary or from repeated attacks of urethral discharge.
- STIs are a leading cause of abortion and stillbirth, prematurity, and congenital infections. They may lead to pelvic inflammatory disease (PID), a major cause of decreased fertility.
- Incubation periods for gonorrhoea are 2 to 7 days; *Chlamydia* 7 to 14 days (or longer); syphilis, 10 days to 12 weeks (usually around 3 weeks), and chancroid, 3 to 14 days.
- STIs may be more commonly diagnosed in men, in whom clinical evidence of infection may be more readily apparent.

## Surveillance goal

- Early detection and treatment of STI reduces transmission rates. Active efforts to diagnose latent syphilis may prevent significant disability.
- Improve early and effective treatment of STIs using simple algorithms based on syndromic diagnosis for index cases and partners.
- Carry out laboratory-based anti-microbial sensitivity monitoring and modify treatment guidelines accordingly at the national level.
- Compare surveillance data for both STIs and HIV/AIDS since STIs may reflect co-presence of HIV.

## Standard case definition

### Genital ulcer syndrome (non-vesicular):

**Suspected case:** Any male with an ulcer on the penis, scrotum, or rectum, with or without inguinal adenopathy, or any female with ulcer on labia, vagina, or rectum, with or without inguinal adenopathy.

**Confirmed case:** Any suspected case confirmed by a laboratory method.

### Urethral discharge syndrome:

**Suspected case:** Any male with urethral discharge with or without dysuria.

**Confirmed case:** *Urethral discharge syndrome:* A suspected case confirmed by a laboratory method (for example Gram stain showing intracellular Gram-negative diplococci).

# Sexually transmitted infections

## Public health action

- Conduct active case finding for specific target groups.
- Conduct primary prevention activities such as promotion of safer sexual behaviours and provision of condoms.
- Assess use of algorithms for detection and treatment of STIs. And improve health worker practice with algorithms.
- Include STI prevention and care services in maternal and child health, and family planning services.
- Target acceptable and effective STI prevention and care services to populations identified as vulnerable to STI transmission.
- Promote early STI health seeking behaviour.

## Analyze and interpret data

- Time:** Graph cases each quarter.
- Place:** No recommendation for analysis of place.
- Person:** Count quarterly cases and analyze age distribution.

## Laboratory confirmation

Routine laboratory confirmation for surveillance is not required.

## Reference

- *Guidelines for Sexually Transmitted Infections Surveillance*. Geneva. UNAIDS and World Health Organization. WHO/CDS/CSR/EDC/99.3. UNAIDS/99.33E

# Smallpox (Variola)

## Background

- Smallpox is an acute contagious disease caused by variola virus, a member of the orthopoxvirus family. Other members of the genus include cowpox, camelpox, and monkeypox. Monkeypox virus has caused the most serious recent human poxvirus infections.
- Smallpox killed as many as 30% of those infected. In 1967, when WHO launched an intensified plan to eradicate smallpox, the disease threatened 60% of the world's population and killed every fourth patient.
- The global eradication of smallpox was certified by a commission of eminent scientists in December 1979 and subsequently endorsed by the World Health Assembly in 1980.
- Smallpox had two main forms: variola major and variola minor. The disease followed a milder course in variola minor, which had a case-fatality rate of less than 1 per cent. The fatality rate of variola major was around 30%. There are two rare forms of smallpox: haemorrhagic and malignant. In the former, invariably fatal, the rash was accompanied by haemorrhage into the mucous membranes and the skin. Malignant smallpox was characterized by lesions that did not develop to the pustular stage but remained soft and flat. It was almost invariably fatal.
- The incubation period of smallpox is usually 12–14 days (range 7–17) during which there is no evidence of viral shedding. During this period, the person looks and feels healthy and cannot infect others.
- The incubation period is followed by the sudden onset of influenza-like symptoms. Two to three days later, the temperature falls and the patient feels somewhat better, at which time the characteristic rash appears, first on the face, hands and forearms and then after a few days progressing to the trunk. Lesions also develop in the mucous membranes of the nose and mouth, and ulcerate very soon after their formation, releasing large amounts of virus into the mouth and throat. The centrifugal distribution of lesions more prominent on the face and extremities than on the trunk, is a distinctive diagnostic feature of smallpox and gives the trained eye cause to suspect the disease. Lesions progress from macules to papules to vesicles to pustules. All lesions in a given area progress together through these stages. From 8 to 14 days after the onset of symptoms, the pustules form scabs which leave depressed depigmented scars upon healing.
- Varicella (chickenpox) can be distinguished from smallpox by its much more superficial lesions, their presence more on the trunk than on the face and extremities, and by the development of successive crops of lesions in the same area.
- Smallpox is transmitted from person to person by infected aerosols and air droplets spread in face-to-face contact with an infected person after fever has begun, especially if symptoms include coughing. The disease can also be transmitted by contaminated clothes and bedding, though the risk of infection from this source is much lower.
- The frequency of infection is highest after face-to-face contact with a patient after fever has begun and during the first week of rash, when the virus is released via the respiratory tract.
- In the absence of immunity induced by vaccination, humans appear to be universally susceptible to infection with the smallpox virus.
- Vaccine administered up to 4 days after exposure to the virus, and before the rash appears, provides protective immunity and can prevent infection or ameliorate the severity of the disease.
- Immediate Notification to WHO is formally required by IHR (2005).

# Smallpox (Variola)

<b>Surveillance goal</b>
<ul style="list-style-type: none"><li>To detect and immediately respond to any suspected case of smallpox.</li></ul>
<b>Standard case definition</b>
<p><b>Suspected case:</b> An illness with acute onset of fever <math>\geq 38.3^{\circ}\text{C}</math> (<math>101^{\circ}\text{F}</math>) followed by a rash characterized by vesicles or firm pustules in the same stage of development without other apparent cause.</p> <p><b>Probable case:</b> 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><b>Confirmed case:</b> A clinically compatible case that is laboratory confirmed.</p>
<b>Respond to alert threshold</b>
<p><b>If a single case is suspected:</b></p> <ul style="list-style-type: none"><li>Report case-based information immediately to the appropriate levels.</li><li>Implement airborne infection control precautions.</li><li>Treat and manage the patient with supportive care.</li><li>Collect specimen safely to confirm the case.</li><li>Implement contact tracing and contact management.</li><li>Conduct active surveillance to identify additional cases.</li><li>Notify WHO.</li></ul>
<b>Respond to action threshold</b>
<p><b>If a single case is confirmed:</b></p> <ul style="list-style-type: none"><li>Maintain strict infection control measures practices throughout the duration of the outbreak.</li><li>Mobilize the community for early detection and care.</li><li>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.</li><li>Conduct active searches for additional cases.</li><li>Request additional help from national and international levels.</li><li>Establish isolation ward to handle additional cases that may be admitted to the health facility.</li></ul>

## Smallpox (Variola)

<b>Analyze and interpret data</b>	
<p><b>Time:</b> Graph cases and deaths daily/weekly/monthly. Construct an epidemic curve.</p> <p><b>Place:</b> Map location of case households.</p> <p><b>Person:</b> 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>	
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<p>Isolation of smallpox (Variola) virus from a clinical specimen Or Polymerase chain reaction (PCR) assay identification of Variola DNA in a clinical specimen</p> <p>Note: Level C or D laboratories only</p>
<b>Specimen</b>	<p>Biopsy specimens*</p> <p>Scabs*</p> <p>Vesicular fluid*</p> <p>Lesion skin (roof)*</p> <p>Pustule material*</p> <p>Blood samples</p> <p><i>Note: blood samples from person where severe, dense rash may be difficult to draw as the skin may slough off. A central line may be needed for access in cases where a peripheral blood draw is difficult.</i></p> <p>* preferred specimens for diagnosis of acute illness during rash phase</p>
<b>When to collect</b>	<p>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>

## Smallpox (Variola)

<p><b>How to prepare, store, and transport</b></p>	<p>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><b>Biopsy specimens:</b> 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. <i>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.</i></p> <p><b>Scabs:</b> Aseptically place scrapings/material into a sterile, leakproof, freezable container. Storage - 20 °C to - 70 °C. Transport ~6h at 4 °C.</p> <p><b>Vesicular fluid:</b> 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. <i>Note: approval must be obtained prior to the shipment of potential smallpox patient clinical specimens to a Reference laboratory.</i></p>
<p><b>Results</b></p>	<p>Diagnostic services for smallpox are not routinely available. Advance arrangements are usually required for smallpox diagnostic services. Contact the appropriate National authority or WHO.</p>
<p><b>Reference</b></p>	
<ul style="list-style-type: none"> <li>• WHO Fact Sheet, Smallpox. <a href="http://www.who.int/mediacentre/factsheets/smallpox">http://www.who.int/mediacentre/factsheets/smallpox</a></li> </ul>	

