

# Public Health Events of Unknown Etiology: A framework for response in the African Region



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# ACRONYMS

<b>CFR</b>	Case fatality ratio
<b>EMC</b>	Epidemic management committee
<b>EMS</b>	Event Management System
<b>ERB</b>	Ethical review board
<b>GOARN</b>	Global Outbreak Alert and Response Network
<b>HBRR</b>	Home-based risk reduction
<b>IDSR</b>	Integrated Disease Surveillance and Response
<b>IEC</b>	Information, education, communication
<b>IHR</b>	International Health Regulations
<b>IPC</b>	Infection protection and control
<b>IUE</b>	Initially unknown etiology
<b>NGO</b>	Nongovernmental organization
<b>PHE</b>	Public health event
<b>PPE</b>	Personal protective equipment
<b>RRT</b>	Rapid response team
<b>SOP</b>	Standard operating procedure
<b>WHO</b>	World Health Organization

# PREFACE

Time delays between a public health event's onset, recognition, investigation, response, and laboratory confirmation are common (1, 2). Nevertheless, even when a public health event's causative agent has yet to be identified by a laboratory, its early and effective recognition, investigation, and response may contribute to minimizing human morbidity and mortality through, respectively, a reduction in exposure and the provision of early clinical management for those affected (3–5).

Although agent-specific guidelines are available for public health event (PHE) response once a laboratory has identified the etiological agent responsible (6), there is a dearth of written guidance for early-stage PHE recognition, investigation, and response when the agent is of initially unknown etiology (IUE). Thus, the African Regional Office of the World Health Organization (WHO) aims to support ministries of health in the Region by providing a concise and easy-to-use technical framework to delineate how early and effective preparedness for, and response to, PHEs of IUE may be realized.

In concordance with the International Health Regulations (IHR) (7) and the Integrated Disease Surveillance and Response (IDSR) regional strategy (8), this framework comprises three cyclic phases: Phase I, Preparedness; Phase II, Response; and Phase III, Monitoring and evaluation. When reviewing this framework in preparation for a future PHE of IUE (Phases I and III), users are encouraged to complement the framework's guidance with a review of relevant literature. However, once a PHE of IUE is potentially under way (Phases II and III), the framework's step-by-step implementation processes may facilitate a timely and effective public health response.

# INTRODUCTION

## Public health events of initially unknown etiology in the WHO African Region

A public health event (PHE) is defined as any event that may have negative consequences for human health, including those that have not yet led to disease or illness but have the potential to do so, and require a coordinated response (7, 9). Ensuing the adoption of the IDSR regional strategy in 1998 (8) and the IHR in 2005 (7), ministries of health in the WHO African Region have aimed to minimize the effects of PHEs on human health, travel, and trade by improving their PHE surveillance and response systems (7, 8). However, as public health threats are omnipresent, ministries of health must continuously endeavour to maintain resilient, timely, and effective PHE surveillance and response systems for expected, emerging, re-emerging, and unidentified PHEs.

## Framework aims and target audience

This framework aims to complement the IDSR strategy (8) to improve preparedness and response systems for expected, emerging, re-emerging, and unidentified PHEs in the WHO African Region. It seeks to provide ministries of health in the Region with technical guidance for early and effective preparedness (Phases I and III) and response (Phases II and III) to PHEs of IUE, which may contribute to minimizing human morbidity and mortality

through, respectively, a reduction in exposure to the event and the provision of early clinical management for those affected (Figure 1).

Through the strengthening of multisectoral and multidisciplinary communication and coordination, technical capacity and operational capability will be developed and maintained to ensure an efficient and effective response to PHEs of IUE. The target audience for this framework, therefore, is a ministry of health's epidemic management committee (EMC) or equivalent body, which is a multisectoral (i.e. incorporating the whole of government and society), multidisciplinary, stakeholder coordination structure for the management and technical oversight of PHEs. An EMC typically includes a technical and multidisciplinary rapid response team (RRT) that is available for quick mobilization and deployment in case of emergencies (8). As an RRT is involved in both preparedness and response, this framework specifically targets them, while it is understood that it is also intended for the EMC.

Figure 1 – Specific objectives of the framework ▶

Figure 1 – Specific objectives of the framework



## Categorization and distribution of public health events of initially unknown etiology

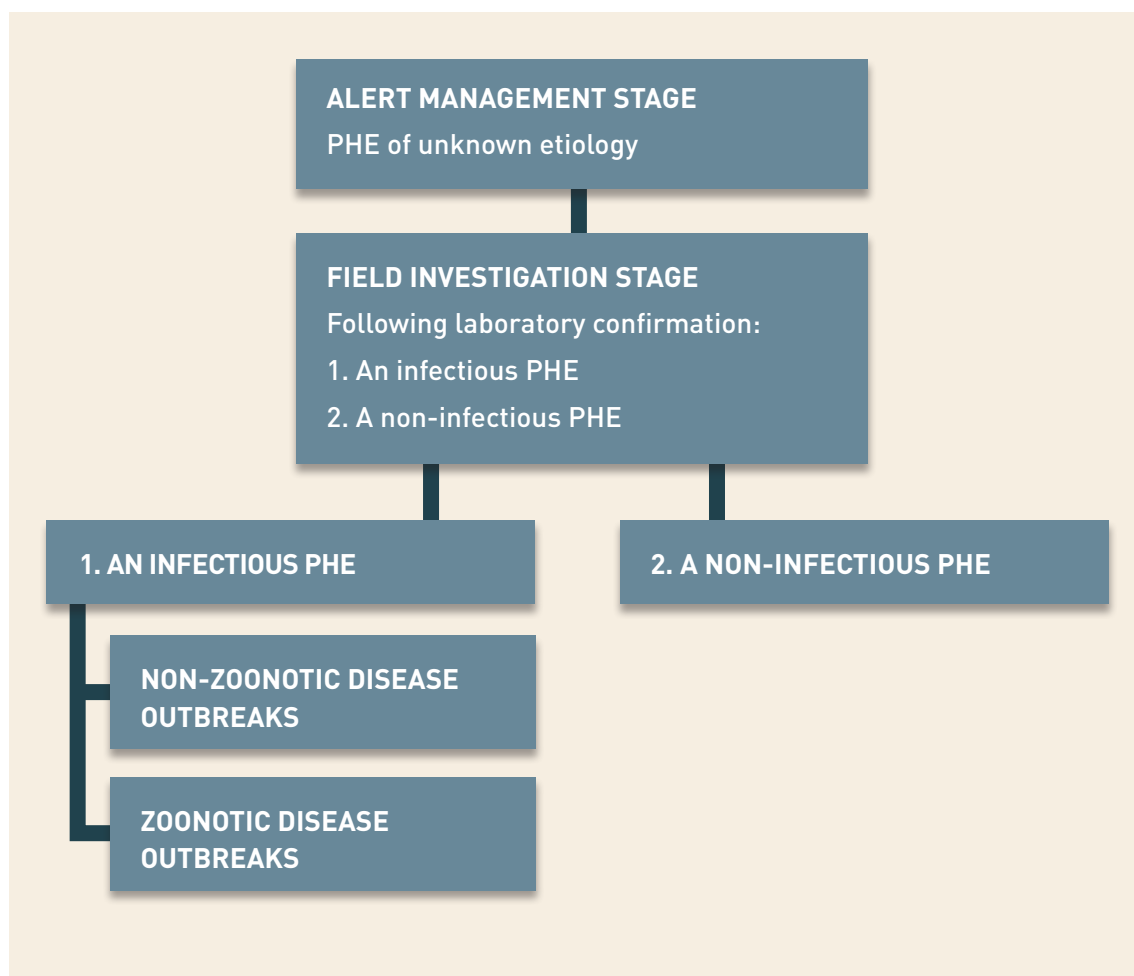
From 2000 to 2012, ministries of health have identified via the WHO Event Management System (EMS)\* an annual mean of 100 PHEs in the WHO African Region; of those, the majority were reported from areas characterized by poor economic support, armed conflict, and/or an antiquated health care system (10). Typically, during the alert management stage of a PHE (see Phase II), events are initially categorized as being of unknown etiology. However, once laboratory diagnostic confirmation of the

PHE is made available (usually during the field investigation stage, Phase II), the PHE of IUE is categorized as infectious or non-infectious, with the former further categorized as being zoonotic or non-zoonotic (Figure 2). For the purpose of this document, reference to a ‘public health event’ hereafter refers to an event of initially unknown etiology.

Figure 2 - Categorization of public health emergencies ▶

\* The EMS is a secure web-based application used by WHO to manage public health events which threaten international health security.

