



AFRICAN UNION

**AFRICA CDC**

Centres for Disease Control and Prevention

Safeguarding Africa's Health



# AFRICA CDC EVENT BASED SURVEILLANCE FRAMEWORK

*Interim Version*

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- Select African Union Member States currently implementing event-based surveillance
- Africa CDC Regional Collaborating Centers
- WHO Regional Office for Africa
- WHO Regional Office for the Eastern Mediterranean
- WHO Headquarters, Lyon office
- Non-governmental organizations including the International Federation for Red Cross and Red Crescent Societies (IFRC) and CARE
- Technical partners, China Centers for Disease Control and US Centers for Disease Control

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## Glossary of Terms

**Community-based surveillance (CBS):** While it may be defined differently in different countries (e.g., community health surveillance, community event-based surveillance), community-based surveillance is the systematic detection and reporting of events of public health significance within a community, by community members. Community health volunteers, the public, religious leaders, civil society members, teachers, and similar groups are engaged and trained to detect and immediately report unusual health events or health risks occurring in their communities.

**Community health volunteers (CHV):** May also be known as community health workers, among others. According to a WHO Study Group, community health volunteers may be members of the communities where they work, should be selected by the communities, are answerable to the communities for their activities, and should be supported by the health system but not necessarily a part of its organization.

**Early Warning and Response (EWAR):** Defined by the World Health Organization (WHO) as the organized mechanism to detect any abnormal occurrence or any divergence from the usual or normally observed frequency of phenomena as early as possible.

**Epidemic Intelligence:** The systematic collection, analysis and communication of any information to detect, verify, assess and investigate *events* and health risks with an early warning objective.

**Evaluation:** The periodic assessment of the relevance, effectiveness and impact of activities in the light of the objectives of the surveillance and response systems.

**Event:** The International Health Regulations (IHR) define an event as “[...] *a manifestation of disease or an occurrence that creates a potential for disease; [...]*” (which can include events that are infectious, zoonotic, food safety, chemical, radiological or nuclear in origin and whether transmitted by persons, vectors, animals, goods/food, or through the environment.).

**Event-based surveillance (EBS):** Defined by WHO as the organized collection, *monitoring*, assessment and interpretation of mainly unstructured ad hoc information regarding health events or risks, which may represent an acute risk to health. Such information can come from diverse sectors and may include animal, environment and other sectors

**Hazard:** An agent or a source that has potential to cause adverse health effects in exposed populations.

**Health facility:** Defined by WHO as any establishment that is engaged in direct on-site patient care.

**Health facility event-based surveillance (HEBS):** *Event-based surveillance* that is conducted in health facilities. Healthcare professionals are involved as primary reporting sources, such as during patient consultations, or as secondary sources reporting unusual health events or health risks picked up through patient consultations.

**Hotline:** A hotline (toll-free) is a phone line that the general public can use to contact an institution/organization about a particular health concern.

**Human-animal-environment interface:** A continuum of contacts and interactions among people, animals, their products, and their environment(s); in some cases, facilitating transmission of zoonotic pathogens or shared health threats.

**Indicator-based surveillance (IBS):** Defined by WHO as the systematic (regular) collection, monitoring, analysis, and interpretation of structured data, i.e., of indicators produced by a number of well-identified, mostly health-based, formal sources.



**Integrated Disease Surveillance and Response (IDSR):** Proposed by the WHO Regional Office for Africa (AFRO), Integrated Disease Surveillance and Response is an approach to improve public health surveillance and response in the African region by linking community, health facility, district, and national levels.

**Intermediate administrative level:** Intermediate administrative levels may be defined differently in different countries. For the purpose of this document, an intermediate level is the public health administrative level below the national-level that is responsible for conducting preliminary investigations and implementing responses to reported public health events or suspected outbreaks in a given jurisdiction. The intermediate level may otherwise be referred to as districts or counties, among others.

**Local administrative level:** Local administrative levels may be defined differently in different countries. For the purpose of this document, a local administrative level is the lowest administrative division within a country, directly above the community-level.

**Media scanning (also known as “media monitoring”):** The active monitoring of the content of media sources on a continuing basis to get information about specific topics.

**Monitoring:** Refers to the routine and continuous tracking of the implementation of planned surveillance activities (monitoring the implementation of the plan of action) and of the overall performance of surveillance and response systems.

**Multisectoral:** Participation of more than one sector working together on a joint program or response to an event (e.g., a joint investigation by public health and law enforcement).

**One Health** is an approach to address a shared health threat at the human-animal-environment interface based on collaboration, communication, and coordination across all relevant sectors and disciplines, with the ultimate goal of achieving optimal health outcomes for both people and animals. A One Health approach applies to the local, regional, national, and global levels.

**Outbreak:** A disease outbreak is the occurrence of cases of disease in excess of what would normally be expected in a defined community, geographical area or season. An outbreak may occur in a restricted geographical area, or may extend over several countries. It may last for a few days or weeks, or for several years. A single case of a communicable disease long absent from a population, or caused by an agent (e.g. bacterium or virus) not previously recognized in that community or area, or the emergence of a previously unknown disease, may also constitute an outbreak and should be reported and investigated.

**Reporting:** The process by which health events and health risks are brought to the knowledge of the health authorities.

**Response:** Any public health action triggered by the detection of a *public health risk* (e.g. *monitoring* of the *event*, information of the public, triggering field investigation and/or implementation of any control or mitigation measures). The nature of the response will have to be adapted according to the nature of the *public health risk*.

**Reservoir:** Any animal, person, plant, soil, substance - or combination of any of these - in which a zoonotic disease agent normally lives and multiplies, and for which it primarily depends on for its survival. It is from the reservoir that the infectious substance is transmitted to a human, animal, or other susceptible host.

**Risk:** The likelihood of an *event* resulting in negative consequences for public health.

**Risk assessment:** A systematic process for gathering, assessing and documenting information to assign a level of *risk* to human health to an *event*. Risk assessment is conducted as part of an investigation of an event.





**Risk characterization:** According to WHO, once a risk assessment team has carried out hazard, exposure, and context assessments of an event, a level of risk should be assigned. This process is called risk characterization.

**Sensitivity:** The ability of EBS to detect health risks. Sensitivity refers to the proportion of events that were effectively detected through EBS among all events that occurred for a given period of time.

**Short Message Service (SMS):** Commonly known as a “text message”. A short message sent electronically from one cell phone to another.

**Signals:** Patterns of disease or other information considered by the Early Warning and Response system as representing potential acute risk to human health, such as an outbreak. All signals may not become events and as such needs to be triaged and verified before response is initiated. Signals may consist of reports of cases or deaths (individual or aggregated), potential exposure of human beings to biological, chemical or radiological and nuclear hazards, or occurrence of natural or man-made disasters.

**Social media messaging:** Online platforms that enable the general public to report and share information and engages them in social networks, for example Facebook, Twitter, etc.

**Triage:** The process of screening out the data and information that are relevant for early detection purposes (i.e. the screening out mild/irrelevant events from potential acute public health events, and the cleaning to eliminate duplicates and correct obvious mistakes).

**Verification:** In the context of the IHR (article 1): “[...] *the provision of information by a State Party to WHO confirming the status of an event within the territory or territories of that State Party*”. (1) Under the IHR, all States Parties are required to provide verification upon request by WHO within a limited time period. In the current document, verification is also the pro-active crosschecking of the validity (veracity) of the *signals* collected by *EWAR*, by contacting the original *source*, additional *sources*, or by performing field investigation. Verification requires that hoaxes, false rumours, and artefacts are eliminated from further consideration.