# Trachoma

## Background

- Trachoma is the leading cause of preventable blindness worldwide. It is caused by infection with *Chlamydia trachomatis* bacteria, and is both treatable and preventable.
- Infections often begin during infancy or childhood and can become chronic. If left untreated, the infection eventually causes the eyelid to turn inwards, which in turn causes the eyelashes to rub on the eyeball, resulting in intense pain and scarring of the front of the eye. This ultimately leads to irreversible blindness, typically between 30 and 40 years of age.
- Trachoma is easily spread through direct personal contact, shared towels and cloths, and flies that have come in contact with the eyes or nose of an infected person.
- WHO estimates that approximately 6 million cases of blindness due to trachoma and 11 million cases of trichiasis occur worldwide each year. Prevalence of active disease in children varies from 10-40% in some African countries.
- The infection primarily affects young children, with blindness occurring later in life. Females are three times more likely than males to suffer from trichiasis, the in-turning of the eyelashes that can lead to blindness. People are most at risk for trachoma infection in areas where there is poor sanitation, lack of latrines, poor sources of clean water, and the presence of flies.
- Primary interventions advocated for preventing trachoma infection include improved sanitation, reduction of fly breeding sites and increased facial cleanliness (with clean water) among children at risk of disease. The scarring and visual change for trachoma can be reversed by a simple surgical procedure performed at village level which reverses the in-turned eyelashes.

## Surveillance goal

- Prevention of blindness by early detection
- Identification of high risk areas and epidemiologic trends
- Estimation of disease burden
- Monitoring of control programs

## Standard case definition

### **Suspected case:**

Any patient with red sticky eyes who complains of pain and itchiness of the eyes.

### **Confirmed case:**

Any patient with red sticky eyes who complains of pain and itchiness of the eyes where examination of the eyes confirms one of the stages of Trachoma infection according to the **WHO Simplified Trachoma Grading System**. (See reference below).

# Trachoma

## Recommended public health action

The World Health Organization has developed a series of interventions to control trachoma known by the acronym SAFE: Surgery, Antibiotics, Facial cleanliness, and Environmental improvement.

Effective Trachoma control has four main components:

- Eye lid surgery for those at immediate risk of blindness
- Antibiotics to treat individual cases and to reduce infection in a community
- The promotion of facial cleanliness and hygiene to reduce transmission
- Environmental improvements such as provision of water and household sanitation

## Analyze and interpret data

**Time:** Monitor epidemiologic trends over time.

**Place:** Plot the location of case households and analyze the distribution.

**Person:** Analyze the distribution of cases by age and other demographic factors.

## Lab confirmation

Routine laboratory confirmation for surveillance is not required.

<b>Diagnostic test</b>	Detection of specific antigen. Nucleic acid tests and tissue culture techniques. Occasionally, in epithelial cells in Giemsa or iodine stained smears by direct microscopy.
<b>Specimen</b>	Collection of conjunctival scrapings
<b>When to collect the specimen</b>	
<b>How to prepare, store, and transport the specimen</b>	After anaesthetizing the conjunctiva with anesthetic eye drops, blot away any discharge and using a spatula with a thin blunt end, scrape the whole of the conjunctiva. Spread the specimen evenly on a slide. As soon as the preparation is air-dry, fix it with methanol for 2-3 minutes if the preparation is to be Giemsa stained.
<b>Results</b>	Outside of specialist laboratories, most ocular infection is diagnosed clinically (see annex 8 on the recommended case definition for the confirmed case) or immunologically.

# Trachoma

## Reference

- WHO Trachoma Page  
<http://www.who.int/topics/trachoma/en/>
- World Health Organization. Trachoma control: A guide for program managers. Geneva: World Health Organization, 2006.  
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- CDC Trachoma  
<http://www.cdc.gov/healthywater/hygiene/disease/trachoma.html>
- The Carter Center  
<http://www.cartercenter.org/health/trachoma/index.html>

# Trypanosomiasis

## Background

- Trypanosomiasis is an infection of blood, lymphatics and central nervous system. In Africa it is caused by the protozoan *Trypanosoma burcei rhodesiense* and *T. b. gambiense*, which are transmitted by the bite of infected *Glossina* (tsetse) flies.
- Trypanosomiasis is endemic in over 30 African countries in West, Central and East Africa. It is highly epidemic in the Democratic Republic of Congo, Angola, and other areas of civil conflict, where 80% of some village populations may be infected. Cattle are the major reservoir of *Trypanosoma brucei rhodesiense*, and humans are the major reservoir for *T. b. gambiense*.
- Incubation period is usually days to weeks with *T. b. rhodesiense*, and months to years with *T. b. gambiense* infections. Without treatment, both forms are usually fatal.
- Trypanosomiasis control strategies include human and cattle population surveys to treat infected persons and diminish cattle reservoirs, and tsetse fly habitat control (for example, removal of bushes and tall grasses near villages, and use of residual insecticides).
- Tuberculosis, malaria, bacterial meningitis, HIV/AIDS, and other central nervous system or systemic infections can produce similar clinical findings.

## Surveillance goal

- Increase percentage of cases confirmed by laboratory methods.
- Use population-based surveys and serologic screening for active case finding in endemic areas.
- Conduct human and cattle screening in trypanosomiasis-free areas.

## Standard case definition

### **Suspected case:**

*Early stage:* a painful chancre originating as a papule and then evolving into a nodule at the primary fly bite site. There may be fever, intense headache, insomnia, painless lymphadenopathy, anaemia, local oedema and rash.

*Late stage:* cachexia, somnolence, and central nervous system signs.

### **Confirmed case:**

A suspected case confirmed by card agglutination trypanosomal test (CATT) or by isolation of trypanosomes in blood lymph nodes or cerebrospinal fluid.

# Trypanosomiasis

## Respond to alert threshold

If you observe that the number of cases or deaths is increasing over a period of time:

- Report the problem according to national guidelines.
- Treat any individual suspected and confirmed cases with appropriate therapy in closely monitored setting.
- Collect specimen for laboratory confirmation.
- Investigate cause of increasing number of cases to identify problems with prevention activities.

## Respond to action threshold

If the number of cases or deaths increases to two times the number usually seen in a similar period in the past:

- Assess prevention activities in the area around the cases and take action to improve them as indicated.
- Conduct active case finding activities if it is an endemic area.
- Conduct vector control activities specified by national guidelines.

## Analyze and interpret data

**Time:** Graph quarterly cases.

**Place:** Plot the distribution of case households.

**Person:** Count monthly cases, and analyze age distribution.

## Laboratory confirmation

### Diagnostic test

Presumptive:

Serological: card agglutination trypanosomiasis test (CATT)

Confirmation:

Parasitological: detection (microscopy) of trypanosomes in blood, lymph nodes aspirates or CSF

### Specimen

Whole blood  
Lymph nodes aspirates  
Cerebrospinal fluid

## Trypanosomiasis

<b>When to collect the specimen</b>	Suspects from endemic places with fever. Any patient with fever and may have come into contact with tsetse flies.
<b>How to prepare, store, and transport the specimen</b>	For slides: Put the slides in a slide box and close properly. Store at room temperature in a dust-free place. In case there is no slide box, the slides can be wrapped in soft tissue paper (filter papers, serviettes, toilet paper, etc.)  For blood in anticoagulant bottles, refer to reference lab.
<b>Results</b>	Results should be available the same day.
<b>Reference</b>	
<ul style="list-style-type: none"><li>• <i>Control and Surveillance of African Trypanosomiasis</i>. Report of a WHO Expert Committee, Geneva, World Health Organization, 1998 (WHO Technical Report Series, No. 881)</li><li>• <i>WHO Recommended Surveillance Standards</i> WHO/CDS/CSR/ISR/99.2</li></ul>	

# Tuberculosis

## Background

- Infection of the lungs and other organs usually caused by *Mycobacterium tuberculosis* transmitted person-to-person by droplet infection through coughing, sneezing or spitting. Clinically, the pulmonary form of the disease is more common than the extra-pulmonary form. The cardinal symptoms of pulmonary TB are chronic cough, weight loss, fever, loss of appetite and night sweats.
- Tuberculosis (TB) is a leading cause of infectious illness and death worldwide with over 8 million new cases and 3 million deaths per year. In African countries, approximately 1.6 million of the new cases and over 600 000 cases occur each year. It is also estimated that between 30 and 50% of all new TB cases detected are infected with HIV and 40% of all AIDS deaths are due to TB. Those who are at highest risk of dying from TB include people with HIV/AIDS, malnutrition and other immuno-compromising conditions, the very young, and the very old.
- The global HIV pandemic has been a major cause of increasing TB cases, especially in African countries.
- Incubation period is approximately 1 to 3 months.
- WHO recommends the Directly Observed Therapy, Short-course (DOTS) strategy to maximize compliance and treatment efficacy and to reduce development of drug-resistant strains. The DOTS strategy has been implemented by at least 40 of 46 Member States in the African Region. Varying degrees of success have been achieved in controlling TB where resources and motivation for diagnosis, treatment, and patient follow up are adequate.
- Clinically, bacterial pneumonia, malaria, trypanosomiasis, HIV/AIDS and a variety of other bacterial, parasitic, and viral infections may cause similar syndromes of fever, cough, fatigue, and weight loss, or may themselves precipitate active TB in an already infected individual. Abdominal or other extra-pulmonary sites of infection may occur after ingestion of un-pasteurized cow's milk (*M. bovis*).