Figure 2 – Categorization of public health emergencies



From decreasing order of categorical frequency and magnitude, PHEs in the WHO African Region in 2011 and 2012 were subsequently categorized as i) infectious disease outbreaks, ii) events of moderate or severe malnutrition, iii) outbreaks of undetermined etiology, iv) natural and man-made disasters, v) animal disease outbreaks, and vi) toxins and chemical exposures according to the EMS. Of toxins and chemical exposures, examples of non-infectious PHEs include contaminated food (11), contaminated water (12), chemically contaminated animals (13), contaminated environments (12), chemical hazards (12), and radiation/nuclear events (14). The rapid growth of industry in sub-Saharan Africa and the exploitation of fossil fuels and mining are increasingly exposing communities to the risk of ill-health from non-infectious agents (15). In Nigeria in 2010 the Ministry of Health and an

international RRT estimated that 26% of children aged less than 5 years who were identified from a survey of 119 family compounds in Zamfara, Nigeria had died of complications from lead poisoning, with the majority of these deaths occurring in the 6-month period preceding the survey (16). Recent public health efforts in targeted villages in Zamfara, such as prevention to lead exposure and chelation therapy, have helped to decrease the mortality rate among children from 43% in 2010 to 1% in 2011 (17).

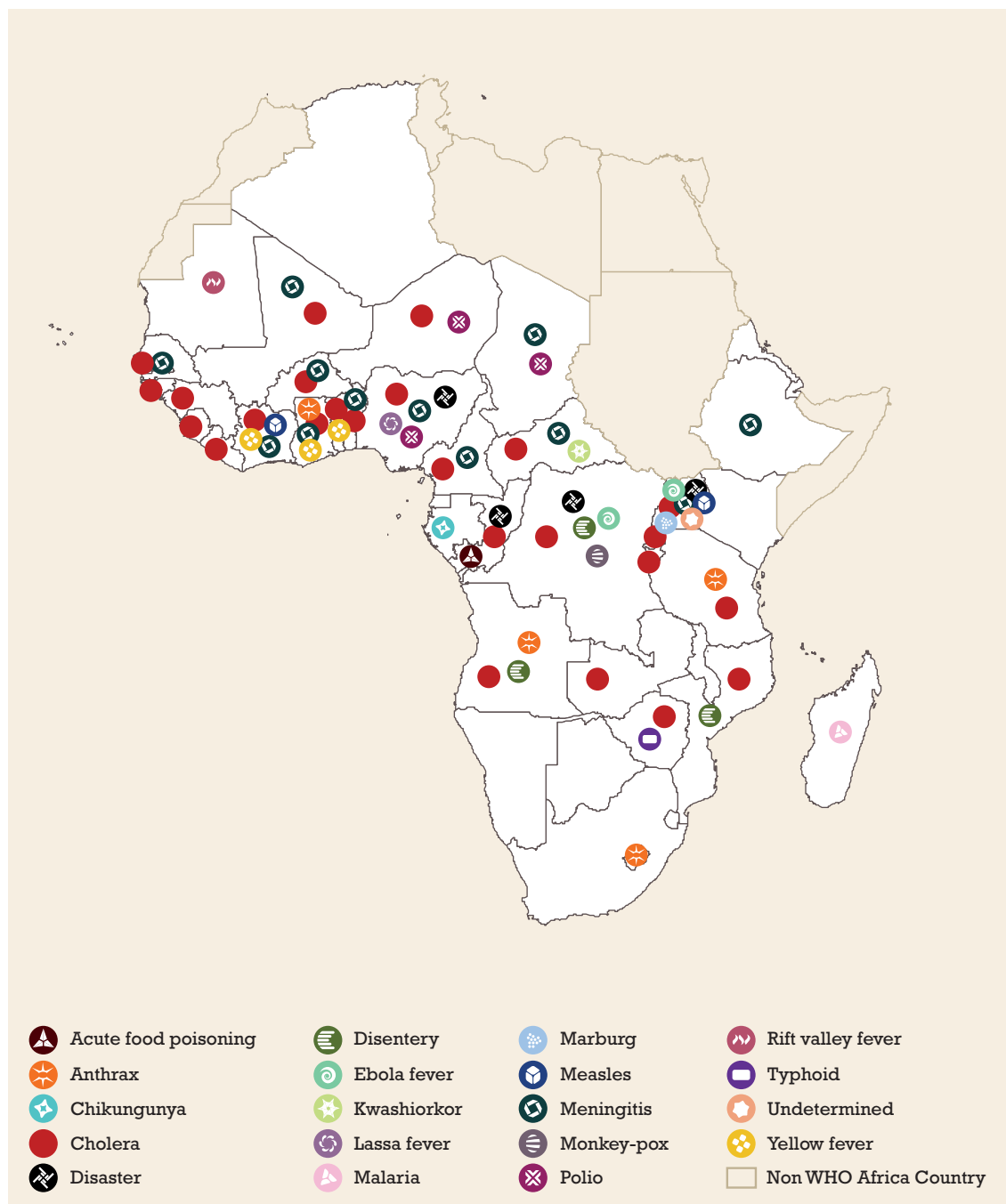
Infectious PHEs, which, similar to some non-infectious PHEs, easily and often traverse geopolitical boundaries of nation states (18, 19), herewith refer to outbreaks of infectious disease among humans, and typically include zoonotic infectious diseases and foodborne illnesses (e.g. cholera, *Shigella*, *Salmonella*, *Entamoeba histolytica*, and others (20, 21)).



Aside from *Vibrio cholerae*, which accounted for approximately 30% of identified PHEs of IUE in both 2011 and 2012, 24% of identified infectious disease outbreaks were zoonotic according to the EMS. Other recent prominent infectious disease outbreaks identified in the WHO African Region via ProMED Mail\* and the EMS, including emerging and re-emerging pathogens, were from avian and pandemic influenza, meningococcal meningitis, anthrax, measles, polio, yellow fever, malaria, dysentery,

Ebola virus disease, Marburg virus disease, dengue fever, Lassa fever, Rift Valley fever, Crimean-Congo haemorrhagic fever, and plague. Figure 3 presents a mapped distribution of PHEs in the WHO African Region identified in 2012, all of which were classified by RRTs as being of unidentified etiology during each event's alert management stage. Of the 64 identified PHEs of IUE, 91% were subsequently determined to be caused by an infectious disease according to the EMS.

Figure 3 – Distribution of identified public health events in the WHO African Region, 2012 ▼



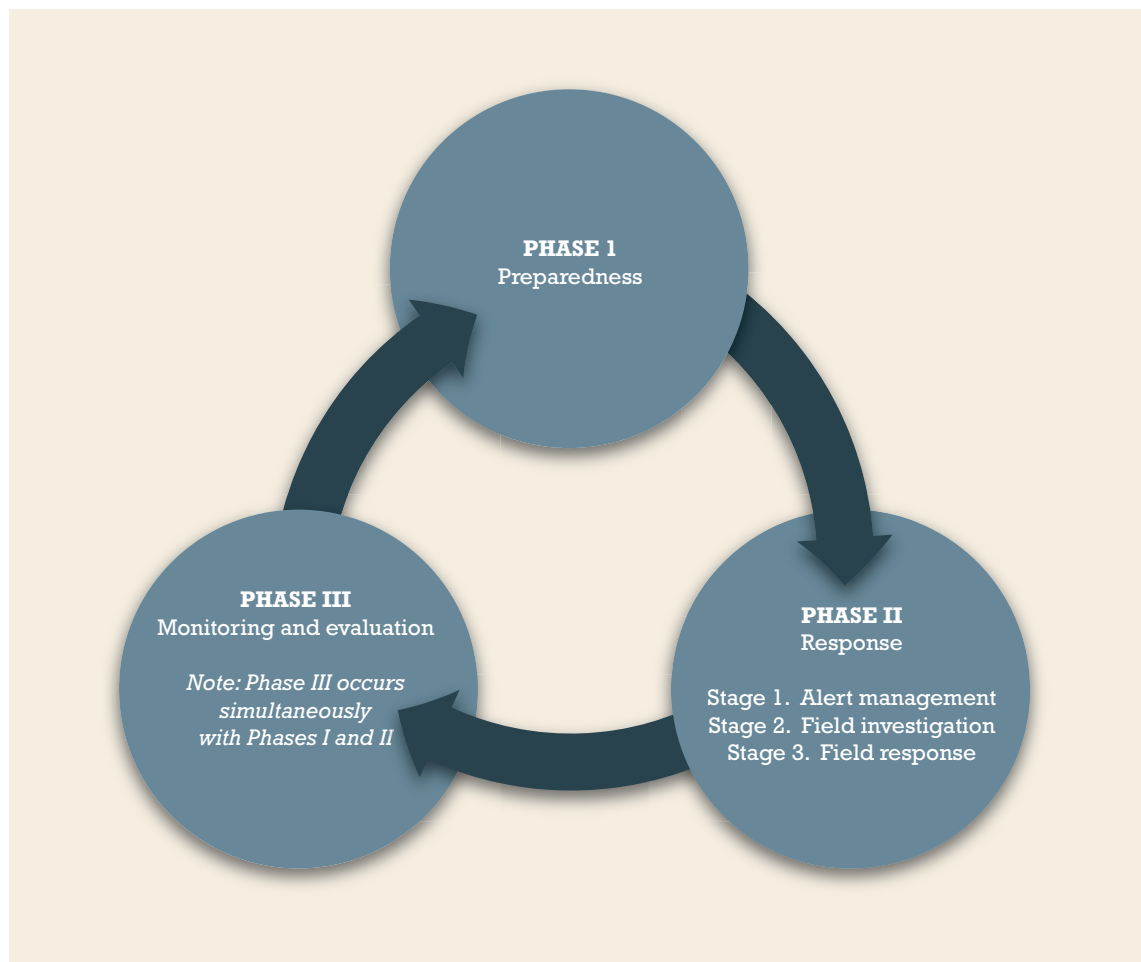
\*\* A program by the International Society for Infectious Diseases, ProMED Mail tracks infectious diseases. It can be accessed at <http://www.promedmail.org/>.