**Wildlife:** Animals considered to be wild or feral or otherwise not adapted to domestic situations; may be mammals, birds, fishes, reptiles, amphibians, etc.

**Zoonotic disease or zoonoses:** an infectious disease that can be shared between animals and humans; can be spread by food, water, fomites, or vectors.



## Use of the Framework for Event-based Surveillance

The *Framework for Event-based Surveillance* is intended to be used by practitioners of public health, public health decision makers, authorities, and agencies responsible for surveillance and response. It is intended to serve as an outline that can guide stakeholders interested in implementing event-based surveillance. To that end, the document is arranged in interlinked modules and annexes that can be modified and adapted as needed by the users.

The *Framework for Event-based Surveillance* does not replace any available materials on event-based surveillance: rather builds on existing documents and serves as a practical guide for the implementation of event-based surveillance in the African region. In African Union countries that have adopted the Integrated Disease Control and Response (IDSR) strategy, this document is a complement to and can enhance the implementation of IDSR.

## Executive Summary

Event-based surveillance (EBS) is defined as the organized collection, monitoring, assessment and interpretation of mainly unstructured ad hoc information regarding health events or risks, which may represent an acute risk to health. Both indicator-based and event-based surveillance components serve the early warning and response (EWAR) function of the public health surveillance system. The *Framework for Event-based Surveillance* offers guidance to public health practitioners seeking to implement EBS at each administrative level in their countries.

This document has been organized in a modular fashion; each module is briefly described below.

**Module 1: Introduction to the *Framework for Event-based Surveillance*.** This module introduces the concept of EBS, describes how countries may implement it in a manner that is integrated into the existing surveillance system, and defines the generic reporting structure that can support EBS.

**Module 2: Event-based surveillance at the national level.** Hotlines and media may act as good sources of information about emerging public health events or outbreaks. This module describes how the use of hotlines and media scanning can act as a type of EBS, as well as the steps of EBS that should be carried out accordingly.

**Module 3: Event-based surveillance at the intermediate level.** Because of their close proximity to communities and health facilities, public health authorities at the intermediate level can be engaged and trained to ensure that events reported to them are investigated and responded to appropriately. This module describes the functional elements of EBS, resources needed to operationalize EBS at the intermediate-level, roles and responsibilities of participating public health personnel, as well as reporting and multisectoral collaboration.

**Module 4: Health facility event-based surveillance.** Event-based surveillance in health facilities (HEBS) is a type of EBS that involves clinicians, nurses, and other relevant healthcare professionals reporting on patterns of disease, which may allow for the recognition of emerging or re-emerging public health threats. This module describes how HEBS can be implemented in health facilities in conjunction with existing indicator-based surveillance.

**Module 5: Community-based surveillance.** This module describes the role of the community in early capture and reporting of events. It details key steps for the implementation of community-based surveillance (CBS), stakeholders and resources required, as well as the flow of information to and from community-level sources and the public health units.

# [ MODULE 1 ]

## INTRODUCTION TO THE FRAMEWORK FOR EVENT-BASED SURVEILLANCE

## MODULE 1: INTRODUCTION TO THE FRAMEWORK FOR EVENT-BASED SURVEILLANCE

The World Health Organization (WHO) revised the International Health Regulations (IHR) in 2005 to require a core set of surveillance, detection, and outbreak response capabilities for each Member State. In 2014, WHO published a global guidance document titled *Early detection, assessment, and response to acute public health events: Implementation of Early Warning and Response with a focus on Event-Based Surveillance*. Published as an interim version, this WHO document aimed to provide general guidance for the enhancement of early warning and response (EWAR) within the framework of national surveillance systems. EWAR includes epidemic intelligence, which is the systematic collection, analysis and communication of any information to detect, verify, assess and investigate events and health risks.

Event-based surveillance (EBS) and indicator-based surveillance (IBS) are components of EWAR and epidemic intelligence. Indicator-based surveillance consists of the routine collection of data from mainly health-based sources, and is the conventional form of surveillance in many countries. Event-based surveillance is not meant to replace other forms of surveillance, including IBS. Both IBS and EBS are complementary with each having a different role to play and purpose. Event-based surveillance is likely to be better at picking up small outbreaks early, while IBS is better suited for monitoring disease trends over time, and is useful for signaling the start of regular seasonal outbreaks of endemic disease. Designating a seasonal alert threshold in an IBS disease monitoring system essentially creates the opportunity to detect a “signal”. IBS may not be very useful for smaller events because signals are either averaged out in large data sets, or lost in the noise of smaller data sets. Event-based surveillance is also better at picking up signals indicating outbreaks in areas where access to healthcare is limited. This *Framework for Event-based Surveillance* will focus on how various types of EBS can be implemented and integrated into national surveillance systems.

The WHO defines EBS as the organized collection, monitoring, assessment and interpretation of mainly unstructured ad hoc information regarding health events or risks, which may represent an acute risk to health. Data for EBS systems can originate from a variety of sources including community residents, news reports of deaths causing public anxiety, schools, animal and environmental sectors. Event-based surveillance data can be sporadic or ad hoc (reported when a situation arises, and not necessarily on a daily, weekly, or monthly basis). A key feature of EBS is an emphasis on immediate detection and rapid reporting of signals. EBS, when implemented correctly, can offer a simple and flexible form of surveillance, and can be tailored to different settings according to the needs of the country. Event-based surveillance can be implemented in communities, in health facilities, or at the national level through hotlines and media scanning.

Readers of this framework are directed to available literature for an in-depth understanding of the definitions and concept of EBS. Event-based surveillance may involve several steps from detection to response; this has been explained in detail by the WHO, and in the modules that follow.

### 1. Implementing event-based surveillance

When the Ministry of Health (MoH) and/or other agencies responsible for surveillance are initiating EBS implementation, careful consideration should be given to both current and future workforce, resources, and infrastructure to stand up and sustain EBS. The MoH/stakeholders can choose to implement all types of EBS covered in this document or choose to incrementally implement EBS, for example initially focusing on community-based surveillance (CBS), and subsequently adding other types of EBS later. Whatever direction the MoH and/or stakeholders take to implement EBS, it is imperative to ensure efficient coordination mechanisms,



both between levels of government and across relevant collaborating sectors, as well as integration and use of data at all levels.

If the decision is made to enhance CBS and health facility EBS (HEBS) (Modules 4 and 5) within a country, the first step should be to draft a list of events to be detected through these types of EBS. This process of prioritizing what to detect and report is complex, and requires input not only from human health-related departments but also the active involvement of animal (wildlife, livestock and other domestic animals), agriculture, border/quarantine, and other relevant sectors in the government. It is recommended to create a technical working group of representatives from different sectors; this multisectoral working group (including human, animal and environmental and other sectors) can define a list of priority events, and may refer to the 2006 WHO document titled *Setting priorities in communicable disease surveillance* to do so. The list of events created should be relevant to the source (i.e., community or health facility setting). For example, seasonal diseases such as dengue and seasonal influenza may be best detected through indicator-based surveillance (IBS), while the detection of foodborne illnesses can be relevant to EBS in both community and health facility settings.

Once a priority list of events has been developed, signals that would allow for the early detection of events should be drafted. The WHO defines signals as data and/or information representing potential acute risk to human health, such as an outbreak. Signals recognize patterns, such as clusters of illness, animal deaths, and ill persons with symptoms not usually seen in communities. Event-based surveillance can also encompass a One Health approach, enabling the capture of events from human, animal, environmental, and other relevant sources.