## Surveillance goal

- Early detection of persons with infectious lung disease to improve chances of clinical improvement and reduce transmission of TB.
- Improve percentage of TB cases confirmed by microscopy.

# Tuberculosis

## Standard case definition

### **Suspected case:**

Any person with a cough of 3 weeks or more.

### **Confirmed case:**

*Smear-positive pulmonary TB:* a) a suspected patient with at least 2 sputum specimens positive for acid-fast bacilli (AFB), or b) one sputum specimen positive for AFB by microscopy and radiographic abnormalities consistent with active PTB as determined by the treating medical officer, or c) one positive sputum smear by microscopy and one sputum specimen positive on culture for AFB.

*Smear negative PTB:* a patient who fulfils all the following criteria: a) two sets taken at least 2 weeks apart of at least two sputum specimens negative for AFB on microscopy, radiographic abnormalities consistent with PTB and a lack of clinical response despite one week of a broad spectrum antibiotic, a decision by a physician to treat with a full course of anti-TB chemotherapy, or b) a patient who fulfils all the following criteria: severely ill, at least two sputum specimens negative for AFB by microscopy, radiographic abnormalities consistent with extensive pulmonary TB (interstitial and miliary), a decision by a physician to treat with a full course of anti-TB chemotherapy, or c) a patient whose initial sputum smears were negative, who had sputum sent for culture initially, and whose subsequent sputum culture result is positive.

## Respond to alert threshold

### **If you observe that the number of cases or deaths is increasing over a period of time:**

- Report problem to the next level, or according to national guidelines.
- Treat individual cases with direct observation (DOTS) including a treatment supporter.
- Where feasible, isolate persons using respiratory infection control practices, especially if multi-drug resistant TB is suspected.
- Investigate cause of increase, including performance of DOTS program in your area.

## Respond to action threshold

### **If the number of cases or deaths increases to two times the number usually seen in a similar period in the past:**

- Assess health worker performance with detection and treatment of smear-positive PTB and improve practices as needed.
- Assess DOTS program and take action to make identified improvements.
- Conduct drug susceptibility tests to establish patterns of resistance.

# Tuberculosis

<b>Analyze and interpret data</b>	
<b>Time:</b>	Graph cases and deaths monthly.
<b>Place:</b>	Plot distribution of case households and workplaces.
<b>Person:</b>	Count monthly cases and deaths. Analyze age and sex distribution quarterly.
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<p>Microscopy: Presence of acid fast bacillus (AFB) in Ziehl Neelsen (ZN) stained smears</p> <p>Culture and identification</p> <p>Drug susceptibility test : Anti-tuberculosis drug resistance occurs when a strain of <i>Mycobacterium tuberculosis</i> isolate is resistant to one or more antimicrobial agents as evidenced by internationally recommended methods for susceptibility tests)</p> <p>MDR =Resistance to Isoniazid and Rifampicin;</p> <p>X-DR= Resistance to Isoniazid and Rifampicin (MDR); plus additional resistance to a fluoroquinolone and a second-line injectable agent</p>
<b>Specimen</b>	<p>Deep-chest sputum</p> <p>Aspirates</p>
<b>When to collect the specimen</b>	Collect sputum (not saliva) for direct smear microscopy and examine at least two stained specimens taken on different days.
<b>How to prepare, store, and transport the specimen</b>	<p>Smear should be examined at health facility where the specimen is taken.</p> <p>TB cultures should be packaged in leak proof containers, wrapped in cotton wool.</p> <p>Transport in waterproof container to reference lab.</p>

# Tuberculosis

<b>Results</b>	TB microscopy is read daily. Quantification of observed mycobacterium are reported using various reporting methods. Refer to the criteria used by the examining laboratory.  Culture : after 6-8 weeks  Anti-tuberculosis drug resistance :The national reference laboratory should be linked to an Supranational reference laboratory by strain exchange to ensure quality control
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## Reference

- *Treatment of Tuberculosis: Guidelines for National Programs*. WHO/TB/97.230
- *Policy Statement of Prevention Therapy Against TB in People Living with HIV*, WHO/TB/98.255
- *Laboratory Services in Tuberculosis Control, Parts I, II and III*. WHO publications WHO/TB/98.258
- *Guidelines to surveillance of drug resistance in tuberculosis* 4<sup>th</sup> ed. WHO/HTM/TB/2009.422

# Typhoid Fever

## Background

- Typhoid fever is a bacterial disease, caused by *Salmonella typhi*. Symptoms usually develop 1–3 weeks after exposure, and may be mild or severe. They include high fever, malaise, headache, constipation or diarrhoea, rose-coloured spots on the chest, and enlarged spleen and liver. Healthy carrier state may follow acute illness.
- Typhoid fever remains a serious public health problem throughout the world, with an estimated 16–33 million cases and 500 000 to 600 000 deaths annually. In the last outbreak in the Democratic Republic of Congo, between 27 September 2004 and early January 2005, no less than 42 564 cases of typhoid fever were reported, including 214 deaths and 696 cases of peritonitis and intestinal perforations.
- In virtually all endemic areas, the incidence of typhoid fever is highest in children from 5–19 years old. The disease is almost exclusively transmitted by food and water contaminated by the faeces and urine of patients and carriers.
- Polluted water is the most common source of typhoid transmission. In addition, shellfish taken from sewage-contaminated beds, vegetables fertilized with night-soil and eaten raw, contaminated milk and milk products have been shown to be a source of infection.
- Typhoid fever has been virtually eliminated in most areas of the industrialized world with the advent of proper sanitary facilities. Most cases in developed countries are imported from endemic countries.
- People can transmit the disease as long as the bacteria remain in their body; most people are infectious prior to and during the first week of convalescence, but 10% of untreated patients will discharge bacteria for up to 3 months.
- Typhoid fever can be treated with antibiotics. However, resistance to common antimicrobials is widespread. Healthy carriers should be excluded from handling food.

## Surveillance goal

- Detect Typhoid Fever sporadic cases and outbreaks promptly, and seek laboratory verification
- Identify areas/population at high risk in order to improve prevention of the disease by taking hygienic measures

## Standard case definitions

**Suspected case:** Any person with gradual onset of persistent fever  $\geq 38^{\circ}\text{C}$  of 3 or more days duration with no other identified cause and additional symptoms that may include malaise, headache, abdominal pain, constipation or diarrhea, joint pain, chills or cough. Intestinal perforation and neurologic disturbances are known complications of untreated typhoid fever.

**Confirmed case:** Suspected case confirmed by isolation of *Salmonella typhi* from blood, bone marrow, bowel fluid or stool.

# Typhoid Fever

## Respond to alert threshold

### If Typhoid fever cases are suspected:

- Arrange for laboratory testing of stool specimens or rectal swabs of suspected cases, especially in situations where food- or waterborne transmission is suspected.
- Report and investigate all suspected outbreaks of typhoid. Search for case/carrier that is the source of infection and for the vehicle (water or food) through which infection is being transmitted.
- Treat typhoid fever patients with antibiotics. Severe cases should be provided supportive measures such as oral or intravenous hydration, the use of antipyretics, and appropriate nutrition.

## Respond to action threshold

### If Typhoid Fever cases are confirmed

- Identify areas/populations at high risk to identify source(s) and mode(s) of transmission in order to prevent and control the disease.
- Conduct health education programmes on hygiene with simple messages on safe water, safe food handling practices, hygiene and hand washing.
- Support provision of clean water and proper sanitation to affected population(s). Chlorinate suspected water supplies. All drinking water should be chlorinated or boiled before use.
- More than 90% of patients can be managed at home with oral antibiotics, reliable care and close medical follow-up for complications or failure to respond to therapy. Patients with persistent vomiting, severe diarrhoea and abdominal distension may require hospitalization and parenteral antibiotic therapy.