## Three phases related to public health events of initially unknown etiology

Similar to strategic approaches to disease outbreak preparedness and response (22, 23), the preparedness of, and response to, a PHE of IUE involves three cyclic phases: Phase I, Preparedness; Phase II, Response; and Phase III, Monitoring and evaluation. Phase II comprises three sequential stages: alert management (**stage 1**); field investigation (**stage 2**); and field response (**stage 3**) (Figure 4). Monitoring and evaluation occurs simultaneously with Phases I and II but constitutes its own phase, as it is a process requiring ongoing commitment and rigour.

Phases I, II, and III highlight the importance of strengthening existing animal and public health surveillance, investigation, response, prevention, and preparedness systems at the country, regional, and international levels, by incorporating a 'One World, One Health' multisectoral approach – a strategic framework for reducing risks of infectious diseases at the animal, human, and ecosystem interface (24).

Figure 4 - Three phases related to public health events of initially unknown etiology ▼



# CORE FUNCTIONS AND RESPONSIBILITIES

Although not a specific phase, it is imperative that core functions and responsibilities required for realizing early and effective preparedness and response to, and monitoring and evaluation of, a PHE of IUE are met by the individuals who serve as institutionally supported RRT members (see [Annex 1](#)). The RRT manager/team leader should ensure maintained communication and coordination with the multisectoral institutions that are identified by the EMC as being contributors to the provision of RRT membership. For example, an epidemiologist working for a ministry of health infectious disease unit may be a contributing RRT member, but in the case of his or her absence, the epidemiologist's functions and responsibilities in the RRT must still be ensured through institutional agreements with the EMC. For all current and prospective RRT members, the RRT manager/team leader should maintain a roster of names, titles, professions, and contact details. Each RRT member should have professional qualifications in his or her field of expertise, relevant and multifarious experience with PHEs, and attend and participate in all EMC/RRT meetings and activities. RRT member inclusion and responsibilities should be written and agreed on by all relevant technical and political entities in the ministry of health and national government ([Annex 2, indicator 1.1](#)).

In line with the IDSR strategy (8), the recommended absolute minimum composition of RRT members to be deployed during a PHE field investigation should include:

- 1 manager/team leader
- 1 clinician/infection control expert
- 1 epidemiologist
- 1 logistician
- 1 social mobilization expert
- 1 anthropologist.

It may also be beneficial to include 1 laboratory specialist to facilitate the extraction of patient samples for diagnostic testing. When possible, it is also encouraged to include additional logisticians in the initial RRT, as robust logistical capacity is essential to any PHE response. Finally, a multisectoral 'One Health' approach should be taken into consideration when forming an RRT deployment to the field. If the PHE of IUE is suspected of involving any part of the animal, human, and ecosystem interface, then individuals with expertise in these sectors should ideally be present (e.g. veterinarian, wildlife specialist, toxicologist, environmental health officer). Institutional RRT-member functions and responsibilities listed in [Annex 1](#) may be modified according to context.

# PHASE I – PREPAREDNESS

An overview of the identification and description of the systems and activities required for realizing PHE preparedness is listed in [Figure 5](#). When, prior to the occurrence of a PHE of IUE, the identified systems and their corresponding recommended action points are established, functional, and maintained, an RRT's effort to minimize morbidity and mortality during field investigation and field response is greatly facilitated. All systems and activities are in line with the IDSR strategy (8), which should be consulted by the framework's user for comprehensive and supplemental information regarding PHE preparedness. Also, please see the following references for additional and relevant preparedness guidance: (8, 25, 26).

Specifically, the preparedness phase aims, through ministry of health leadership, to ensure that an RRT is able to respond efficiently and effectively to a PHE of IUE, and that essential resources are available for immediate action (7). Although the systems and activities listed in [Figure 5](#) may serve as a recommended checklist for preparedness, it is recognized that each local infrastructure has its own opportunities and challenges. While some may require contextual modification, all systems and activities listed in [Figure 5](#) should be established, functional, and maintained prior to the occurrence of a PHE of IUE.

Figure 5 – Overview of the systems and activities required for realizing public health event preparedness ▼

## 01

### Epidemic management committee (EMC)

- Through official agreements, ensure that the EMC/RRT is a national, recognized, and collaborative multisectoral and multidisciplinary platform of institutions with effective communication and collaboration. Consult IHR and IDSR strategy (7, 8). See also *WHO's Whole-of-Society Pandemic Readiness* (27).
- Determine the RRT coordination structure within the EMC.

## 02

### Rapid response team (RRT)

- The RRT should be functional and sufficiently agile and resilient to be deployed once an alert is deemed credible. This crucial attribute should be tested and evaluated at least once every six months through RRT scenario-based field training and deployment ([Annex 2, indicator 1.2](#)).

# 03

## Surveillance

- Ensure the existence of country and regional multisectoral surveillance and information systems that are capable of providing formal and non-formal PHE alerts to the EMC/RRT. See the IDSR publication for further information (8).
- Strengthen community-based surveillance.

# 04

## Training/ Capacity building

- EMC/RRT members should read published scientific literature pertinent to their field of expertise and all PHEs occurring in their geographic region of responsibility.
- Scenario-based field training and deployment should serve as RRT-member capacity-building exercises.

# 05

## Infection prevention and control

- Ensure all relevant national policies related to infection prevention and control are established and their corresponding systems are functional for preventing the spread of disease and hazardous agents. This includes complete vaccination coverage for all RRT members.
- An RRT should have the capability of implementing infection prevention and control measures when conducting field investigation and response.

# 06

## Communication plan

- Define responsibilities and lines of multisectoral and multidisciplinary communication for ensuring efficient and effective technical and political support and action (28, 29).

# 07

## Logistics and finance

- An EMC/RRT should ensure that all its preparedness and response activities are sufficiently supported logistically and financially. When in the field this may include the provision of per diem, lodging, petrol and vehicles, personal protective equipment (PPE), medical material, general supplies, and communication devices such as a satellite phone, two-way radios, and/or mobile phones.
- In particular, an RRT must ensure that a budget (i.e. a mechanism that releases timely funds) is available for the purchase of petrol and that an adequate number of vehicles are functional and immediately accessible prior to the field investigation stage.
- Pre-position material and supplies.

## 08

### Written response plan

- The EMC/RRT should develop a written copy of their country-adapted and context-relevant PHE of IUE preparedness and response plan. This includes how to process alerts and conduct the field investigation and field response for PHEs expected to occur in the future (e.g. the expected seasonality of meningococcal meningitis in the meningitis belt of Africa). This framework may serve as the template for these efforts when the etiology remains undetermined, but context-specific modifications are likely and thus, best to identify and address prior to an event's occurrence ([Annex 2, indicator 1.3](#)). Additionally, this plan should include standardized epidemiological and clinical data collection templates for data collection during field investigation and field response stages.
- For each specific PHE that could potentially occur in the country and/or region, a case management strategy, including details for the prompt availability of supplies from quality assured sources (such as ceftriaxone for meningitis or ringer lactate for cholera, etc.) should be agreed on and written in the response plan prior to the occurrence of a PHE.
- Define the relationship between the EMC/RRT and the IHR focal point (30).