Signals may consist of reports of cases or deaths (individual or aggregated), potential exposure of human beings to biological, chemical or radiological and nuclear hazards, or occurrence of natural or man-made disasters. Signals should be broad, aiming for high sensitivity, and should be framed in a manner that allows for the capture of emerging threats and all hazards. In general, to ensure sustainability, the list of signals should be limited in number. For communities, signals should be in simple language and should take into consideration local language and cultural contexts. It may be worthwhile to field test the signals before full-scale implementation of EBS. It is also important to note that the process of event and signal selection should be dynamic, readily amenable for additions or deletions as the need arises.

## 2. Epidemic intelligence and event-based surveillance

Data from EBS should be a component of epidemic intelligence (EI). Epidemic intelligence is defined as the systematic collection, analysis and communication of any information to detect, verify, assess, and investigate events and health risks with an early warning objective (as opposed to monitoring of disease trends or burdens). Epidemic intelligence should integrate both sources of information (IBS and EBS) to efficiently detect acute public health events and/or risks. Ideally, a centralized EI unit (which often times can be a surveillance unit) at the national-level should be available to collect, collate, and analyze information collected through each type of EBS, or from the designated reporting modalities. Such an EI unit should be able to routinely receive, analyze, and visualize data from both IBS and EBS sources.

Where available, Public Health Emergency Operation Centers (PHEOC) can act as EI hubs by receiving, analyzing, and visualizing multiple data streams, including EBS, IBS surveillance data. EI hubs should be staffed with a trained workforce capable of analyzing and interpreting data in real time. Such PHEOCs can be embedded within a Ministry of Health epidemiology, surveillance, or equivalent department, rather than existing as a standalone space, and can operate continuously for routine health surveillance. PHEOCs should be inclusive of focal points



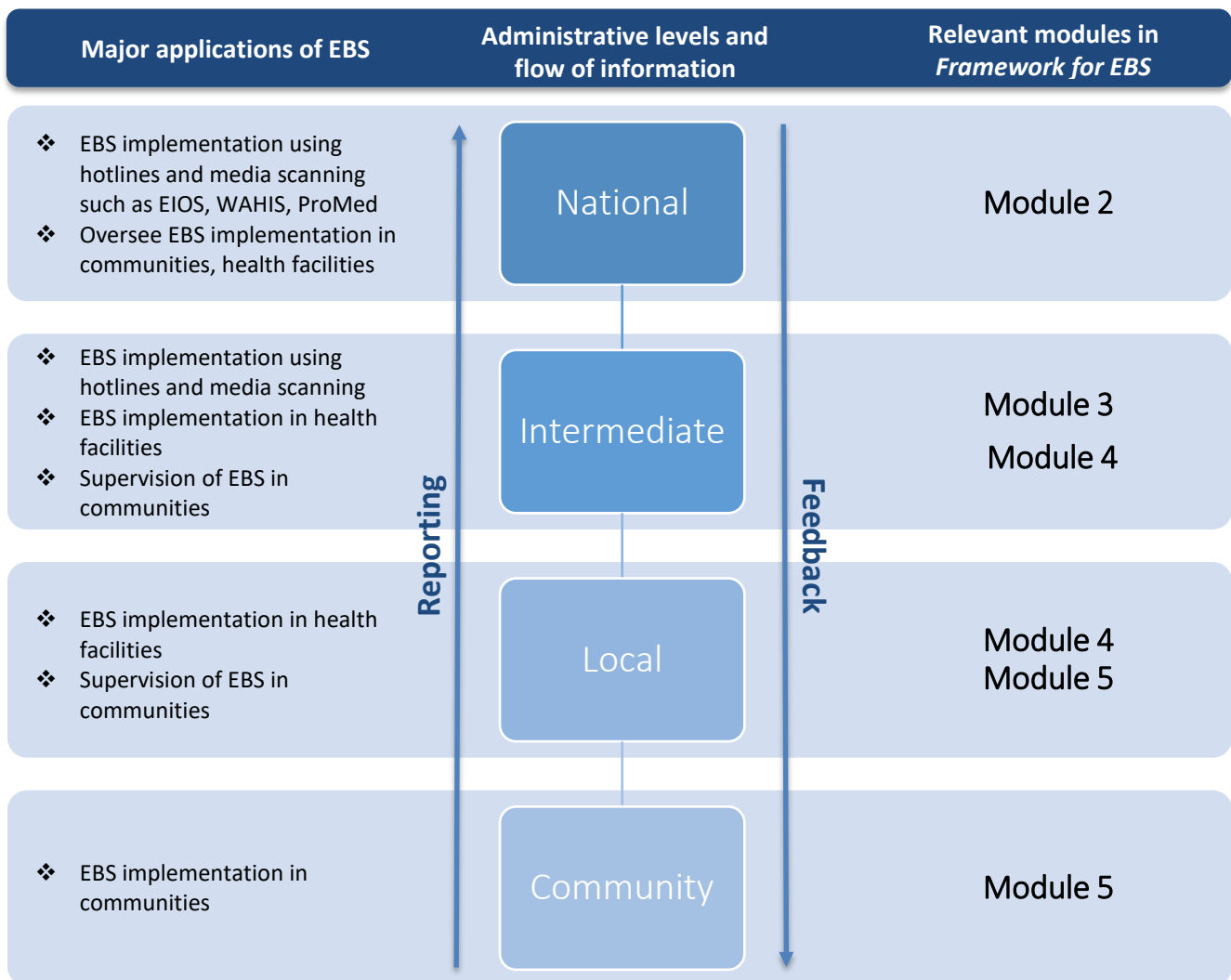
from other relevant sectors, especially if a multisectoral, One Health approach to event monitoring and response is of interest.

### 3. Model for EBS implementation by administrative level

In the context of surveillance and response, the flow of information can follow different paths in a given country. For the purposes of this document, we chose to use a representative model with four main administrative levels: national, intermediate, local, and community. Figure 1 depicts this model, major applications of EBS, and the modules of this document relevant for implementation of EBS at each level.

Countries should consider this figure as a framework that can be adapted to their existing surveillance and reporting platforms. Whatever the surveillance platform, it is important to emphasize that feedback to the local and community levels is essential for the sustainability of EBS.

**Figure 1 – Representative model of administrative levels in a country, alongside major applications of EBS, and modules relevant for EBS implementation at each level**



#### 4. Link to Joint External Evaluation

The WHO Joint External Evaluation (JEE) tool was designed to assess country-level progress made to prevent, detect, and respond to emerging public health threats in meeting the requirements outlined in the IHR<sup>4</sup>. The JEE target for surveillance is a country that has: strengthened foundational IBS and EBS systems that are able to detect events of significance for public health, animal health, environmental health, and health security; improved communication, coordination and collaboration across sectors and between local, intermediate, national and international levels of authority regarding surveillance of events of public health significance; improved country and intermediate level/regional capacity to analyze and link data from and between strengthened, real-time surveillance systems, including interoperable, interconnected electronic reporting systems<sup>4</sup>. The *Framework for Event-based Surveillance* will help support African Union Member States to achieve this target by serving as practical guide to implement EBS. As countries begin to implement and demonstrate EBS functionality they will ensure an increase in JEE scores and progress towards meeting the requirements outlined in the IHR.



## 〔 MODULE 2 〕

### EVENT-BASED SURVEILLANCE AT THE NATIONAL LEVEL



## MODULE 2: EVENT-BASED SURVEILLANCE AT THE NATIONAL LEVEL

### 1. Hotlines

#### 1.1. Introduction

Community residents can be motivated to self-report events that may impact the public's health, including emerging public health events or outbreaks. Within the context of event-based surveillance (EBS), self-reporting from the community requires clear and simple channels of communication to appropriate health authorities within a country. Channels such as hotlines, short message service (SMS), or social media messaging platforms may be leveraged in the implementation of EBS, and should be moderated by a team of trained employees that can immediately respond to the calls or requests of information on public health events from the community.