## Analyze and interpret data

**Time:** Graph cases and deaths weekly. Construct an epidemic curve during outbreaks.

**Place:** Plot location of case households with precise mapping.

**Person:** Report immediate case-based information for cases and deaths. Report summary totals monthly. During outbreak, count cases and deaths weekly. Analyze by age. Assess risk factors to improve prevention of outbreaks.

## Laboratory confirmation

<b>Diagnostic test</b>	Culture: Isolation of <i>salmonella spp.</i> from stool or blood of a patient The WIDAL Test should not be used for diagnostic purpose
<b>Specimen</b>	Blood  Stool

## Typhoid Fever

<b>When to collect</b>	Collected samples preferably before antibiotics are administered
<b>How to prepare, store, and transport</b>	5-10 ml of blood distributed in a blood culture bottle. Stool in stool container  Store specimens at 4-8 C or ambient temperature away from heat and direct sunlight.
<b>Results</b>	Blood culture 4 days to 2 weeks  Stool 3-4 days.
<b>Reference</b>	
<ul style="list-style-type: none"><li>• <i>The Diagnosis, Treatment and Prevention of Typhoid Fever</i>; WHO/V&amp;B/03.07</li><li>• Weekly Epidemiological Record; N° 1, 2005, 80, 1-8; <a href="http://www.who.int/wer">http://www.who.int/wer</a></li><li>• <i>WHO Recommended Surveillance Standards</i> WHO/CDS/CSR/ISR/99.2</li></ul>	

# West Nile Fever

## Background

- West Nile Fever is a febrile illness resulting from a mosquito-borne arbovirus in the *Flaviviridae* family. It is a zoonotic disease transmitted from birds to humans and other animals. Serological evidence suggests that the infection is present throughout practically the entire African continent. West Nile Fever most likely emerged in Africa and is now found world-wide. Outbreaks occur in humans, birds and horses.
- Most cases are mild and may not come to the attention of the health system. Patients seeking health care usually present with flu-like symptoms such as fever, headache and body aches. Occasionally patients present with a skin rash on the neck, trunk, arms or legs.
- People of all ages and conditions may be affected. However, those who are above age 50 years or who have had an organ transplant are at increased risk of severe illness.
- Very severe cases include signs of encephalitis, meningo-encephalitis or meningitis. Symptoms include high fever, headache, neck stiffness, stupor, tremors, convulsions, flaccid paralysis and coma.
- The case fatality rate in patients with neurological involvement ranges from 4% to 14% and as high as 29% in elderly patients.
- West Nile Fever can be prevented by avoiding mosquito bites especially at dusk when mosquitoes are most active. Insect repellents, wearing long sleeves and trousers, staying indoors and draining breeding sites like pools of standing water can reduce exposure to mosquitoes.
- Confirmation of West Nile Fever in patients with clinical symptoms requires laboratory confirmation of specific IgM antibodies in cerebrospinal fluid and serum specimens.
- Because there is no specific treatment for West Nile Fever, patients with severe disease are usually hospitalized for supportive treatment and nursing care.

## Surveillance goal

- Identify risk factors for infection and determine high-risk populations for targeted prevention activities
- Identify geographic areas for targeted prevention and control activities
- Identify most severe cases for referral to hospitalized care

## Standard case definition

### **Suspected case:**

*A hospitalized case of encephalitis due to unknown cause*

### **Confirmed case:**

*Confirmation of West Nile Fever is through laboratory diagnostics to identify WNV-specific IgM*

## West Nile Fever

<b>Respond to alert threshold</b>	
<p><b>If a single case is suspected:</b></p> <ul style="list-style-type: none"> <li>• Report case-based information immediately to the appropriate levels.</li> <li>• Treat and manage the patient with supportive care.</li> <li>• Collect specimen safely to confirm the case.</li> </ul>	
<b>Respond to action threshold</b>	
<p><b>If a single case is confirmed:</b></p> <ul style="list-style-type: none"> <li>• Treat and manage the patient with supportive care</li> <li>• Mobilise the community through education in order to promote adoption of behaviours that reduce disease risk such as protection against mosquito bites and reduction of mosquito breeding sites</li> <li>• Conduct community education on how WNV is transmitted and on how to prevent being infected</li> </ul>	
<b>Analyze and interpret data</b>	
<b>Time:</b>	Construct an epidemic curve during the outbreak.
<b>Place:</b>	Plot location of case residence and worksite.
<b>Person:</b>	Immediate case-based reporting of cases and deaths. During an outbreak, count and report cases and deaths. Analyze age and sex distribution. Assess risk factors immediately and consider request for assistance to improve outbreak control.
<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	Presence of IgM antibodies against West Nile Fever
<b>Specimen</b>	<p><i>For ELISA:</i> Whole blood, serum or plasma</p> <p><i>For PCR:</i> Whole blood or blood clot, serum/plasma or tissue</p> <p><i>For immunohisto-chemistry:</i> Skin or tissue specimens from <i>fatal</i> cases.</p>

## West Nile Fever

<b>When to collect the specimen</b>	<p>Collect specimen from the first suspected case.</p> <p>If more than one suspected case, collect until specimens have been collected from 5 to 10 suspected cases.</p>
<b>How to prepare, store, and transport the specimen</b>	<p>HANDLE AND TRANSPORT SPECIMENS FROM SUSPECTED VHF PATIENTS WITH EXTREME CAUTION. WEAR PROTECTIVE CLOTHING AND USE BARRIER PRECAUTIONS.</p> <p><i>For ELISA or PCR:</i></p> <ul style="list-style-type: none"> <li>• Refrigerate serum or clot</li> <li>• Freeze (-20C or colder) tissue specimens for virus isolation</li> </ul> <p><i>For Immunohistochemistry:</i></p> <ul style="list-style-type: none"> <li>• Fix skin snip specimen in formalin. Specimen can be stored up to 6 weeks. The specimen is not infectious once it is in formalin.</li> </ul> <p>Store at room temperature. Formalin-fixed specimens may be transported at room temperature.</p>
<b>Results</b>	<p>Diagnostic services for VHF are not routinely available. Advance arrangements are usually required for VHF diagnostic services. Contact the appropriate National authority or WHO.</p>
<b>Reference</b>	
<ul style="list-style-type: none"> <li>• Global Alert and Response; West Nile Fever epidemic updates <a href="http://www.who.int/csr/don/archive/disease/west_nile_fever/en/">http://www.who.int/csr/don/archive/disease/west_nile_fever/en/</a></li> <li>• <u>Pedro N. A and Boris Szyfres</u>. <i>Zoonoses and Communicable Diseases Common to Man and Animals. Third edition, Volume II. Chlamydioses, Rickettsioses and Viroses, Part II: Viroses</i> Pages 372-376. Pan American Health Organization, WHO</li> <li>• Epidemic/Epizootic West Nile Virus in the United States: Guidelines for Surveillance, Prevention and Control. <a href="http://www.cdc.gov/ncidod/dvbid/westnile/resources/wnv-guidelines-aug-2003.pdf">http://www.cdc.gov/ncidod/dvbid/westnile/resources/wnv-guidelines-aug-2003.pdf</a></li> <li>• Infection Control for Viral Hemorrhagic Fevers in the African Health Care Setting WHO/EMC/ESR/98.2</li> <li>• Evans, A.S. (ed). <i>Viral Infections of Humans; Epidemiology and Control</i>. 1989. Plenum Medical Book Company, New York</li> </ul>	

# Yellow fever

## Background

- Acute viral hemorrhagic disease caused by a flavivirus transmitted human-to-human via the domestic species of *Aedes* mosquitoes (Urban epidemics) or to humans from primate reservoir via a forest mosquito species (Sylvatic cycle).
- 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 haemorrhage, 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) and other parasitic, viral, or bacterial diseases such as malaria, Dengue Chikungunya, leptospirosis, hepatitis A-E, Epstein-Barr virus, West Nile, Q fever, anthrax, rickettsial diseases, etc, 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.

## Surveillance goal

- Seek confirmation of yellow fever and rule out other possible etiologies of fever with jaundice
- Provide information in order to adopt appropriate control measures
- Identify populations at risk of yellow fever
- Monitor the epidemiology of the disease and the impact of control measures
- Support operational research and innovation

# Yellow fever

## Standard case definition

### Suspected case:

Any person with acute onset of fever, with jaundice appearing within 14 days of onset of the first symptoms.