## 09

### Diagnostic laboratories

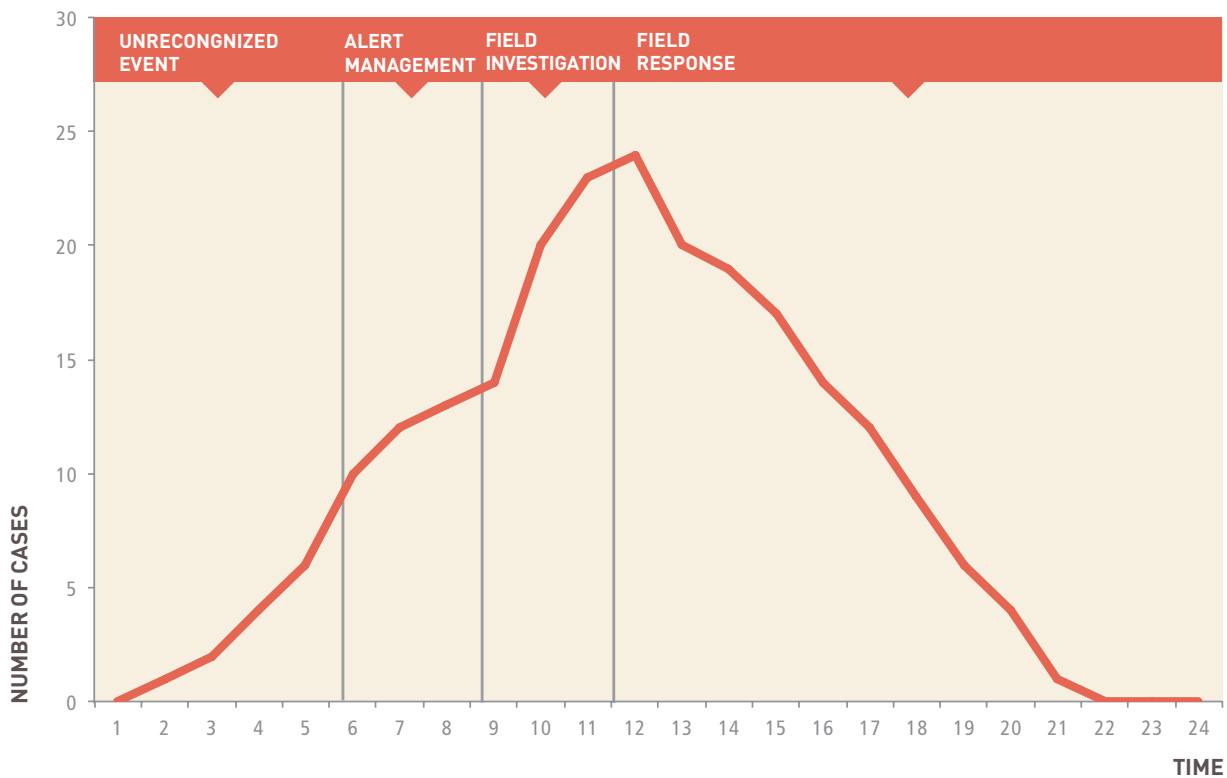
- For each potential and expected PHE, complete a written and politically-endorsed agreement between the EMC/RRT and the identified laboratories for receiving and processing samples for diagnostic confirmation. Note: Diagnostic tests may be needed for infectious PHEs, non-infectious PHEs, chemical exposures, animal testing, etc.
- This agreement should include approximate costs and time frames for the reporting of results, and provide the RRT with the specific laboratory-recommended protocols for shipping samples nationally and/or internationally for diagnostic testing. In turn, the RRT should purchase and have readily available all diagnostic sampling kits deemed potentially necessary for obtaining and sending samples when conducting a field investigation of a PHE of IUE.

# PHASE II – RESPONSE

Phase II describes the recommended step-by-step activities and their components for an EMC/RRT to realize the three sequential stages of response to a PHE of IUE: alert management (stage 1); field investigation (stage 2); and field response (stage 3), shown in Figure 6. Activities and components in this phase may serve as a recommended checklist, though the realities of each event as well as the local infrastructure will impact to what degree and in what way each step is realized. Activities are presented in approximate chronological order, though

some may be carried out simultaneously while others may require contextual modification. All activities and their components are in line with the IDSR strategy (8), which should be consulted by the framework's user for comprehensive and supplemental information regarding PHE response.

Figure 6 – Alert, investigation, and response stages to a public health event ▼



## Alert management

Alert management is the **first stage** of the PHE response. An alert is information from a formal or informal source that a PHE is either occurring or likely to commence (31). A formal alert source may include a functioning PHE surveillance system, while a non-formal alert source could include a written or verbal report from a health professional, the media, or other entity. Box 1 lists possible alert criteria. With an emphasis on characterizing the event (syndrome) and developing standardized clinical and epidemiological case definitions, the alert management stage aims to identify the occurrence of a suspected PHE of IUE, commence field investigation when necessary, and report details to the next level, as defined by the IDSR framework (8). In line with the IDSR strategy (8), alert management activities (steps 1 to 6) are listed on pages 17.

## Field investigation

Field investigation is the **second stage** of the PHE response. It aims to ensure that samples are collected and sent to previously identified laboratories for diagnostic confirmation and to gather evidence about what may be causing the event in order to implement appropriate control, prevention, and treatment strategies (7). In line with IDSR strategy (8), field investigation activities (steps 1 to 10) are listed on pages 18–19.

## Field response

Field response is the **third stage** of the PHE response. It aims to coordinate and mobilize resources and personnel to implement an appropriate public health response (7). More specifically, this stage aims to stop the primary and/or secondary acquisition of the PHE (irrespective of its etiology) and to ensure that optimum patient care is provided. Primary transmission involves human infection through single or multiple events from a hazardous source.

### Box 1 – Alert criteria that can be used to determine the initiation of a field investigation of a public health event

1. The source of the information
2. Available epidemiological data
3. Contextual information
4. The magnitude, duration, and severity of the reported event
5. The potential risk for international spread
6. Political implications for not responding
7. Media interest
8. The experience of the persons conducting the assessment

Secondary transmission typically involves direct contact with a person's infected bodily fluids during the acute phase of their illness, direct contact with their remains, and/or with contaminated fomites. *Note:* For some PHEs, airborne transmission may be possible.

Typically, an RRT remains on-site when transitioning from the field investigation to the 'full-blown' field response stage. Laboratory diagnosis confirming the cause of the PHE typically triggers the implementation of more extensive response activities. Recommended field response step-by-step activities are to 1) scale up, 2) maintain, and 3) scale back. As a part of these activities, field response components are, in no order of predetermined priority, implemented for reducing exposure to the PHE and providing optimum clinical care for those infected. In line with the IDSR strategy (8), field response activities (steps 1 to 3) are listed on page 20, and the field response components in **Figure 7**.



## Stage 1 – Alert management activities (6 steps)

### Step 1. Ensure the establishment of an alert network

The EMC should have an established, functional, and maintained countrywide and regional information-source network for receiving and managing formal and non-formal alerts. This network should be multisectoral and multidisciplinary (i.e. include animal and other surveillance systems). The EMC should agree on, record, disseminate, and adhere to clinical and epidemiological case definitions and epidemic thresholds for all PHEs that could potentially occur in the country and region. Also, please note the *Abuja Declaration on HIV/AIDS, Tuberculosis, and Other Related Infectious Diseases* (32).

### Step 2. Maintain vigilance

The EMC/RRT should be vigilant when monitoring both formal and non-formal alert sources for potential PHEs occurring in their sector of responsibility, as a credible alert may not always be obvious. For example, filovirus outbreaks are often initially recognized from an epidemiological link among cases (i.e. direct contact between family members and/or health-care workers), rather than a specific clinical case definition, which is often indiscernible from a number of other endemic tropical diseases (2, 33).

### Step 3. Receive alerts and assess their credibility – I

As an alert will trigger the preliminary multisectoral decision-making processes for the PHE field investigation, the EMC/RRT must first assess an alert's credibility. Thus, EMC/RRT members who receive and manage alerts must have prior experience with PHEs in order to apply his or her knowledge and logic to the alert's credibility assessment process. Also, it should be recorded how and by whom the alert was communicated to the EMC/RRT.

### Step 4. Receive alerts and assess their credibility – II

When assessing an alert, EMC/RRT members will use criteria to determine if an alert is credible or not (see Box 1). Remember, proactive enquiries in the community and/or requests for further information can be helpful and are encouraged, though not at the expense of efficiency.

### Step 5. Receive alerts and assess their credibility – II

In agreement with the EMC chairman, or equivalent, if the RRT manager/team leader determines that an alert is credible the coordination of the field investigation stage will commence. The EMC/RRT will initially state what possible public health risk(s) may be under way and ensure that the relevant multisectoral and multidisciplinary stakeholders are informed and ready to support the imminent field investigation stage. This will include, among others, nongovernmental organizations (NGOs) and academia. Additionally, assistance can be requested from WHO, which has the ability to coordinate international support through regional mechanisms and the Global Outbreak Alert and Response Network (GOARN).

Note: The commencement of the field investigation stage should not be unnecessarily hindered by a lack of previously agreed logistical and/or financial support as the RRT scenario-based field training and deployment training should have previously ensured the efficiency and effectiveness of the multisectoral response.

### Step 6. Evaluate

The alert management stage should be evaluated for efficiency and effectiveness at least once per month. This includes writing a short report detailing the number of alerts received, number of alerts deemed credible (and of which, how many were infectious versus non-infectious PHEs), and number of alerts responded to with a field investigation by the RRT ([Annex 3, indicators 2.1–2.3](#)).

## Stage 2 – Field investigation activities (10 steps)

### Step 1. Pack the vehicle(s)/transport

Pack the vehicle(s)/transport with medicine for infected patients potentially encountered during the investigation. Medication should be selected based on what PHE may be occurring and only administered by a trained medical doctor. Also pack diagnostic sampling kits (as recommended by official laboratory protocols), PPE, office supplies, communication devices, data collection templates, analysis tools such as a laptop with appropriate statistical software, and money for expenses.