A hotline is a phone line that the public can use to obtain information from an organization or to give the organization information. It is a short number to receive direct phone calls or information from social media platforms such as WhatsApp, Facebook, or Twitter. Within EBS, a hotline can be used to capture signals reported by the community. According to the World Health Organization (WHO), signals are data and/or information considered by an early warning and response system as representing an event with potential acute risk to human health, such as an outbreak.

It is recommended to have a single number that can be used as a hotline for reporting that is easy to remember. Advocacy through health authorities, community health volunteers, non-governmental organizations, religious and other leaders, or schools may assist in disseminating information to the public about what should be reported, and how the public may report (i.e., what number to call). Hotline numbers may also be advertised through promotional messaging on traditional platforms such as TV, radio, and newspapers. This messaging should be in locally spoken languages to ensure inclusiveness. Developing partnerships with major communication companies as well as communication ministries or agencies within a government may also support widespread messaging about the existence and utility of an EBS hotline. For example, communications companies can send SMS messages to their clients to spread the message about the purpose of EBS, the importance of immediately reporting signals, and how signals can be reported.

The hotline should be operational at all times, with a team of trained employees that can respond to the calls or requests of information from the community.

#### 1.2. Signal detection

Signal detection is the process of capturing information on potential public health events reported to the hotline. Members of the general public may communicate with the hotline desk through phone calls, SMS, social media messaging or website chats. The hotline desk team should filter received notifications from callers to determine which signals are valid. A list of signals developed by national public health authorities should be provided to hotline desk operators, or responders, so that they are able to continue with the registration of signals. The call responder, or operator, should register valid signals in a signal logbook (see Annex 1 for example signal logbook) as well as a minimum set of data for each signal.

## 1.3 Sources

### 1.3.1 Hotline

A hotline (toll-free) is a phone line that the general public can use to contact an institution/organization about a particular health concern. Hotlines should be in a short customized coded digit numbers or regular digits numbers (e.g., 311). These hotlines enable callers to swiftly report signals that indicate the possibility of a public health event occurring.

### 1.3.2 Short Message Service (SMS)

Short Message Service (SMS) is commonly known as a “text message”. Correspondents send queries to an institutional SMS contact number, which can also be used to respond to queries about signals or ongoing public health events.

### 1.3.3 Social media messaging platform

Social media messaging are online platforms that enable the general public to report and share information and engages them in social networks, like Facebook, Twitter, Blogs, WhatsApp, among others. Most of the platforms are free and available on the Internet as downloads and applications, as well as on smartphones. A special dedicated contact number or account should be used to capture signals from these platforms.

## 1.4 Methodology

The hotline team should be trained on how to respond to and collect information from the public in a professional manner. The public should feel respected while reporting the signals. This ensures sustainability of participation in reporting signals. The calls can be recorded to monitor and evaluate the behavior of the team in responding to the public calls. If possible, the same number can be used for hotline, SMS and social media platforms to avoid confusion. For example, if a hotline number is 5476, messages sent by SMS or Facebook Messenger should also be sent to the same number. The cost of reporting signals to public health authorities should be zero. Calls received by the hotline but later deemed to be malicious or without merit should be noted and no action on such a call should be taken.

Standardization of the process of responding to calls and messages is essential to facilitate the accurate and timely registration of the signals in a logbook, as well as reporting the signals to the appropriate public health authorities. Each country should provide a culturally sensitive set of questions and ways of responding and collecting of information from the public. As a general rule, every call and message should be responded to in a timely and respectful manner. The set of questions and messages responding to the caller should reflect the items in the signal logbook. Most importantly, the way of responding to the calls and messages should be standardized. Response to calls and messages may need to be customized depending on the nature of the platform. All signals captured should be entered into the signal logbook.

### 1.4.1 Call methodology

The responder to the call should start by greeting the caller and thanking them for their proactivity to report to the Ministry of Health, or other relevant ministry hosting the hotline, concerning potential public health events. Then, the responder should follow a prepared set of questions that directly reflect the questions posed in the signal logbook. The call should be ended by thanking the caller again for their time, patience, and proactivity.

The responder will directly register in the signal logbook the signals that meet the pre-defined list of signals. Calls should be returned as soon as possible in situations where a call is interrupted or disconnected, or if calls are received while the responder is busy; this will ensure that all signals are collected.

#### 1.4.2 Messaging methodology

Once an SMS or a social media message is received, an instant automated message should greet the sender, thank them, and state that an operator will be in contact. Automated questions or a responder can collect information from the sender. Data should be registered directly in the signal logbook according to the pre-defined list of signals for the country. Information about the sender should be collected for further communication and details about the signals reported. A direct call to the sender may be needed if more information is required.

## 2. Media scanning

### 2.1 Introduction

Media are channels of general communication amongst a population, and they act as gathering tools used to store and disseminate information or data. Traditional sources of media such as newspapers, magazines, TV, radio, bulletins and other printed forms of communication, as well as electronic or online sources can act as a substantial role in framing public opinion. Risk communication plans often consider mass media as an effective way for engagement of communities to manage any public health threat. Thus, scanning of media can be leveraged as a type of EBS for early detection of public health events and emerging outbreaks.

### 2.2 Detection

Media scanning is an active process that should be performed using different media. A standard set of prioritized events by country and constant procedures, defined within a standard operating procedure document, should be prepared before implementation. Both national and international sources should be considered. Media scanning is recommended to be performed at the national level.

### 2.3 Sources for media scanning

Internet-based media scanning is a rapid tool that provides a full pool of all sources of media. Not only should a country's specific sources be scanned, but neighboring or cross-border initiatives, regional, and global sources are recommended to be considered for media scanning as well. The sources for media scanning can be publicly accessible, or may require registration. Some websites are for internal communication, for example, the WHO Event Information Site for National IHR Focal Points. Online media sources can be classified into official and non-official sources.

#### 2.3.1 Official sources

Signals detected through official sources are reliable and do not need further verification. The following are examples of official sources:

- Websites of governmental sectors including, but not limited to, Ministries of Health, Agriculture, Environment, and Foreign Affairs
- Websites for official organizations such as universities and internationally recognized centers of research
- Official pages/accounts on social media for governmental and official organizations: most organizations have official accounts on social media which can be considered a reliable source of information
- WHO official websites for Early Warning e.g., WHO's International Health Regulations Event Information Site for National Focal Points, which is a secured platform accessible only to national focal points
- WHO Disease Outbreak News (DON)
- Websites for WHO regional offices, e.g., AFRO, EMRO, EURO, SEARO, WPRO, PAHO
- Official public health agencies, e.g., US CDC, ECDC, ACDC websites
- Disease-specific sources (e.g., Global Influenza Surveillance and Response)
- World Organisation for Animal Health (OIE); World Animal Health Information System
- Food and Agriculture Organization of the United Nations (FAO)
- International Food Safety Authorities Network (INFOSAN)
- The International Atomic Energy Agency (IAEA) for environmental events (radiological and chemical)

### 2.3.2 Unofficial sources

The signals detected through unofficial sources are not reliable and need to be verified, though they may be a good source for acute public health events. The following are examples of unofficial sources:

- Newspapers and magazines
- Online content of TV and radio channels
- Social media

Social media such as Facebook and Twitter are Internet-based applications that allow individuals to communicate in a network which boosts information sharing. Information from social media, which at first must be verified, may offer a direct channel to confirmed events.