### Probable case:

A suspected case

**AND**

One of the following

- Epidemiological link to a confirmed case or an outbreak
- Positive post-mortem liver histopathology

### Confirmed case:

A probable case

**AND**

One of the following

- Detection of YF-**specific**\* IgM
- Detection of four-fold increase in YF IgM and/or IgG antibody titres between acute and convalescent serum samples
- Detection of YFV-**specific**\* neutralizing antibodies

*\*YF-specific means that antibody tests (such as IgM or neutralizing antibody) for other prevalent flavivirus are negative. This testing should include at least IgM for Dengue and West Nile and may include other flavivirus depending on local epidemiology.*

**OR**

One of the following

- Detection of YF virus genome in blood or other organs by PCR
- Detection of yellow fever antigen in blood, liver or other organs by immunoassays
- Isolation of the yellow fever virus

•

# Yellow fever

## Respond to alert threshold

### If a single case or cluster is suspected or probable:

- Fill out notification form, including clinical information, case based forms, check vaccination status and travel history
- Take blood specimen for laboratory confirmation. You may obtain convalescent specimen from patient(s)
- Diagnose and 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 probable site of infection. Determine vaccination coverage of the community and start planning for vaccination (in case of a cluster)
- Strengthen routine yellow fever immunization

## Respond to action threshold

### In addition to alert threshold response If a single case is confirmed:

- Continue / complete epidemiological investigation including screening for vaccination status
- Initiate entomological investigation if indicated
- Determine vaccination coverage in affected area (routine EPI, recent outbreak responses or preventive campaigns)
- Initiate social mobilization for interventions selected
- Continue risk communication and action to reduce risk including vector control if indicated
- Initiate vaccination in affected villages, district or town/city based on epidemiological findings
- Notify to WHO through Central Authorities using IHR decision instrument
- Continue to strengthen routine yellow fever immunization, especially for hard-to-reach areas

## Analyze and interpret data

- Time:** Generate Weekly Graphs of cases and deaths.  
During outbreaks, construct epidemic curves (to monitor daily then weekly trends).
- Place:** Plot location of case households and occupation with precise mapping.
- Person:** Report immediate case-based information for cases and deaths. Report summary totals weekly.  
During outbreak, count cases and deaths daily as they occur, then weekly when the epidemic matures or ends. Analyze by person variables (age, sex, occupation...). Assess risk factors to improve prevention of sporadic outbreaks.

## Yellow fever

<b>Laboratory confirmation</b>	
<b>Diagnostic test</b>	<ol style="list-style-type: none"> <li>1. ELISA for the presence of yellow fever Specific IgM and IgG antibodies.</li> <li>2. Exclusion of Dengue, West Nile virus and other locally prevalent flavivirus will be necessary for the confirmation of yellow fever.</li> <li>3. PCR, YF specific seroneutralization, virus isolation or histopathology</li> </ol>
<b>Specimen</b>	<p>Serum in the acute and convalescent phases of the illness; In the event of death, postmortem liver specimen</p>
<b>When to collect the specimen</b>	<p>Within 14 days of onset of first symptoms Collect specimen from at least the first to 10<sup>th</sup> suspected cases of yellow fever. Collect specimen from last cases (based on epidemic curves) to decide on the end of the epidemic.</p>
<b>How to prepare, store, and transport the specimen</b>	<ul style="list-style-type: none"> <li>• Collect 10 ml of venous blood from adults, 1-5 ml from children, in a capillary tube, microtainer, or if necessary in a standard glass test tube.</li> <li>• Separate blood cells from serum: <ul style="list-style-type: none"> <li>○ 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.</li> <li>○ If no centrifuge, put sample in refrigerator overnight (4 to 6 hours) until clot retracts. Pour off serum the next morning.</li> <li>○ 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.</li> </ul> </li> <li>• Store serum at 4°C.</li> </ul> <p>Transport serum samples using appropriate packaging to prevent breaking or leaks during transport. Avoid glass tubes for shipment and transport if possible.</p> <p>The specimen should arrive at the laboratory within 3 days of being collected. Avoid shaking of specimen before serum has been collected.</p> <p>To prevent bacterial overgrowth, ensure that the serum is poured into a clean glass test tube. The test tube does not need to be sterile – just clean.</p> <p>Transport the serum in an EPI hand vaccine carrier at 4°C-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.</p>
<b>Results</b>	<p>Laboratory results should be received within 7 days of reception of the specimen in the laboratory.</p>

# Yellow fever

## Reference

- *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 2010

## Annexes to Section 9

The following annexes are examples of program specific forms. Some forms are for documenting initial findings while others are designed for in-depth investigation. Refer to your country's national surveillance program for the appropriate forms.

- ANNEX 9A** AEFI - investigation form
- ANNEX 9B** Acute flaccid paralysis - case investigation form
- ANNEX 9C** Cholera - case-based investigation form
- ANNEX 9D** Guinea worm - case investigation form
- ANNEX 9E** Maternal death - reporting form
- ANNEX 9F** Measles - case investigation form
- ANNEX 9G** Neonatal tetanus - case investigation form
- ANNEX 9H** Tuberculosis - MDR and XDR TB - case-based reporting form
- ANNEX 9I** Viral hemorrhagic fever - case report form
- ANNEX 9J** VHF - case investigation form



## ANNEX 9A Adverse event following immunization – investigation form

### AEFI Investigation

An adverse event following immunization (AEFIs) is a medical incident that takes place after an immunization, causes concern and is believed to be caused by the immunization. Programmes providing immunization services should include a system for AEFI detection and reporting, investigation and management, data analysis, corrective action, relevant communication and evaluation of the system. The ultimate goal of an investigation is to determine whether the vaccine or immunization process is responsible for the reported event(s) or to find another cause and correct it if possible, and reassure the public.

#### Further resources:

[http://www.who.int/immunization\\_safety/aefi/en/](http://www.who.int/immunization_safety/aefi/en/)

[http://www.who.int/immunization\\_safety/aefi/managing\\_AEFIs/en/index6.html](http://www.who.int/immunization_safety/aefi/managing_AEFIs/en/index6.html)

<http://www.who.int/immunization/documents/792.pdf>

1.

#### Be prepared (Steps to take before an event occurs)

- Read the resource documents on reporting, management and investigation of AEFIs.
- Develop standards: case definitions for reportable AEFIs, use of reporting forms and investigation procedures.
- Designate and train staff to conduct an AEFI investigation using the investigation form.
- Train staff on how to collect specimens.
- Establish procedure, criteria and designated person for notifying WHO and UNICEF (if UN-supplied vaccine) or other relevant party depending on procurement mechanism.
- Establish a National Technical Advisory Committee with representation from major medical organizations.
- Identify a spokesperson for public communications.

2.

#### Receiving a report

- Ensure immediate reporting of most serious events and rapid attention to reports received.
- Verify the information in the report and classify and assess the AEFI using established case definitions. Decide whether it needs further investigating.
- If investigation is warranted, travel to the location of the AEFI, or delegate responsibility to another trained person.

<p><b>3.</b></p>	<p><b>Investigate and collect data</b></p> <ul style="list-style-type: none"> <li>• Ask about the patient</li> <li>• Ask about the vaccine and other drugs potentially received</li> <li>• Ask about other vaccines</li> <li>• Ask about immunization services</li> <li>• Observe the service in action</li> <li>• Ask about cases in unvaccinated persons</li> <li>• Establish a more specific case definition if needed</li> <li>• Formulate a hypothesis as to what caused the AEFI</li> </ul> <p><b>Collect specimens if appropriate:</b></p> <ul style="list-style-type: none"> <li>• from the patient</li> <li>• the vaccine (and diluent if applicable)</li> <li>• the syringes and needles</li> </ul>
<p><b>4.</b></p>	<p><b>Dispatch specimens</b> to appropriate testing facility (laboratory, regulatory authority, etc...)</p>
<p><b>5.</b></p>	<p><b>Analyze the data</b></p> <ul style="list-style-type: none"> <li>• Review epidemiological, clinical, and laboratory findings</li> <li>• Summarize and report findings</li> </ul>
<p><b>6.</b></p>	<p><b>Take action</b></p> <ul style="list-style-type: none"> <li>• Communicate with health staff</li> <li>• Communicate findings and action to the parents and public</li> <li>• Correct problem (based on the cause) by improving training, supervision, and/or distribution of vaccines/injection equipment</li> <li>• Replace vaccines if indicated</li> </ul>