### Step 2. Arrive on location

Proceed to the geographic location(s) where the PHE of IUE is reportedly occurring. Ensure that collaborative relationships between local, district, national, and regional health and political authorities are developed from the start. To the greatest extent possible, establish working relationships that complement each entity's investigative responsibilities.

### Step 3. Conduct a preliminary assessment and collect data

Together with local authorities, review all available sources of information in the affected community, including patient registrars at each implicated health facility. At health facilities and in the community, collect demographic, epidemiological, and clinical data, which may help to formulate an hypothesis about the etiology of the event and to establish preliminary epidemiological and clinical case definitions.

*Note:* For effective PHE management, all stakeholders should adhere to the same case definitions. Case definitions may be modified once further information is made available ([Annex 4, indicator 3.3](#)). Also, provide standardized data collection templates, which were designed and agreed on in the preparedness phase.

### Step 4. Formulate an hypothesis

Following the preliminary assessment and data collection, the RRT should formulate an initial hypothesis regarding the possible cause(s) of the PHE of IUE. If a source, such as water, food, or a particular location, is thought to be responsible for primary transmission to humans or animals, ensure that access to the potential hazard is blocked and prohibited. Continuously assess and, when appropriate, modify the hypothesis according to the emergence and availability of new data and information.

### Step 5. Collect and send specimens and/or patient samples for laboratory diagnosis

Collect appropriate samples including patient, animal or environmental samples based on your preliminary hypothesis and in accordance with laboratory protocol procedures for confirming a diagnosis. Communicate via telephone or other method to the appropriate laboratory that samples are being sent ([Annex 4, indicator 3.1](#)). Procedures and reasons for the diagnostic test should be clearly explained to the patient and their family and only performed with their verbal consent.

## Step 6. Training

When necessary, provide medicine and PPE to local health staff or others after providing training on its use. An example of possible medical training might include the treatment of meningococcal meningitis in a location without previous recognized infections. Training sessions might also include community members, health staff, and local authorities to prevent exposure to the PHE, and how they might best treat and care for those infected and/or affected.

## Step 7. Ensure the provision of optimum clinical care

Prioritize the health and safety of those infected by ensuring (encouraging) health authorities to provide optimum clinical care and early clinical management ([Annex 4, indicator 3.2](#)). Optimum patient care is defined as the best possible care available based on the probable and eventual diagnosis of the PHE and the contextual setting.

## Step 8. Communicate to EMC and enact support channels

Communicate via telephone or other method to the EMC the field investigation findings so that technical and political support channels can be immediately activated and utilized, as previously established during the preparedness phase, and IHR reporting (7) at the national level can commence. It may be desirable to request the presence of an on-site diagnostic and patient-monitoring laboratory.

## Step 9. Write a field investigation report

Immediately following step 8, write a report to inform all authorities and stakeholders of the current situation. A report template can be found in [Annex 6](#).

## Step 10. Identify potential research

Identify potential research that may be undertaken by the RRT and others that may contribute to the improvement of PHE identification, control, prevention, and/or treatment efforts. Maintain involvement in research design, development, implementation, and follow-up.

*Reminder:* Ensure that standards for clinical research and participant protection are respected. This includes using an ethical review board-approved study protocol and obtaining **written consent** for research participation from individuals informed about the potential risks, benefits, alternatives, and responsibilities of the study *prior* to their study enrolment.

Stage 3 – Field response activities (3 steps) ▶

## Stage 3 – Field response activities (3 steps)

### Step 1. Scale-up response components

In no predetermined order of priority, the RRT should ensure that the response components in [Figure 7](#) commence as soon as possible. The RRT may not always be responsible for the development and implementation of each component, but the RRT should ensure that each component is being addressed by a relevant entity and that the associated activities complement national and/or international standards. Remember, all response components are aimed at preventing exposure to the PHE and ensuring the provision of optimum patient care for those infected/affected. Also, the RRT should ensure daily community and multisectoral communication for, and coordination of, implemented response components ([Figure 7](#)).

### Step 2. Maintain response components

Ensure that all response components are effective and maintained throughout the duration of the event. Also, ensure daily community and multisectoral communication for, and coordination of, implemented response components ([Figure 7](#)).

### Step 3. Scale-back response components

In discussion with multisectoral and multidisciplinary stakeholders, slowly begin to scale-back the response components. Typically, the epidemiological data contribute to the decision-making process of when to begin this step.

*Important:* Remain vigilant as premature scaling back of activities may result in further transmission. Also, when possible, conduct post-PHE health services restoration, patient follow-up, reporting, and research according to country guidelines.

*Reminder:* Ensure that standards for clinical research and participant protection are respected. This includes using an ethical review board-approved study protocol and obtaining **written consent** for research participation from individuals informed about the potential risks, benefits, alternatives, and responsibilities of the study *prior* to their study enrolment.

Figure 7 – Field response components

# 01

## COMPONENT 1.

### Epidemiological surveillance and case detection

- An epidemiological surveillance and case detection system (e.g. contact tracing) should be organized whereby community leaders and members alert the RRT of suspected cases. This system should refer individuals fulfilling a PHE epidemiological or clinical case definition, when available, to a health facility for clinical assessment and, if appropriate, admission. These activities aim to identify incident PHE or IUE cases and allow for prompt hospitalization to minimize, when relevant, secondary transmission in the community ([Annex 5, indicator 4.1](#)). Also, there may be the need to collect additional patient or environmental samples during the course of the PHE to guide case management.

# 02

## COMPONENT 2.

### Case diagnosis

- Individuals who fulfil clinical and epidemiological case definitions are accompanied to a hospital ward for clinical assessment and, when appropriate, categorized as a suspected patient of a PHE of IUE while a sample is obtained for laboratory confirmation. Patients with eventual laboratory-confirmed negative test results are discharged and assessed for an alternative illness or remain on the ward and re-tested if clinical suspicion remains (3).
- The RRT should contribute to clinical discussions regarding discharge protocols and long-term patient follow-up.

# 03

## COMPONENT 3.

### Case detection in the health facility

- Similar to epidemiological surveillance and case detection in the community, case detection in a health facility aims to identify incident PHE cases and allow for prompt isolation to stop secondary transmission. Activities include screening patients on admission as well as those hospitalized on general wards such as paediatrics, adult medicine, and maternity. Corpses are also screened. General wards refer their suspected cases to the specified hospital ward. When possible, RRTs encourage health facility authorities to operate all normal services during a PHE in order to satisfy the population's hospital care needs. However, RRTs also accept when health facility authorities suspend or reduce non-essential services, such as immunization services, as the best way to conduct health facility management during the unresolved PHE ([Annex 5, indicator 4.1](#)).

# 04

## COMPONENT 4.

### Case management

- All patients should receive optimum patient care, which is defined as the best possible care available based on the probable diagnosis of the PHE and the contextual setting ([Annex 5, indicator 4.3](#)). Case management protocols should be in accordance with national and/or international standards.

# 05

## COMPONENT 5.

### Design and construction of the ward

- After arriving at a location where the PHE of IUE is suspected and encountering a make-shift hospitalization unit, the RRT, when relevant, will design and construct a ward, which has separate areas for the eventual suspected and confirmed cases. The size of the structure(s) allows for adequate spacing between patients, especially for those awaiting laboratory confirmation, so as to avoid cross-contamination among patients. Transparent web-like net fencing (34) is often erected around the ward, usually with a single entrance and exit, to control patient and staff flow. Design and construction of the ward are dependent on what type of event is transpiring.

Figure 7 – Field response components (continued)

## 06

### COMPONENT 6.

Psychosocial support and psychological care

- The psychosocial support component aims to assist in mediations of burial and disinfection and help home-based risk reduction (HBRR) teams with patients, families, and community. Through two-way discussions, psychosocial support ensures that relatives of the deceased participate in burial and disinfection activities while adhering to bio-safety norms. In support of the HBRR programme, they speak directly with patients and caregivers to explain procedures, listen to and take into account their concerns, and ensure agreement with programme participation. Concurrent with burial and disinfection and HBRR activities, the psychosocial teams sensitize family members, neighbours, and bystanders to the causes and modes of transmission of the PHE/illness/hazard and the intervention. Similar to information, education, and communication (IEC) campaigns, psychosocial interventions allay fear and anger among family members, reduce patient stigmatization, and quell rumours and panic in the community (35, 36).
- Similar to the psychosocial support component of the community intervention, psychological care aims to help inform patients and their families about the PHE of IUE and allay their fear. Psychological support also mitigates misunderstandings about the objectives and activities of the RRT's intervention, and thereby improves relationships between the RRT and its beneficiaries. Psychosocial support and psychological care components are dependent on what type of event is transpiring.

## 07

### COMPONENT 7.

Peripheral health facility support

- Health staff of facilities located on or near the fringe of a PHE's epicentre are trained on prevention measures and requested to identify possible infections and report potential cases to the authorities. Peripheral health facility support is dependent on what type of event is transpiring.