Unofficial websites for international organizations include ProMED, the Global Public Health Information Network (GPHIN), HealthMap, and MEDISYS, among others.

## 2.4 Methods and strategies of online media scanning

Online information sources can be scanned manually on a daily, or more frequent, basis by visiting pre-defined websites regularly and searching for relevant information according to the list of signals in the country. Searches can now be conducted automatically through advanced technological tools that aggregate online information from multiple sources using keywords compiled from a list of signals. An automated method of conducting EBS can provide much more information with less time and effort, however, information captured by the platform currently must be triaged by a person to decide whether a signal is to be reported or otherwise acted on. The country can choose which method to use, according to available resources.

### 2.4.1 Manual scanning

Manual scanning requires taking the following steps:

- Develop a checklist for scheduled review of online sources

- Develop a list of prioritized signals regarding strategies, capacities and resources of the country
- Develop a list for keywords related to the list of prioritized signals including diseases, syndromes or events
- Visit all predetermined websites in the checklist of online sources to scan for keywords

#### 2.4.2 Automated scanning

There are multiple automated technological tools that can be used for scanning of online information from predefined sources. These tools can save time and effort and support early detection of public health threats:

- Rich site summary (RSS feeds) are standardized software tools that monitor the pre-identified websites and inform the user with updates.
- Contributor-based sources are based on sharing information among health professionals, in which individuals collect information that can be accessed through shared feeds. ProMED mail is the most relevant example.
- Automated information feeds or services developed by governments or international organizations that collect health information from several sources, and then can decrease time spent in scanning for individual sources. These are also called data aggregators, and many are currently undergoing development.

The difference between an RSS feed and a data aggregator is that RSS feeds are tools to inform the user with the update generated by one source, while aggregators can extract information from multiple sources.

Technology tools for scanning online sources of information may be developed by each country for optimum customization, while free applications for scanning the online content are available. For example, Google Trends can track keyword queries in time and by location. Additionally, Google Alert is a free service that sends emails to the user when it finds new results matching the user's keyword queries.

### 3. Steps of EBS conducted using hotlines and media scanning

#### 3.1 Registration of EBS signals

Signals that are captured from media and hotlines and correspond to the pre-defined list of signals, should be registered in a signal logbook. Each signal captured should include data about the signal's detection, triage, and verification, until the response (see example in Annex 1). Signal registration should include the minimum data set for tracking the signals, for example:

- Source/informant: name, contact phone and time and date of the call/detection
- Signal: when it happened, who was affected (cases, deaths) and where it starts and spreads
- Follow up of the signal: triage, verification, risk assessment and response

#### 3.2 Assessment of signals for verification

If the signal matches one of the priority signals for the country, the signal should immediately undergo verification. If the signal is generically defined, for example, an unusual event that may pose a public health threat, a qualified public health specialist or team leader should assess the signal to decide whether to discard the signal, or to proceed for verification.

### 3.3 Verification

*Verification* is an essential step to confirm the validity of the captured signals, and should be conducted by subject matter experts. Prior to EBS implementation, official focal points should be assigned as contacts during the verification process, according to the nature and location of the event. A list of official focal points should be prepared, and should include experts in different sectors and subject matters to assist in verification of signals. Verification of a signal should be done at the lowest possible administrative level, following the existing surveillance system structure in the country, usually at the local level nearest to the location of the signal.

#### 3.3.1 Verification flow

Two possible pathways may be taken to conduct verification:

- Direct contact from national level to the local level: This pathway bypasses the intermediate level. However, the intermediate level may not have enough information about the signal to carry out verification and response if needed. However, direct contact to the local level may ensure immediate contact with the authority in charge for verification.
- The usual pathway of routine surveillance (national-intermediate-local) is recommended because it ensures notification and follow-up of the intermediate levels, which may facilitate response to the public health event, if needed.

When a signal is sent to the local level for verification, the time and person contacted should be registered in the logbook. Once a signal is verified and requires action, it is determined to be an event. When a signal is verified, the local level should promptly start the investigation by collecting further information in the field in accordance with existing guidance for public health investigations, for example, by taking photos or laboratory samples, conducting physical examinations, and recommending laboratory testing. As a general rule, signals should be verified within 24 hours of detection. However, countries may decide whether this 24 hour window of verification is appropriate, or whether it should be shortened or extended according to the severity and priority of each defined signal, as well as existing surveillance capacities.

The list below includes official points of contact for event verification and characterization. Though this list may overlap with typical EBS information sources, these sources are also useful for collecting additional information to corroborate an event:

Ministry of Health (or relevant Ministry), and the healthcare system

- National level
- Epidemiology units
- Laboratory units
- Intermediate and local-level health facilities, particularly those conducting health facility event-based surveillance (HEBS)
- Communities conducting community-based surveillance (CBS)

Other stakeholders in different sectors and authorities at all levels are recommended to be included to foster a One Health approach. It is recommended to assign only one person as an EBS focal point at the intermediate and local levels to handle receipt and verification of signals, and to communicate and share information with other stakeholders in other relevant sectors for zoonotic diseases or environmental hazards, if needed.



### 3.3.2 Reporting of EBS signals for verification

Reporting of signals to the focal point or public health authority responsible for verification can be done in different ways, such as by landline phone, mobile phone, email, wireless device, SMS, fax, or a cross-platform messaging service such as WhatsApp. A country may choose to implement any tool, but should consider available resources needed to use these tools. For example, the use of email requires a reliable Internet connection. Tools used for reporting must allow for prompt notification to ensure that verification and response to public health events are not delayed. Electronic reporting through a web-based application may be a good alternative to manual methods, depending on existing resources and capacities of the existing surveillance system. Electronic systems can support registration, reporting, verification, response and analysis. It can guarantee immediate, parallel reporting to all relevant levels that have access to the system, and may also generate automated reports.

### 3.3.3 Follow up of verified signals

The team at the national level should assign at least one person to follow up on signals sent for verification until verification is obtained. According to the country's capacity, the country can decide the number of responsible personnel for follow up. However, at least one person from the hotline or media scanning team should be responsible for the follow up of the signals that were sent for verification until it is confirmed that verification and response were completed. If the EBS unit is operating 24/7, the same person who captures signals should follow up on those signals waiting to be verified, during the same working shift. For proper handover between shifts, the ending shift should update the starting shift with the verification status of the signals.

### 3.3.4 Regular EBS meetings

Event-based surveillance using hotlines and media scanning will capture a number of signals each day that will be sent for verification and follow-up. The national EBS team should have regular meetings to review the detected signals and their verification and response status. Relevant information should be collected for these meetings. Daily EBS meetings are recommended at the national-level for routine work. If there is an emergency or a signal of high importance, an immediate meeting is recommended. A daily report for the detected signals and their verification status should be disseminated to stakeholders, who can be defined by the country. A weekly meeting summarizing the activities of the EBS unit for the week should also be prepared and disseminated to a wider audience, including members of the EBS network in the country, e.g., community health volunteers, healthcare professionals, and zoonotic and veterinary staff.

## 3.4 Risk assessment and characterization

### 3.4.1 Risk assessment

Once a signal is verified as an event, risk assessment begins. Risk assessment is a systematic and continuous process for gathering, assessing, and documenting information to provide the basis for actions required to manage and reduce the negative consequences of an acute public health event. Every assessment is a process by which the available information about a real event is analyzed and a judgment is made as to whether it poses an immediate risk to public health. In this case, a full risk assessment is done.

For a signal that has been substantiated as true event but does not pose an immediate threat to public health, the team should monitor the event and undertake risk assessments when new information becomes available.