# ANNEX 9B Acute flaccid paralysis – case investigation case form

Official Use **Epid Number:** \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_  
 Only (completed by district team) Province District Year Onset Case Number Received:  
 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

## IDENTIFICATION

**District:** \_\_\_\_\_ **Province:** \_\_\_\_\_  
**Nearest Health Facility to Village:** \_\_\_\_\_ **Village/Neighbourhood:** \_\_\_\_\_ **Town/City:** \_\_\_\_\_

Address:  
 \_\_\_\_\_  
 \_\_\_\_\_

**Name(s) of patient:** \_\_\_\_\_ **Mother/Father:** \_\_\_\_\_

**Sex:**  1 = Male, 2 = Female **Date of birth:** \_\_\_\_/\_\_\_\_/\_\_\_\_ or **Age: years** \_\_\_\_ **months** \_\_\_\_  
 (If DOB is unknown)

## NOTIFICATION/INVESTIGATION

**Notified by:** \_\_\_\_\_ **Date Notified:** \_\_\_\_/\_\_\_\_/\_\_\_\_ **Date Investigated:** \_\_\_\_/\_\_\_\_/\_\_\_\_

## HOSPITALIZATION

Admitted to hospital?  1= Y, 2= N **Date of admission** \_\_\_\_/\_\_\_\_/\_\_\_\_  
**Medical record number:** \_\_\_\_\_  
**Facility Address:** \_\_\_\_\_

## CLINICAL HISTORY

Please use the following key, 1=Yes, 2=No, 9=Unknown.

Question	Answer	Site of paralysis
Fever at Onset of paralysis		LA <input type="checkbox"/> <input type="checkbox"/> RA
Paralysis progresses <= 3 days		LL <input type="checkbox"/> <input type="checkbox"/> RL
Flaccid & sudden paralysis		
Asymmetrical		Onset of paralysis: ____/____/____

**AFTER INVESTIGATION, WAS IT TRUE AFP?**  1= Y, 2= N

If "No," then the rest of the form does not need to be completed. Mark "6" for Final Classification.

## VACCINATION HISTORY

Birth \_\_\_\_/\_\_\_\_/\_\_\_\_ 3<sup>rd</sup> \_\_\_\_/\_\_\_\_/\_\_\_\_  
 Total Doses of Polio:  99=Inconnu 1<sup>st</sup> \_\_\_\_/\_\_\_\_/\_\_\_\_ 4<sup>th</sup> \_\_\_\_/\_\_\_\_/\_\_\_\_  
 2<sup>nd</sup> \_\_\_\_/\_\_\_\_/\_\_\_\_ If >4, last dose \_\_\_\_/\_\_\_\_/\_\_\_\_

## SPECIMEN COLLECTER DE SELLES

**Date Sent to**  
**Date 1<sup>st</sup> Stool:** \_\_\_\_/\_\_\_\_/\_\_\_\_ **Date 2<sup>nd</sup> Stool:** \_\_\_\_/\_\_\_\_/\_\_\_\_ **National lab:** \_\_\_\_/\_\_\_\_/\_\_\_\_

**STOOL SPECIMEN RESULTS:**

Condition of Stool:  1=Adequate, 2= Not Adequate

\_\_\_\_/\_\_\_\_/\_\_\_\_

Date received by national Lab

\_\_\_\_/\_\_\_\_/\_\_\_\_

Date results sent by lab to district

\_\_\_\_/\_\_\_\_/\_\_\_\_

Date results receive by district

\_\_\_\_/\_\_\_\_/\_\_\_\_

Date isolate sent by national Lab to regional lab

\_\_\_\_/\_\_\_\_/\_\_\_\_

Date differentiation result sent by regional lab

\_\_\_\_/\_\_\_\_/\_\_\_\_

Date differentiation result received by district

Primary Isolation

Results:

P1	P2	P3	NP-Ent	W1	W2	W3	V1	V2	V3	NP-Ent

---

**FOLLOW UP EXAMINATION**

Date of follow up examination: \_\_\_\_/\_\_\_\_/\_\_\_\_

Findings at Follow-up:

1= Residual paralysis    3= Lost to follow-up  
2= No residual paralysis    4= Death before follow-up

LA	<input type="checkbox"/>	<input type="checkbox"/>	RA
LL	<input type="checkbox"/>	<input type="checkbox"/>	RL

Residual Paralysis?

---

**FINAL CLASSIFICATION OF THE CASE:**

1=Confirmed, 2=Compatible, 3= Discarded 6=Pas PFA

---

**INVESTIGATOR**

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Unit: \_\_\_\_\_ Address: \_\_\_\_\_ Phone: \_\_\_\_\_

\_\_\_\_\_

Cholera Case Investigation Form		
Area : Patient and clinical laboratory related information		
	Variables/Questions	Answers
1	Detection day (dd/mm/yyyy)	
2	Detection place (Health facility or Community)	
3	Patient identification number (yyyy-week-CCC-PPP-DDD-Reporting site- <i>nnn</i> )	
4	Patient surname or last name	
5	Patient first name(s)	
6	Age (years)	
7	Sex (F/M)	
8	Number of people in same household	
9	Patient's residential Address	
10	Village/Town	
11	Neighborhood	
12	District	
13	Province	
14	Country	
15	Date of onset (first symptoms) (dd/mm/yyyy)	
16	Clinical signs and Symptoms	
17	Was patient exposed to any known risk factor for this disease? (Yes/No)	
18	If yes, specify risk factor(s): Water used by the patient for drinking : (list by type, e.g. tap water, Borehole, unprotected well, protected well, River, dam, lake, pond)	
19	Number of doses of cholera Vaccine	
20	Date last dose was administered	
21	<b>Laboratory related information: at least first and last cases</b>	
22	<i>Vibrio cholerae</i> identified in stools?	
23	Drugs to which the vibrio strain is sensitive	

24	Drugs to which the vibrio strain is resistant	
25	Outcome (Died, Survived, Unknown)	
26	Final Classification (Not a case, Suspect, Probable, Confirmed by Lab, Confirmed by epidemiological link, Pending)	
27	Other Notes and Observations	
28	Date latest update of this record (dd/mm/yyyy)	

**Area: Risk factor search (Information to be obtained from the water and sanitation group of the investigation team)**

	Variables/Questions	Answers
	<b>Mapping Potential Hazards</b>	
1	<b>Potential vibrio vehicles: drinking water</b>	
2	Drinking water source 1	
3	Drinking water source 2	
4	Drinking water source 3	
5	Drinking water source 4	
6	<b>Potential vibrio vehicles: non drinking water</b>	
7	Non drinking water source 1	
8	Non drinking water source 2	
9	Non drinking water source 3	
10	Non drinking water source 4	
11	<b>Potential vibrio vehicles: Food items</b>	
12	Food items 1	
13	Food items 2	
14	Food items 3	
15	Food items 4	
	Food items 5	
17	Food items 6	
18	Food items 7	
19	Food items 8	
20	<b>Bacteriology lab findings</b>	
21	Drinking water found infected by vibrio	
22	Non drinking water found infected by vibrio	

23	Food items found infected by vibrio	
24	<b>Looking out for Exposure to the identified hazards</b>	
25	Water used by the patient for drinking : (list by type, e.g. tap water, Borehole, unprotected well, protected well, river, dam, lake, pond):	
26	Within 3 days prior to the onset of the disease did the patient drink from	
27	Water source 2 (Yes/No)	
28	Water source 3 (Yes/No)	
29	Water source 4 (Yes/No)	
30	Water source 5 (Yes/No)	
31	Within 3 days prior to the onset of the disease did the patient eat	
32	Food item 1 (Yes/No)	
33	Food item 2 (Yes/No)	
34	Food item 3 (Yes/No)	
35	Food item 4 (Yes/No)	
36	Food item 5 (Yes/No)	
37	Within 3 days prior to the onset of the disease did the patient attend any	
38	funerals (Yes/No)	
39	other social event (Yes/No)	

**ANNEX 9D**

**Guinea worm - case investigation form**

[Country Name]

**GUINEA WORM ERADICATION PROGRAMME  
CASE INVESTIGATION FORM FOR GUINEA WORM DISEASE**

**Epid No:** \_\_\_\_\_  
**C O U - R E G - D I S - Y R - C A S E**

*To be completed in triplicate*

**I. Reporting/Investigation Information**

Reporting Village: \_\_\_\_\_ Zone: \_\_\_\_\_ District: \_\_\_\_\_ Region: \_\_\_\_\_

Date Case Reported: (dd/mm/yyyy) \_\_\_/\_\_\_/\_\_\_ Reported by: \_\_\_\_\_ Position: \_\_\_\_\_

Date Case Investigated: \_\_\_/\_\_\_/\_\_\_ Investigated by: \_\_\_\_\_ Position: \_\_\_\_\_

**II. Patient Information and Place of Residence**

Name: \_\_\_\_\_ Father's Name/Landlord's Name: \_\_\_\_\_

Age: \_\_\_\_\_ Sex: \_\_\_\_\_ Occupation: \_\_\_\_\_ Ethnicity: \_\_\_\_\_

Resident Address: Village: \_\_\_\_\_ Zone: \_\_\_\_\_

Area/Sub District: \_\_\_\_\_ District: \_\_\_\_\_ Region: \_\_\_\_\_

Setting: Urban/Rural \_\_\_\_\_ Land Marks: \_\_\_\_\_

Place of residence is same as the reporting village: YES/NO Residence since when(in months): \_\_\_\_\_

(Please fill BOX "III. Place stayed in the last 10-14 months ...." If the number of months stayed in this box was less than 10.)