## 08

### COMPONENT 8.

Information, education, and communication campaign

- An effective IEC campaign is crucial to the control of a PHE of IUE, and is typically implemented at the beginning of the field response stage. Its aims, via mass media communication and discussions with community groups and individual families, are to increase community understanding of the PHE occurrence and acceptance of the response, and to encourage health facility-based assessment and hospitalization for suspected and confirmed cases. *(continues on the next page)*

# 08

## COMPONENT 8.

Information, education, and communication campaign (continued)

- IEC programmes mitigate fear and anger among family members, reduce patient stigmatization, and quell rumours and panic in the community (35, 36) ([Annex 5, indicator 4.2](#)). The EMC/RRT should identify a spokesperson for this component. IEC campaigns are dependent on what type of event is transpiring.

# 09

## COMPONENT 9.

Safe burial and disinfection

- Safe burial of potentially infected corpses and disinfection of household items are crucial to halting some infectious PHEs. In the case of a filovirus outbreak, an RRT works with family members to adapt burial practices to reduce risk and to incorporate these with innocuous traditional burial rites, such as song and dance and the use of coffins. For example, families can identify the corpse before burial, carry and lower the coffin into the grave while using gloves, and fill the grave with earth, but no family members are allowed to touch the corpse. Potentially infected household items are disinfected with a 0.5% chlorine solution and items such as mattresses and clothing are burnt and replaced. Processes of disinfection, burning, and replacement are explained to and witnessed by family members in order to facilitate acceptance of the procedures and quell rumours. Safe burial and disinfection are dependent on what type of event is transpiring.

# 10

## COMPONENT 10.

Home-based risk reduction

- Home-based risk reduction (HBRR) is implemented if an individual resists hospital-based care. The patient is advised to stay in one room of the house not shared with anyone else while a designated caregiver (e.g. a family member) is provided PPE and trained to care for the patient. The patient is followed-up daily by a medical professional and psychologist who ensure adherence to the HBRR protocol, replenish medical stocks, and clinically assess the patient. At each visit, the patient is encouraged to accept hospitalization, as HBRR is a provisional and second-best solution to health facility-based patient management. HBRR is dependent on what type of event is transpiring.

# 11

## COMPONENT 11.

Infection control in the health facility

- Infection control in a health facility, a mainstay of intervention during a PHE of IUE, involves the detection and isolation of cases, as well as generic infection control. Activities include improving water quality, storage, and delivery, as well as creating systems for safe disposal of sharps and contaminated waste. Also, the number of injections should be limited, when possible. (*continues on the next page*)

Figure 7 – Field response components (continued)

# 11

## COMPONENT 11.

### Infection control in the health facility (continued)

- For some PHEs, such as a filovirus outbreak, disinfection of the health facility is conducted by spraying the structure and material with a 0.5% chlorine solution. When necessary, hospital staff and RRT members wear PPE, which consists of a hood, goggles, mask, gown, apron, gloves (two pairs), and boots.
- Note: Neither patients themselves, nor their clinical bedside paperwork are to be sprayed with chlorine. Please ensure that their hands and/or feet are sprayed **only after** their or their caregiver's verbal consent.
- Infection control in the health facility is dependent on what type of event is transpiring.



# PHASE III – MONITORING AND EVALUATION

Monitoring and evaluation involves the systematic and ongoing collection, analysis, and interpretation of data. Stakeholders analyse and interpret data to plan, implement, adapt, and evaluate a public health strategy. In the specific case of this framework's strategy, monitoring is the routine and continuous tracking of the EMC/RRT's preparedness and response capacities and the efficiency and effectiveness of the response (i.e. alert management, field investigation, and field response). Evaluation is the periodic assessment of how well the RRT has met their objectives (e.g. efficiency and effectiveness of the response for reducing exposure to the PHE (minimizing morbidity) and providing early clinical management for those infected (minimizing mortality)) (37).

Surveillance is a recognized and well-documented public health approach (i.e. methodology) to generate prospective health data. Surveillance data are used to estimate measurements for programme monitoring and evaluation, including the monitoring of programme intervention strategies in relation to ongoing PHE trends, and the identification of high-risk groups and the most prevalent causes of morbidity and mortality. Additionally, surveillance provides indications of programme deteriorations or improvements so as to respond with health interventions based on the generated data.

Monitoring and evaluating preparedness of, and response to, PHEs of IUE can be achieved by using indicators that can be measured repeatedly, directly or indirectly, and over time (37). A good indicator is one that is valid, reliable, and easily measured. Indicators often are expressed in whole numbers and ratio percentages. As indicators are estimated measurements, it is important that they are, to the greatest extent possible, both reliable and valid. Reliability is an estimate of the consistency of the measurement whereas validity is an estimation of the accuracy of the measurement.

Indicators are typically categorized as being either a process or outcome indicator. A process indicator measures programme and activity performance, such as the percentage of patient samples sent in the last month to a diagnostic laboratory that was previously identified by the EMC/RRT during the preparedness phase and sent according to the laboratory's stated sample-shipping protocol during a field investigation of a PHE of IUE. An outcome indicator measures how well the EMC/RRT initiative is accomplishing its stated objectives, such as the comparison of health determinants within a defined population during the field investigation and response stages, and weekly or monthly intervals thereafter.

[Annex 2](#) lists the recommended key indicators for measuring and evaluating EMC/RRT preparedness and response capacities. For key indicators for measuring and evaluating EMC/RRT efficiency and effectiveness for alert management, field investigation, and field response, see [Annexes 3–5](#).

Finally, to improve the preparedness of, and response to, future PHEs of IUE, it is crucial that the EMC, RRT, and all other relevant entities conduct an after-action review of their preparedness of, and response to, a recently transpired PHE of IUE. An after-action review, often conducted as a multisectoral discussion and subsequent write-up of lessons learnt, helps stakeholders to identify what went well and what needs to be improved prior to the next PHE. The key indicators in [Annexes 2–5](#) should be calculated and presented together with the write-up of the after-action review for a discussion among relevant stakeholders. This process should be undertaken and completed within six months following the official declaration of the conclusion of a PHE.

# ANNEXES

## Annex 1 – Institutional RRT-member minimum core functions and responsibilities

Type and minimum number of RRT members	Minimum core functions required	Minimum responsibilities related to PHE preparedness, response, and monitoring and evaluation	RRT manager: Record here the names, titles, professions, and contact details for each identified human resource
<b>Manager/Team leader (1)</b>	<ol style="list-style-type: none"> <li>1. Relevant management and/or team leader experience.</li> <li>2. Experience with surveillance and response to PHE.</li> <li>3. Able to engage technical and political entities within the national government.</li> </ol>	<ol style="list-style-type: none"> <li>1. Maintain communication and coordination with the multisectoral institutions that are identified by the EMC as being contributors to the provision of RRT membership.</li> <li>2. Ensure that both technical and political mechanisms respond to a PHE of IUE.</li> <li>3. Oversee the technical inputs of each RRT member.</li> <li>4. Responsible for assessing RRT preparedness and response capabilities by using indicators. The epidemiologist should calculate the indicators for the manager/team leader.</li> <li>5. Responsible for testing at least once every six months through scenario-based field training and deployment, the functionality, agility, and resilience of the RRT to be deployed upon PHE recognition.</li> <li>6. With the epidemiologist, responsible for managing all RRT-generated data sources.</li> <li>7. Responsible for the bi-annual revision and adaptation of the country-adapted and context-relevant PHE of IUE response plan.</li> <li>8. Responsible for writing a short monthly RRT report detailing the number of alerts received, number of alerts deemed credible, of the number of alerts deemed credible, how many were infectious versus non-infectious PHEs, and number of alerts responded to by the RRT, with their corresponding timeframes.</li> </ol>	<ol style="list-style-type: none"> <li>1. Individual's name:</li> <li>2. Individual's job title:</li> <li>3. Individual's organization:</li> <li>4. Individual's contact details:</li> </ol>
<b>Epidemiologist (1 to 2)</b>	<p><b>Education:</b> Postgraduate degree in epidemiology.</p> <p><b>Experience:</b> Proven field experience in responding to PHE outbreaks.</p>	<ol style="list-style-type: none"> <li>1. Able to investigate and analyse the epidemiology of clusters of suspected, probable and confirmed cases, including time, place, person analysis, and mode of contamination, as well as the investigation of the source of a PHE.</li> <li>2. To establish/strengthen active surveillance activities and follow-up of contacts.</li> </ol>	<ol style="list-style-type: none"> <li>1. Individual's name:</li> <li>2. Individual's job title:</li> <li>3. Individual's organization:</li> <li>4. Individual's contact details:</li> </ol>

**Epidemiologist  
(1 to 2)  
(continued)**

5. Calculate all indicators for the manager/ Team leader and discuss their meaning and interpretation with him or her.
6. Support and mobilize teams for rapid outbreak assessment and/or investigation.
7. Evaluate the current alert and response systems, including the existing case definitions.
8. Support data management, analysis, and interpretation of the descriptive epidemiology.
9. Assist in the planning of retrospective analytical epidemiological studies aimed at identifying the source and route of PHE transmission.
10. Reporting to national response team/partners as needed.
11. Liaise with other international partners in the field to facilitate field investigation and response.