Risk assessments can be performed at national or intermediate levels depending on the magnitude of the event or the capacity of staff across the levels of the Ministry of Health, or other relevant Ministries e.g., Ministry of Agriculture for animal events, in a One Health context. Where resources are limited, events should be reported directly to the event assessment team at the national level for assessment within 24 hours of the initial event report. The speed with which assessments can be conducted will depend on the relationships the central team has with local-level public health authorities or health facilities in close proximity to the origination of the signal. Under the supervision of the national team, the involvement of local-level public health authorities in verification, and where possible a preliminary assessment, will make the system more responsive.

In conducting a risk assessment, the first step is to form the risk assessment team, the composition of which is critical. Usually, an epidemiologist, program manager, public health expert, and a communication specialist make up the initial team. Additional experts in animal health, food safety, toxicology, and others, may be brought in at any time, but may also be needed at the beginning of the process. Team composition management must be flexible.

Once the team is formed, the formulation of risk questions follows (see Annex 2 for an example set of questions). These questions ensure that relevant information is collected and focus on who is likely affected, likely exposure to a hazard or when, why, and how a population may be adversely affected by the hazard. Countries may opt to use the three risk questions that WHO employs based on the current standardized template: serious impact to public health, risk of event spreading and risk to insufficient control measures.

Once risk questions are decided upon, the team is ready to undertake the risk assessment process. The level of risk assigned to an event is based on the:

- Suspected (or known) hazard
- Possible exposure to the hazard
- Context in which the event is occurring

#### 3.4.2 Hazard assessment

Hazard assessment is the identification of the characteristics of a public health hazard and the associated adverse health effects. Hazards can include biological, chemical, radiological, and nuclear events.

The process of conducting a hazard assessment is unambiguous when laboratory confirmation of the etiologic agent is available, or when the event is easily characterized on clinical and epidemiologic features. In all other cases, hazard assessment starts with describing the event using descriptors of person (or animal), place, and time. A list of possible causes is then generated based upon the initial description of the event, known burden of disease in the affected community, and the type and distribution of existing hazards (e.g., the number and location of chemical plants and the chemicals they use).

Once possible etiologies or causes are listed, the analyst should determine the source of the hazard in order to understand the context and anticipated burden of the hazard on the population. All of these data points allow for a determination of whether an event is unusual or unexpected.

#### 3.4.3 Exposure assessment

Exposure assessment is the evaluation of the vulnerability of individuals and populations to likely hazards. The key output of the assessment is an estimate of:

- Number of people or group known or likely to have been exposed
- Number of exposed people or groups who are likely to be susceptible

Information required to evaluate exposure can include:

- Mode of transmission
- Information related to the animal host(s), reservoirs, or vectors
- Incubation period (known or suspected)
- Estimation of the potential for transmission (e.g.  $R_0$  basic reproduction number)
- Immune status of the exposed population
- Dose and duration of exposure

#### 3.4.4 Context assessment

Context assessment is an evaluation of the environment in which an event is taking place. This may include the physical environment (climate, vegetation, land use, and water systems and sources), the health of the population (nutritional status, disease burden and previous outbreaks), infrastructure (including transportation, clinical, and public health systems), and cultural practices and beliefs.

Context assessment also considers social, ethical, technical, scientific, economic, environmental, and political factors that can affect the potential severity of the event. Technical factors are particularly critical because they include the ability of the country's surveillance units (both indicator and event-based surveillance) to detect cases and the overall prevalence of comorbidities in the affected population. Additional social factors include the affected population's health-seeking behavior.

When conducting a context assessment, it is imperative that subject matter experts (SME) provide commentary to characterize the magnitude of the event, and include any relevant SME who may be able to assist, e.g., veterinarians during a potential zoonotic disease outbreak. When contacting an SME, an analyst in an EBS unit should provide a summary of the event, the source of information, and any other details a SME might need to properly provide an assessment. For example, the additional detail may be background epidemiologic or environmental data that could be relevant to the event. As stated earlier, subject matter experts should be identified prior to the establishment and implementation of an EBS unit in order to execute assessments.

#### 3.4.5 Risk characterization

Once the EBS unit has carried out the hazard, exposure, and context assessments, a level of risk should be assigned. This process is called risk characterization. For some units, risk characterization results in mathematical output from a quantitative model or comparison with an external standard value. But, an equally acceptable process may result in a risk characterization based on the expert opinion of the EBS team, with input from SMEs.

The hazard, exposure, and context assessments help estimate the potential consequences of the event. All types of consequences should be considered: social, economic, environmental, political, and long-term consequences such as anticipated morbidity and mortality.

A risk matrix can be a useful and comprehensive tool to facilitate this process. The matrix combines estimates of the likelihood with estimates of the consequences. As the majority of acute public health event risk assessments are qualitative, the categories used in the matrix are not based on numerical values but on broad descriptive definitions of likelihood and consequences (see Figure 1 and Tables 1-3).

When applying the matrix, the definitions of likelihood and consequence can be refined to fit with the national or intermediate level context in each country.

Figure 1 – Risk characterization matrix

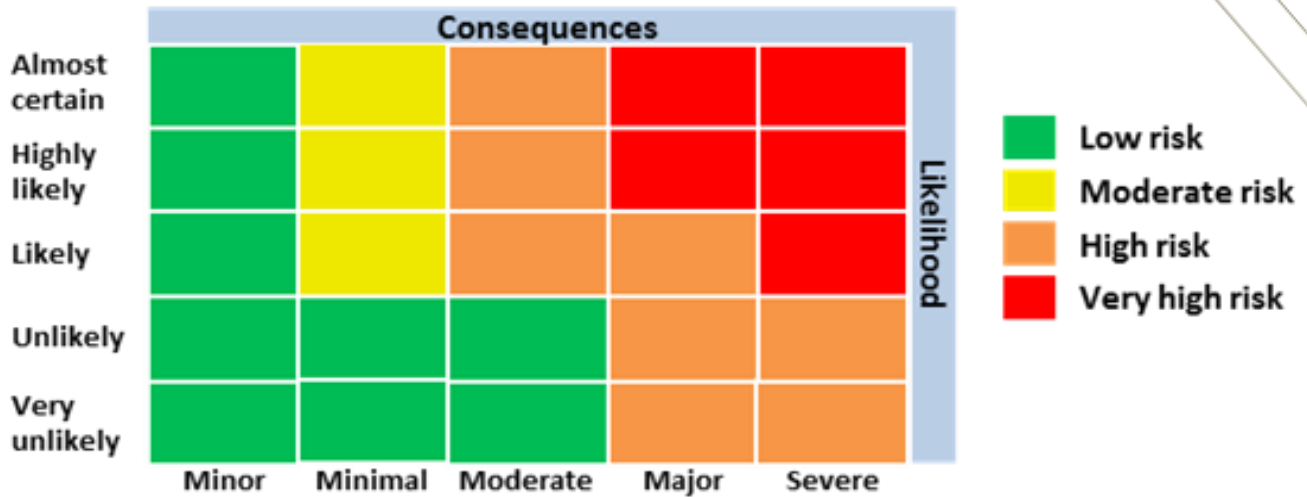


Table 1. Estimates of likelihood

Level	Definition
<i>Almost certain</i>	Is expected to occur in most circumstances (e.g. probability of 95% or more)
<i>Highly likely</i>	Will probably occur in most circumstances (e.g. a probability of between 70% and 94%)
<i>Likely</i>	Will occur some of the time (e.g. a probability of between 30% and 69%)
<i>Unlikely</i>	Could occur some of the time (e.g. a probability of between 5% and 29%)
<i>Very unlikely</i>	Could occur under exceptional circumstances (e.g. a probability of less than 5%)