**III. Place stayed in the last 10-14 months if not the same as above.**

Village: \_\_\_\_\_ Zone: \_\_\_\_\_ Area/Sub District: \_\_\_\_\_

District: \_\_\_\_\_ Region: \_\_\_\_\_ Country: \_\_\_\_\_

**IV. Travel History of patient in the last 10-14 months**

Date From:	Date To:	Village:	Sub District	District:	Region:
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Possible water sources that the patient might have contaminated with location details and GPS:

Name	Latitude	Longitude	Type	Source	Check box if Treated with Abate and Date
_____	_____	_____	_____	_____	<input type="checkbox"/>
_____	_____	_____	_____	_____	<input type="checkbox"/>

**GUINEA WORM ERADICATION PROGRAMME  
CASE INVESTIGATION FORM FOR GUINEA WORM DISEASE**

Epid No: \_\_\_\_\_  
**C O U - R E G - D I S - Y R - C A S E**

*To be completed in triplicate*

\_\_\_\_\_  \_\_\_\_\_  
 \_\_\_\_\_  \_\_\_\_\_

**V. Sign and symptom**

What was the first sign/symptom before the emergence of worm? Blister/Itching/Swelling/Others: Specify \_\_\_\_\_  
 Emergence of guinea worm: YES/NO No of Worms: \_\_\_\_\_ Is this the first guinea worm emerged this year? YES/NO  
 Date of the First guinea worm emerged: \_\_\_/\_\_\_/\_\_\_\_\_ Was the case detected before worm emerged? YES/NO

**VII. Case Containment Measures and Guinea-worm registry**

Received any health education: YES/NO Patient entered any water source: YES/NO  
 Place Managed: CCC/Home/Health Centers/Hospital  
 Name of Health Facility/Health Center/Other Centers if patient was hospitalized: \_\_\_\_\_

Admission Date: \_\_\_/\_\_\_/\_\_\_\_\_ Discharged Date: \_\_\_/\_\_\_/\_\_\_\_\_

SN.NO.	Location of worm	Date worm detected emergence	Date of guinea-worm by supervisor:	Date confirmed emergence	Date of guinea-worm completely expelled	Regular bandaging	Extracted
_____	_____	___/___/_____	___/___/_____	___/___/_____	___/___/_____	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	___/___/_____	___/___/_____	___/___/_____	___/___/_____	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	___/___/_____	___/___/_____	___/___/_____	___/___/_____	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	___/___/_____	___/___/_____	___/___/_____	___/___/_____	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	___/___/_____	___/___/_____	___/___/_____	___/___/_____	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	___/___/_____	___/___/_____	___/___/_____	___/___/_____	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	___/___/_____	___/___/_____	___/___/_____	___/___/_____	<input type="checkbox"/>	<input type="checkbox"/>

**VIII. Specimen Handling**

Was a specimen (worm) saved and preserved in alcohol? YES/NO If NO WHY?  
 Date sent to Region: \_\_\_\_\_ Received By: \_\_\_\_\_ Date Received by: \_\_\_\_\_

**GUINEA WORM ERADICATION PROGRAMME  
CASE INVESTIGATION FORM FOR GUINEA WORM DISEASE**

**Epid No:** \_\_\_\_\_  
**C O U - R E G - D I S - Y R - C A S E**

*To be completed in triplicate*

Date sent to National: \_\_\_\_\_ Received By: \_\_\_\_\_ Date Received by: \_\_\_\_\_

**For National Secretariat Only:**

Did you send it for confirmation? Yes/No Date sent: \_\_\_\_\_ Sent To: \_\_\_\_\_

Date Result Received \_\_\_\_\_

Result:

**IX. Other Information**

Use of cloth filter: YES/NO

Frequency of changing filters 1-rarely; 2-sometimes; 3-always; 4-never

Remarks: \_\_\_\_\_

***Person who completed this form:***

\_\_\_\_\_  
NAME

\_\_\_\_\_  
POSITION

\_\_\_\_\_  
CELL PHONE NO

\_\_\_\_\_  
SIGNATURE

***Disease Control or Surveillance Officer:***

## ANNEX 9E

## Maternal death - reporting form

<b>Maternal Death Reporting Form</b>		
<i>The form must be completed for all deaths, including abortions and ectopic gestation related deaths, in pregnant women or within 42 days after termination of pregnancy irrespective of duration or site of pregnancy</i>		
<b>Questions / Variables</b>		<b>Answers</b>
1	Country	
2	District	
3	Reporting Site	
4	How many of such maternal deaths occurred cumulatively this year at this site?	
5	Date this maternal death occurred (day/month/year)	
6	Maternal death locality (Village or Town)	
7	Record's unique identifier (year-Country code-District-site-maternal death rank)	
8	Maternal death place (Community, health facility, district hospital, referral hospital or private hospital, on the way to health facility or hospital)	
9	Age (in years) of the deceased	
10	Gravida: how many times was the decease pregnant?	
11	Parity: how many times did the late deliver a baby of 22 weeks/500g or more?	
12	Time of death (specify "During pregnancy, At delivery, during delivery, during the immediate post partum period, or long after delivery")	
13	If abortion: was it spontaneous or induced?	
<b>Maternal death history and risk factors</b>		
14	Was the deceased receiving any antenatal care? (Yes/No)	
	Did she have Malaria? (Yes or No)	
15	Did she have Hypertension? (Yes or No)	
16	Did she have Anaemia? (Yes or No)	
17	Did she have Abnormal Lie? (Yes or No)	
18	Did she undergo any Previous Caesarean Section? (Yes or No)	
19	What was her HIV Status? (choose "HIV+; HIV-; or Unknown HIV status")	
<b>Delivery, puerperium and neonatal information</b>		
20	How long (hours) was the duration of labor	
21	What type of delivery was it? (choose one from "1=Vaginal non assisted delivery, 2= vaginal-assisted delivery (Vacuum/forceps), or 3=Caesarean section"	
22	What was the baby status at birth? (Alive or Stillborn)	

## Maternal Death Reporting Form

*The form must be completed for all deaths, including abortions and ectopic gestation related deaths, in pregnant women or within 42 days after termination of pregnancy irrespective of duration or site of pregnancy*

	Questions / Variables	Answers
23	In case the baby was born alive, is he/she still alive or died within 28 days after his/her birth? (choose 1=Still alive, 2=neonatal death, 3=died beyond 28 days of age)	
24	Was the deceased referred to any health facility or hospital? (Yes/No/Don't know)	
25	If yes, how long did it take to get there? (hours)	
26	Did the deceased receive any medical care or obstetrical/surgical interventions for what led to her death? (Yes/No/Don't know)	
27	If yes, specify where and the treatment received*	
28	Primary cause of the Maternal Death	
29	Secondary cause of the Maternal Death	
30	Analysis and Interpretation of the information collected so far (investigator's opinion on this death)	
31	Remarks	
32	Maternal death notification date (day/month/year)	
33	Investigator (Title, name and function)	
	* <u>Treatment received</u>	
	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, intsrumental delivery (Forceps;Vacuum), Caesarian section, anetshesia ( general, spinal, epidural , local)	
	<u>Definitions</u>	
	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	