**Clinician  
and infection  
control expert  
(1 to 2)**

**Education:**  
Medical or nursing university degree.

**Experience:**  
Field experience in effective clinical case management during PHEs. Referral system skills are also required. Clinical experience in infection control, experience in training of professionals on infection control measures and implementing and evaluating infection prevention and control practices would be an advantage.

1. Directly support case management in the health facilities, as well as within the community.
2. Guide the RRT and others to ensure that optimum care is provided.
3. Provide guidance on clinical and epidemiological case definitions.
4. Collect robust demographic, treatment, and patient monitoring data for improved clinical response to PHEs.
5. Assess infection control practices in health care facilities in the affected districts/area.
6. Provide guidance on necessary infection control equipment for central, provincial, and district level hospitals that are needed in order to adequately respond to an outbreak.
7. Adapt infection control national guidelines and advise on modifications to be implemented in order to prevent the occurrence of PHE infection associated with health care in health facilities within an affected district.
8. Conduct on-site IPC training for staff at provincial/district hospitals according to the review of infection control measures.
9. Work in coordination with all response teams.
10. Report on findings and assist the RRT/ international team and national authorities.

1. Individual's name:
2. Individual's job title:
3. Individual's organization:
4. Individual's contact details:

**Social  
mobilization  
expert  
(1 to 2)**

**Education:**  
University degree in social sciences and/or communication.

**Experience:**  
Experience in social mobilization/ behavioural communication approaches.

1. Undertake a rapid appraisal to understand perceptions, knowledge, beliefs, and practices within households, communities, and health care settings in affected areas in relation to PHE control, prevention, and treatment interventions.
2. Identify barriers and facilitating factors (including the sociocultural and organizational context) that may hinder or facilitate the uptake of potential recommended risk reduction and health protection measures within households, communities, and health care settings.
3. On the basis of the findings of the rapid assessment, advise and make recommendations to the ministry of health on the implementation of effective response strategies and effective and feasible interventions.
4. On the basis of the findings of the rapid assessment, develop effective social mobilization strategies that support outbreak control and prevention measures.

1. Individual's name:
2. Individual's job title:
3. Individual's organization:
4. Individual's contact details:

<p><b>Anthropologist (1)</b></p>	<p><b>Education:</b> University degree in medical anthropology.</p> <p><b>Experience:</b> Extensive experience in developing, implementing, and evaluating medical anthropological policies, procedures, and tools in low-resource settings. Experience working in PHE response and emergency situations is an added advantage.</p>	<ol style="list-style-type: none"> <li>1. Carry out investigation that will help better understand local cultural attitudes to the PHE. Identify beliefs and practices that may amplify or help control the PHE.</li> <li>2. Identify and incorporate local beliefs and practices into patient care and response efforts.</li> <li>3. Contribute to conducting ecological studies in relation to primary cases, if possible.</li> <li>4. Investigate social and anthropological issues that would support better understanding of community perception of the PHE.</li> <li>5. Investigate cultural and social norms within the communities that will contribute to developing better rapport and trust with the community.</li> <li>6. Support the documentation of the anthropological aspects of the PHE.</li> </ol>	<ol style="list-style-type: none"> <li>1. Individual's name:</li> <li>2. Individual's job title:</li> <li>3. Individual's organization:</li> <li>4. Individual's contact details:</li> </ol>
<p><b>Logistician (1 to many)</b></p> <p>Note: Logisticians are crucial for timely and effective investigations and responses. The more logistical support, the better.</p>	<p><b>Education:</b> University degree or equivalent level of education in supply chain management, emergency response logistics, or PHE response logistics.</p> <p><b>Experience:</b> Field experience in logistics operations for responding to infectious disease outbreaks and/or other public health emergencies.</p>	<ol style="list-style-type: none"> <li>1. Ensure logistical support is provided for preparedness and investigation of, and response to, PHEs for each discipline/technical area (e.g. patient samples for laboratory diagnosis require logistic support for sampling and transport).</li> <li>2. Maintain stockpiles of essential materials (e.g. PPE) for use during the investigation of, and response to, a PHE.</li> <li>3. Identify strategic storage points to support the response.</li> <li>4. Provide guidance on logistics and supply chain management at all levels.</li> <li>5. Provide logistics support for tracking shipment of samples to identified laboratories.</li> <li>6. Operate and maintain administrative procedures during field operations, and address financial management, and human resource issues.</li> <li>7. Manage finance issues when relevant.</li> <li>8. Manage logistical communication devices.</li> <li>9. Manage team security.</li> </ol>	<ol style="list-style-type: none"> <li>1. Individual's name:</li> <li>2. Individual's job title:</li> <li>3. Individual's organization:</li> <li>4. Individual's contact details:</li> </ol>
<p><b>Laboratory specialist* (1 to 2)</b></p>	<p><b>Education:</b> University degree in microbiology, biology, or related science.</p> <p><b>Experience:</b> Field experience in the interaction of laboratories and surveillance activities.</p>	<ol style="list-style-type: none"> <li>1. Provide guidance on establishing an operational system for appropriate collection, packaging, and transport of samples from the field to reference lab.</li> <li>2. Establish SOPs for the participation of laboratories in investigation and laboratory confirmation of the PHE.</li> <li>3. Set up systems to better link laboratories and epidemiology teams.</li> <li>4. Work in coordination with response teams to enhance national, regional, and international lab networks to allow efficient laboratory identification of epidemic-prone diseases and public health risks.</li> </ol>	<ol style="list-style-type: none"> <li>1. Individual's name:</li> <li>2. Individual's job title:</li> <li>3. Individual's organization:</li> <li>4. Individual's contact details:</li> </ol>
<p><b>Financial officer* (1 to 2)</b></p>	<p><b>Education:</b> University degree.</p> <p><b>Experience:</b> Previous finance experience in a ministry of health.</p>	<ol style="list-style-type: none"> <li>1. Organize rapid replenishment of account when required.</li> <li>2. Organize petty cash for staff deployed to the field.</li> <li>3. Ensure that all financial transactions processed during out-of-office hours are recorded and retroactively cleared on the first subsequent day of business.</li> <li>4. Clear all financial documents.</li> <li>5. Monitor cash flow and work with counterparts on cost sharing of relevant activities.</li> </ol>	<ol style="list-style-type: none"> <li>1. Individual's name:</li> <li>2. Individual's job title:</li> <li>3. Individual's organization:</li> <li>4. Individual's contact details:</li> </ol>

\* These positions are suggested, but not absolutely required in the RRT.

## Annex 2 – Preparedness and response capacity indicators

The following table of recommended key indicators may facilitate EMC/RRTs in the WHO African Region when measuring and evaluating an RRT's preparedness and response capacity to PHEs of IUE. Only data generated from the RRT, overseen by its manager/team leader and the epidemiologist, will be used. All indicators are to be reported monthly, unless stated otherwise.

Number	Indicator	Numerator/Denominator*
1.1	Percentage of RRT-member positions which have been filled by on RRT-member who fulfils all of the listed core functions needed to realize PHE of IUE preparedness	Number of RRT-member positions which have been filled by an RRT-member who fulfils all of the listed core functions needed to realize PHE of IUE preparedness ÷ Number of RRT-member positions, both filled and not yet filled
1.2	The number of scenario-based field trainings conducted by the EMC/RRT	NA  <i>Note: This essential EMC/RRT preparedness training <b>should be conducted and evaluated at least once every six months</b></i>
1.3	The EMC/RRT has developed and written a country-adapted and context-relevant preparedness and response plan to PHEs of IUE	NA  <i>Note: This essential RRT preparedness and response plan <b>should be revised and updated at least once every six months</b></i>

NA: not applicable.

\* Numerator and denominator are multiplied by 100 for calculating percentage.

## Annex 3 – Alert management indicators

The following table of recommended key indicators may facilitate EMC/RRTs in the WHO African Region when measuring and evaluating the timeliness and effectiveness of the RRT's alert management of PHEs. Only data generated from the RRT, overseen by its manager/team leader and the epidemiologist, will be used. All indicators are to be reported monthly, unless stated otherwise.