**Table 2. Estimates of consequences**

<i>Minimal</i>	<ul style="list-style-type: none"> <li>• Limited impact on the affected population</li> <li>• Little disruption to normal activities and services</li> <li>• Routine responses are adequate and there is no need to implement additional control measures</li> <li>• Few extra costs for authorities and stakeholders</li> </ul>
<i>Minor</i>	<ul style="list-style-type: none"> <li>• Minor impact for a small population or at-risk group</li> <li>• Limited disruption to normal activities and services</li> <li>• A small number of additional control measures will be needed that require minimal resources</li> <li>• Some increase in costs for authorities and stakeholders</li> </ul>
<i>Moderate</i>	<ul style="list-style-type: none"> <li>• Moderate impact as a large population or at-risk group is affected</li> <li>• Moderate disruption to normal activities and services</li> <li>• Some additional control measures will be needed and some of these require moderate resources to implement</li> <li>• Moderate increase in costs for authorities and stakeholders</li> </ul>
<i>Major</i>	<ul style="list-style-type: none"> <li>• Major impact for a small population or at-risk group</li> <li>• Major disruption to normal activities and services</li> <li>• A large number of additional control measures will be needed and some of these require significant resources to implement</li> <li>• Significant increase in costs for authorities and stakeholders</li> </ul>
<i>Severe</i>	<ul style="list-style-type: none"> <li>• Severe impact for a large population or at-risk group</li> <li>• Severe disruption to normal activities and services</li> <li>• A large number of additional control measures will be needed and most of these require significant resources to implement</li> <li>• Serious increase in costs for authorities and stakeholders</li> </ul>

**Table 3. Interpretation of risk level**

<i>Low risk</i>	Managed according to standard response protocols, routine control programs and regulation (e.g. monitoring through routine surveillance systems)
<i>Moderate risk</i>	Roles and responsibility for the response must be specified. Specific monitoring or control measures required (e.g. enhanced surveillance, additional vaccination campaigns)
<i>High risk</i>	Senior management attention needed: there may be a need to establish command and control structures; a range of additional control measures will be required some of which may have significant consequences
<i>Very high risk</i>	Immediate response required even if the event is reported out of normal working hours. Immediate senior management attention needed (e.g. the command and control structure should be established within hours); the implementation of control measures with serious consequences is highly likely

The risk assessment team should decide how frequent the risk assessment may be updated. Usually, if there is an observed epidemiologic change that entails escalation of interventions, risk assessment may be reviewed and updated. An example case scenario on the steps of EBS that should be taken, from signal detection through media scanning to risk assessment, is available in Annex 3 of this document.

# [ MODULE 3 ]

## EVENT-BASED SURVEILLANCE AT THE INTERMEDIATE LEVEL

## MODULE 3: EVENT-BASED SURVEILLANCE AT THE INTERMEDIATE LEVEL

### Executive summary

While each country may classify the *intermediate level* differently (district, county, etc.), this term refers to the level of a country's public health and/or surveillance system that is responsible for conducting preliminary investigations and implementing responses to reported public health events or suspected outbreaks in a given jurisdiction. In some countries, and in the Integrated Disease Surveillance and Response (IDSR) system, the intermediate level may be the district-level unit and seen as the unit of implementation of health services. For the purpose of this module, the term intermediate-level will be used to denote this level of the public health system.

Because of their close proximity to communities and health facilities, public health authorities at the intermediate level can be engaged and trained to ensure that events reported to them are accurately assessed for risk. The integration of event-based surveillance (EBS) data into existing national surveillance platforms may also occur at this level.

It is important to emphasize that EBS is an integral component of routine surveillance activities for intermediate-level surveillance staff. Event-based surveillance should use existing resources and infrastructure set aside for routine surveillance, where possible. This module describes the functional elements of EBS, resources needed to operationalize EBS at the intermediate-level, roles and responsibilities of public health personnel participating in EBS, as well as reporting and multisectoral collaboration.

### 1. Functions of EBS at the intermediate level

All functions of EBS are illustrated in Figure 1. In contrast to case definitions that are narrow and disease-specific, EBS requires the detection and immediate reporting of signals, which are broad and indicate the possibility of a serious public health event. Signals that are verified are classified as events.

Public health authorities at the intermediate level may receive EBS-related information in the form of signals or events from a variety of sources, including communities and health facilities. Regardless of the source of EBS information, the functions of EBS implementation that take place at the intermediate level are the same, and are described in the sub-sections below. Although not explained in detail in this framework, key consideration should be given to including surveillance from animal and environmental health sectors.

**Figure 1 – Functions of EBS. Intermediate-level public health authorities may participate in triage, verification, and risk assessment.**

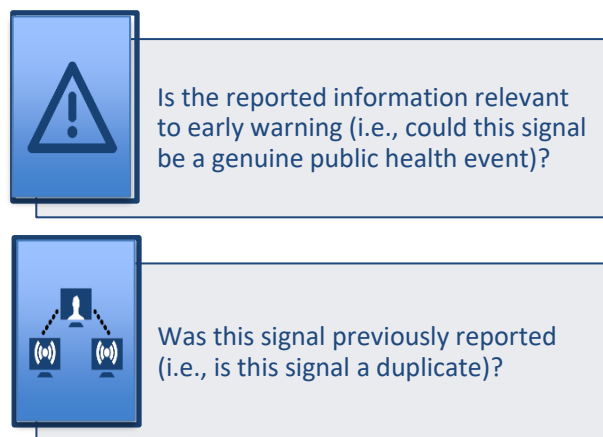


### 1.1 Triage

Public health authorities at the intermediate level may receive signals from health facilities conducting health facility EBS, or HEBS. When authorities receive information about a reported signal, they conduct *triage*. Because of its high sensitivity, EBS is likely to generate signals from non-events. Therefore, the authenticity of the signal needs to be established. Figure 2 summarizes the triage process, and provides possible questions to ask.

Because EBS operates as a sensitive surveillance system, authorities at the intermediate level should continue to encourage the reporting of signals even if they may be later discarded as “non-events.”

**Figure 2 – Questions to ask during triage.**



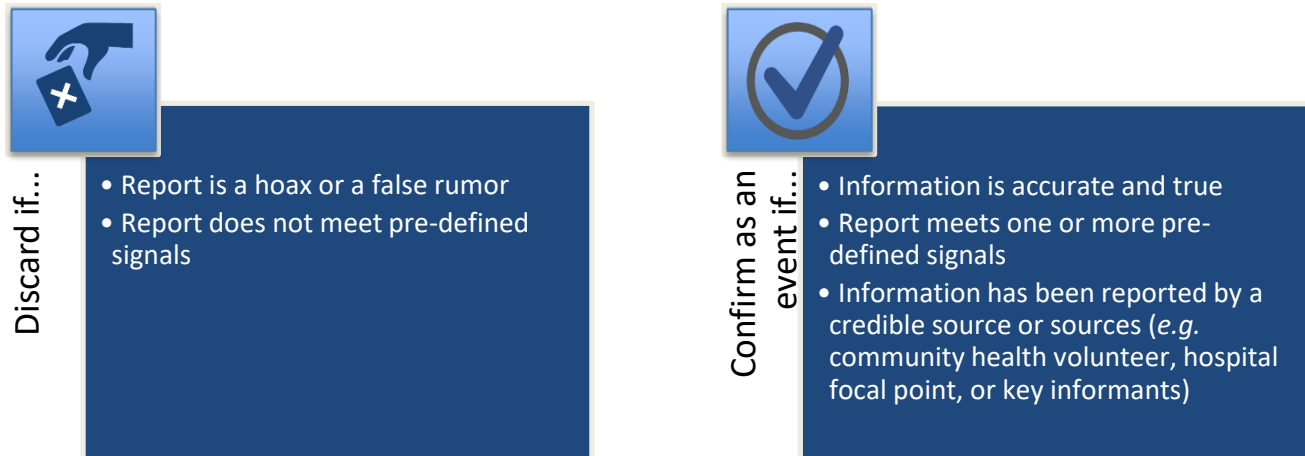
### 1.2 Verification

Intermediate-level authorities receiving signals from health facilities must also verify these signals before they are determined to be events. *Verification* is the determination that a signal is valid (i.e. it is not a false alarm or a false rumor), reliable, and that it corresponds to at least one of the signals pre-defined for EBS implementation. Criteria for verification may include asking questions of those who have notified the signal to ensure that they have correctly understood the signal, whether or not the signal has been confirmed by least two different sources, or the fact that the signal has been notified by a person with medical authority (veterinarian, physician or laboratory assistant). An example EBS verification tool is available in Annex 8.