## ANNEX 9F

## Measles - case investigation form

MEASLES CASE INVESTIGATION FORM	
Variable/Description	Value/Answer
Country	
ID number	
Reporting district	
Province of report	
Reporting health facility	
Disease/Condition	Measles
Date received form at national level (day/month/year)	
Name(s) of patient	
Date of birth (day/month/year)	
Age in years	
Age in months	
Patient's residence: village/neighborhood	
Town/City	
Urban/Rural	
District of Residence	
Province	
Sex (M/F)	
Date seen at health facility (day/month/year)	
Date health facility notified district (day/month/year)	
Date of onset (day/month/year)	
Number of vaccine doses	
Date of last vaccination (day/month/year)	
Blank variable #1	
Blank variable #2	
In-patient or Out-patient?	
Outcome (1=Alive; 2=Dead; 3=Unknown)	
Final classification (1=Lab Confirmed; 2=Confirmed by Epidemiological linkage; 3=Compatible; 4=Discarded (IgM negative); 5= Pending (Suspected with specimen lab results pending)	
Date sent form to district (day/month/year)	
Date received form at district (dd/mm/yyyy)	
Date specimen collection (dd/mm/yyyy)	
Date specimen sent to Lab (dd/mm/yyyy)	
Specimen source	

### MEASLES CASE INVESTIGATION FORM

Variable/Description	Value/Answer
Specify	
Date lab received specimen (dd/mm/yyyy)	
Specimen condition [1=adequate (good); 2=not adequate (not good)]	
Measles IgM (1=positive; 2=negative; 3=indeterminate; 4=pending)	
Rubella IgM (1=positive; 2=negative; 3=indeterminate; 4=pending)	
Other lab results	
Date lab sent results to district (dd/mm/yyyy)	
Date district received lab results (dd/mm/yyyy)	
Name, title and function of reporting officer	

# ANNEX 9G

# Neonatal tetanus - case investigation form

Official Use **Epid Number:** \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ Received  
 Only (completed by district team) Province District Year Onset Case Number at National \_\_\_\_/\_\_\_\_/\_\_\_\_

### IDENTIFICATION

District: \_\_\_\_\_ Province: \_\_\_\_\_  
 Nearest Health Facility to Village: \_\_\_\_\_ Village/Neighbourhood: \_\_\_\_\_ Town/City: \_\_\_\_\_

Address: \_\_\_\_\_  
 \_\_\_\_\_

Name(s) of patient: \_\_\_\_\_ Mother: \_\_\_\_\_  
 Sex:  1 = Male, 2 = Female Father: \_\_\_\_\_

### NOTIFICATION/INVESTIGATION

Notified by: \_\_\_\_\_ Date Notified: \_\_\_\_/\_\_\_\_/\_\_\_\_ Date Case Investigated: \_\_\_\_/\_\_\_\_/\_\_\_\_

### MOTHER'S VACCINATION HISTORY

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

**Question**  
 Mother vaccinated with TT?  
 Have card?  
 Number of doses:  
 Vaccination status of mother prior to delivery? \*\*

Answer	1 <sup>st</sup> ____/____/____	4 <sup>th</sup> ____/____/____
	2 <sup>nd</sup> ____/____/____	5 <sup>th</sup> ____/____/____
	3 <sup>rd</sup> ____/____/____	If >5, last dose ____/____/____

\*\*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, 9=U, where applicable.

**Questions**  
 Mother received antenatal care?  
 How many prenatal visits?  
 Attended by a trained TBA/midwife?  
 If attended by a trained TBA/midwife, give name  
 Attended by doctor/nurse?


**Questions**  
 Location of birth: \*\*\*  
 If birth in institution, name of institution:  
 Cut cord with a sterile blade?  
 Cord treated with anything?  
 Describe treatment of cord: Where?


\*\*\* 1=Hospital, 2=Health centre, 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, 9=U, where applicable.

Was baby normal at birth?  
 Normal cry and suck during first 2 days?  
 Stopped sucking after 2 days?  
 Arched back?  
 Stiffness?  
 Onset of symptoms: \_\_\_\_/\_\_\_\_/\_\_\_\_


Spasms or Convulsions?  
 Complications?  
 Did the baby die?  
 Age at death:  
 Age of onset in days:

Days
Days (99=Unknown)

---

**TREATMENT**

Date of admission \_\_\_\_/\_\_\_\_/\_\_\_\_

Medical record number: \_\_\_\_\_

Facility Address: \_\_\_\_\_

**Questions**

Seen in OPD?

Admitted?

<b>Answer</b> 1=Y, 2=N, 9=U

---

**COMMENTS:****RESPONSE**

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

**Questions**

Mother given protective dose of TT within 3 months of report?

Supplemental immunization within same locality as the case?

<b>Answer</b>

Date of response: \_\_\_\_/\_\_\_\_/\_\_\_\_

Details of response: \_\_\_\_\_

---

**FINAL CLASSIFICATION OF THE CASE:**Neonatal Tetanus: 

1=Yes, 2=No, 9=Unknown

---

**INVESTIGATOR**

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Unit: \_\_\_\_\_ Address: \_\_\_\_\_

Phone: \_\_\_\_\_

**ANNEX 9H**

**Tuberculosis - MDR and XDR TB - case-based reporting form**

Case based Multi-Drug Resistant and Extensively Drug Resistant Tuberculosis Report Form																													
Country:					Year:																								
Quarter:					Month:					Drug Susceptibility Test Results (S=sensitive; R=Resistant; I=intermediate; U=unknown)																			
Case unique Identifier (Detection year-Country code-Number in Tb Register)	Sex (F/M)	Age (Years)	Date of Diagnosis (dd/mm/yyyy)	Type of Notification (MDR-TB* or XDR-TB**)	TB Site (Pulmonary or extra Pulmonary)	Type of TB Case (New/Relapse/After default/After failure of first treatment/After failure of re-treatment/Transfer in/Other)	Patient Treatment Status (On treatment/Not on treatment/Don't Know)	HIV Status (positive/negative/Unknown)	H	R	E	Z	S	T	A	K	C	Cf	Of	Lf	Mf	Gf	Gf	Pt	Et	C	PA	Other (Specify)	



**ANNEX 9I**
**Viral hemorrhagic fever - case reporting form**

<b>IDSR Viral Hemorrhagic Fever Case Report Form</b>		
<b>Variables / Questions</b>		<b>Answers</b>
1	Detection day (dd/mm/yyyy)	
2	Detection place (Health facility or Community)	
3	Patient identification number (yyyy-week-CCC-PPP-DDD-Reporting site- <i>nnn</i> )	
4	Patient surname or last name	
5	Patient first name(s)	
6	Age (years)	
7	Sex (F/M)	
8	Number of people in same household	
9	Number of other contacts	
10	Patient's residential address	
11	Village/Town	
12	Neighborhood	
13	District	
14	Province	
15	Country	
16	Date of first symptoms onset (dd/mm/yyyy)	
17	Observed Symptoms and Clinical signs	
18	Was patient exposed to any known risk factor for this disease? (Yes/No)	
19	If yes, specify risk factor(s)	
20	Lab results	
21	Final Classification (Not a case, Suspect, Probable, Confirmed by Lab, Confirmed by epidemiological link, Pending)	
22	Outcome (Died, Survived, Unknown)	
23	End of latest contact followed-up (dd/mm/yyyy)	
24	Other Notes and Observations	
25	Date latest update of this record (dd/mm/yyyy)	

# ANNEX 9J Viral hemorrhagic fever – case investigation form

<b>ID Case</b> Date of reception: ___/___/___ Country: _____
--------------------------------------------------------------------

**Date of detection of the case** \_\_\_/\_\_\_/\_\_\_

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: \_\_\_/\_\_\_/\_\_\_ 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*)

- Health staff, details:  
 Name of health care facility \_\_\_\_\_ Service \_\_\_\_\_ qualification \_\_\_\_\_  
 Miner  House wife  Hunter/trading game meat  Children  
 Pupil/ Student  Farmers  Others \_\_\_\_\_

### Status of the patient

Status of the patient at detection  Alive  Death If dead, please specify date of death: \_\_\_/\_\_\_/\_\_\_

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: \_\_\_/\_\_\_/\_\_\_

Name of the village where the patient got ill \_\_\_\_\_ Country \_\_\_\_\_

Did the patient travel during illness :  Yes  No  DNK

If Yes, indicate the places and the country:

Village \_\_\_\_\_ Health Centers \_\_\_\_\_ Country \_\_\_\_\_  
 \_\_\_\_\_ Health Centers \_\_\_\_\_ Country \_\_\_\_\_

Did the patient have fever?  Yes  No  DNK. If yes, date of onset for the fever: \_\_\_/\_\_\_/\_\_\_

### Does or 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 |
| Diarrhoea                 | <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 |

<b>ID Case</b> Date of reception: ___/___/___ Country:
--------------------------------------------------------------

**Exposition 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 \_\_\_\_\_ ID Case
- 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. de 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 \_\_\_/\_\_\_/\_\_\_ ID Lab \_\_\_\_\_

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  Confirmed  Not a case