Number	Indicator	Numerator/Denominator*
2.1	Percentage of alerts received by the EMC/RRT that the EMC/RRT deem credible	Number of alerts received by the EMC/RRT that the EMC/RRT deem credible ÷ Number of alerts received by the EMC/RRT
2.2	Of the number of alerts received by the EMC/RRT that the EMC/RRT deem credible, the percentage that are later determined to be caused by an infectious disease	Number of alerts received by the EMC/RRT that the EMC/RRT deem credible and are later determined to be caused by an infectious disease ÷ Number of alerts received by the EMC/RRT that the EMC/RRT deem credible
2.3	Of the number of alerts received by the EMC/RRT that the EMC/RRT deem credible, the percentage that are responded to by the RRT with a field investigation starting < 48 hours** after receiving the alert	Number of alerts received by the EMC/RRT that the EMC/RRT deem credible and are responded to by the RRT with a field investigation starting < 48 hours after receiving the alert ÷ Number of alerts received by the EMC/RRT that the EMC/RRT deem credible and are responded to by the RRT with a field investigation

\* Numerator and denominator are multiplied by 100 for calculating percentage.

\*\* As determined in *Protocols for assessing national surveillance and response capacities for the International Health Regulations*. Geneva, World Health Organization, 2010 ([http://www.who.int/ihr/publications/who\\_hse\\_ihr\\_201007\\_en.pdf](http://www.who.int/ihr/publications/who_hse_ihr_201007_en.pdf), accessed 10 March 2013).

## Annex 4 – Field investigation indicators

The following table of recommended key indicators may facilitate EMC/RRTs in the WHO African Region when measuring and evaluating the timeliness and effectiveness of the RRT's field investigation of PHEs. Only data generated from the RRT, overseen by its manager/team leader and the epidemiologist, will be used. All indicators are to be reported monthly, unless stated otherwise.

Number	Indicator	Numerator/Denominator*
3.1	Percentage of samples sent to a diagnostic laboratory that was previously identified by the RRT during the preparedness phase and sent according to the laboratory's stated sample-shipping protocol	<p>Number of samples sent to a diagnostic laboratory that was previously identified by the RRT during the preparedness phase and sent according to the laboratory's stated sample-shipping protocol</p> <p>÷</p> <p>Number of samples sent to a diagnostic laboratory that was previously identified by the RRT during the preparedness phase</p>
3.2	Percentage of PHE of IUE patients who were receiving optimum patient care when witnessed by the RRT during its field investigation stage	<p>Number of PHE of IUE patients who were receiving optimum patient care when witnessed by the RRT during its field investigation stage</p> <p>÷</p> <p>Number of PHE of IUE patients identified during the field investigation stage</p> <p><i>Note: Optimum patient care is defined as the best possible care available based on the probable and eventual diagnosis of the PHE of IUE and the contextual setting where the patients were hospitalized</i></p>
3.3	Percentage of PHE of IUE patients who were having their epidemiological and clinical data recorded by health-facility personnel when witnessed by the RRT during its field investigation stage	<p>Number of PHE of IUE patients who were having their epidemiological and clinical data recorded by health-facility personnel when witnessed by the RRT during its field investigation stage</p> <p>÷</p> <p>Number of PHE of IUE patients attended to by health-facility personnel when witnessed by the RRT during its field investigation stage</p>
3.4	Were local authorities involved in the field investigation? (Yes or No)	NA

NA: not applicable.

\* Numerator and denominator are multiplied by 100 for calculating percentage.

## Annex 5 – Field response indicators ►

## Annex 5 – Field response indicators

The following table of recommended key indicators may facilitate EMC/RRTs in the WHO African Region when measuring and evaluating the timeliness and effectiveness of the RRT's field response to PHEs. Only data generated from the RRT, overseen by its manager/team leader and the epidemiologist, will be used. All indicators are to be reported monthly, unless stated otherwise.

Number	Indicator	Numerator/Denominator*
4.1	Percentage of potential PHE of IUE patients detected by the epidemiological surveillance system, who were ill, and which resulted in the subsequent hospitalization of the patient	<p>Number of potential PHE of IUE patients detected by the epidemiological surveillance system, who were ill, and which resulted in the subsequent hospitalization of the patient</p> <p>÷</p> <p>Number of potential PHE of IUE patients detected by the epidemiological surveillance system and were ill</p> <p><i>Note:</i> Early identification of incident PHE of IUE patients allows for prompt hospitalization and the minimization of secondary transmission in the community</p>
4.2	Number of PHE of IUE IEC campaign sessions conducted on-site during the field response stage by the RRT for either the affected community or health personnel, or both	<p>NA</p> <p><i>Note:</i> IEC campaign sessions increase understanding of the PHE occurrence, acceptance of the response, and encourage health facility-based assessment and hospitalization for suspected and confirmed cases. Moreover, IEC sessions mitigate fear and anger among family members, reduce patient stigmatization, and quell rumours and panic in the community</p>
4.3	As assessed by the RRT, the percentage of identified PHE of IUE patients who received optimum patient care at any time during the field response stage	<p>Number of identified PHE of IUE patients who received optimum patient care at any time during the field response stage</p> <p>÷</p> <p>Number of identified PHE of IUE patients</p> <p><i>Note:</i> Optimum patient care is defined as the best possible care available based on the probable and eventual diagnosis of the PHE of IUE and the contextual setting where the patients were hospitalized</p>

NA: not applicable.

\* Numerator and denominator are multiplied by 100 for calculating percentage.



## Annex 6 – A field investigation report template

When writing your field investigation report, please cut and paste this report into a new Microsoft Word sheet so that you may format the document according to your responses.

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### REPORT FOR RESPONDING TO AN INVESTIGATION OF A PUBLIC HEALTH EVENT OF UNKNOWN ETIOLOGY

1. Write here a brief summary of the investigation, including whether or not a public health event (PHE) of unknown etiology is currently transpiring. Also include the name(s) of the villages, towns, districts, and country involved. When possible, include population numbers for each.
2. Describe the clinical presentation of the patients as assessed by patient registrars, local health authorities, and/or family or friends.
3. Describe the clinical presentation of the patients as assessed by the RRT clinician.
4. Include here descriptive epidemiology of the PHE. All data should be described and oriented in terms of person, place, and time and presented with analyses and interpretation.

a. Patient demographic summary (i.e. age, gender, occupation, town or village of residence)

b. Number of cases and deaths (reported by epidemiological week)

c. Incidence rate (reported by epidemiological week)

An incidence rate is defined as the number of new cases of a disease that occur during a specified period of time in a population at risk for developing the disease during the same specified period of time.

$$\text{Incidence rate} = \frac{\text{Total number of persons who developed a certain illness in a specified time period, multiplied by } k \text{ (1000 or 10 000)}}{\text{Number of persons at risk for a certain illness in specified time period}}$$

d. Case fatality ratio (reported by epidemiological week)

A case fatality ratio is an incidence proportion. It is the proportion of people, among those who develop a disease, who then proceed to die from the disease. It does not measure the development of the disease but rather death from disease. The CFR should be used as a description of the proportion of people who succumb from an infectious disease.

$$\text{Case fatality ratio} = \frac{\text{Number of people who die from a certain illness}}{\text{Number of people who developed the illness}}$$

e. Attack ratio (reported by epidemiological week)

Attack ratio is a type of incidence rate used for acute diseases. The attack ratio measures the proportion of the population affected by the PHE of unknown etiology until present time.

$$\text{Attack ratio} = \frac{\text{Number of people at risk who develop a certain illness}}{\text{Number of people at risk}}$$

5. Write here the proposed and preliminary epidemiological and clinical case definition(s) agreed on by the RRT and local health authorities.
6. Include here a map of the affected area, with village locations of the identified cases and deaths.
7. Describe here how the PHE of IUE may be transmitted and the potential population(s) at risk.
8. Describe here the RRT's proposed response activities to control the primary and/or secondary transmission of the PHE of unknown etiology.
9. Include here a security assessment, including information about the affected area's context, security, airports, rivers, lakes, and roads.
10. Describe here the availability, usage, and needs for all resources including the staff, cold chain equipment, vehicles, petrol, medical materials, and drug stocks.
11. List the names and locations of the diagnostic laboratories where the samples were sent.
12. Please state whether or not the RRT would like to request the presence of an on-site diagnostic and patient monitoring laboratory, and if so, what concrete steps are being taken to ensure the arrival of such a laboratory.
13. Describe here the current planning, action, and potential next steps of the RRT.
14. Describe here the capacity of local health authorities to safely and effectively treat the infected patients and bury the dead.
15. In line with the 'One Health' approach, please recommend if specialists not currently part of the RRT are needed to be sent to the PHE location (e.g. medical toxicologist, medical psychologist, chemical or hazardous material specialists, etc.).

16. If the information is available, write here the dates for the following:

- a. Date of initial alert received by the epidemic management committee/rapid response team, or equivalent body (dd/mm/yyyy): .....
- b. Date of arrival on location of the Rapid Response Team (dd/mm/yyyy): .....
- c. Date of laboratory confirmation of the etiology of the public health event (dd/mm/yyyy): .....

This report was written on (dd/mm/yyyy): .....

Please sign your name using block letters so as to be read clearly. This report was written by:

1. Name: .....

Institution and position: .....

Phone:..... E-mail:.....

2. Name: .....

Institution and position: .....

Phone:..... E-mail:.....

3. Name: .....

Institution and position: .....

Phone:..... E-mail:.....

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