The result of verification is the confirmation that a signal is true or false. Once a signal is verified, it becomes an event (Figure 3). If confirmed as an event, information related to the event must be entered into a logbook or register at the intermediate-level. Systematic verification of all signals detected through EBS is essential in order not to overburden the public health system with false signal investigations or responses, or with unreliable information.

**Figure 3 – This model can be used to determine the outcome of signal verification, once sufficient information has been collected and validated.**



### 1.3 Risk assessment and characterization

*Risk assessment* is the systematic and ongoing process of gathering, evaluating and documenting information that will form the basis of the actions required to manage and minimize the negative consequences of a serious public health event. The process results in assigning a level of risk that an event presents to human health. Risk assessment should be conducted by intermediate-level public health authorities who propose the action or response that must be taken to manage and minimize the negative consequences of serious public health events. Risk assessment is a systematic and continuous process for gathering, assessing and documenting information to provide the basis for actions required to manage and reduce the negative consequences of an acute public health event.

A risk assessment should be conducted continuously from the detection of a signal to the end of the response to an event. Public health authorities evaluate all available information and then assess or characterize the level of risk that the situation poses to public health. As new information about the situation can arise at any time, the ongoing risk assessment ensures that the appropriate response is triggered, and that it reflects the level of risk the event poses to public health. The first risk assessment of an event must take place within 48 hours of the detection of one or more signals. Resources must be set aside to train staff in risk assessment.

Regardless of the source of the information, a risk assessment should be carried out at the intermediate level and, if relevant, at the higher levels as well. This may involve collaboration between the public health system at these administrative levels with communities and health facilities. It is also important that risk assessment covers all relevant sectors to take into account the extent of human, animal and environmental risks. All information collected during the risk assessment should be recorded systematically.

Table 1 provides an example of questions that may be useful to answer during the risk assessment process. Risk assessment will vary depending on the source and the event, but could include:

- Contacting local health authorities;
- Contacting the original source;
- Cross-referencing information with other sources;
- Gathering additional information; or
- Consulting the Internet to determine if official information is available.

**Table 1 – Examples of questions to ask when conducting a risk assessment.**

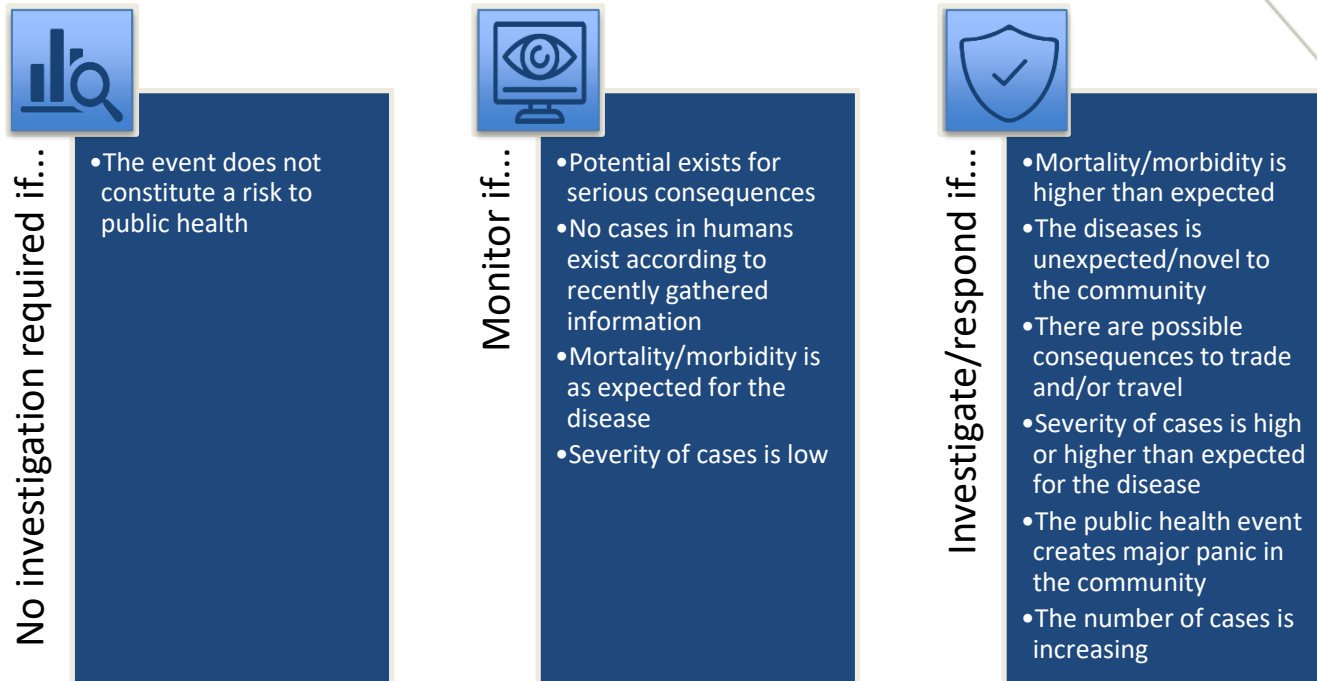
#### Possible risk assessment questions

- Does the suspected disease have a high potential for spread (e.g., cholera)?
- Is there a higher than expected mortality or morbidity reported for the event?
- Is the event unusual or unexpected in the community?
- Is there a cluster of cases with similar symptoms?
- Does the disease have possible consequences for trade or travel?
- Does the event have possible consequences for human health?
- Does the event affect livestock/wildlife
- is there environmental consequences?

Once enough information about the event has been gathered, intermediate-level public health authorities can determine the outcome of the risk assessment. Figure 4 describes the information collected during the risk assessment that can inform the results of the assessment. Risk assessment can have three different outcomes:

- No new investigation or action is required and the event may be closed;
- The event must be monitored; or
- An investigation and a response must be initiated.

Figure 4 – Processes and possible outcomes of risk assessment.



#### 1.4 Investigation and response

Regardless of source of the signal, once an event has been confirmed, the public health system should respond to the event using existing routine protocols for investigation and response. Case Investigations must include specimen collection and laboratory diagnostics. The most critical component of early warning and response systems is the response element. This has been widely covered in IDSR manuals and other WHO documents and will not be addressed in this document.

## 2. Workforce

Event-based surveillance should be part of routine surveillance and response systems within a country. Thus, public health authorities at the intermediate level who typically conduct routine surveillance activities should be involved to carry out EBS functions.

Public health authorities at the intermediate-level should receive training on EBS from higher administrative levels. These public health authorities should subsequently act as trainers for the workforce involved in EBS implementation at local levels, communities, and health facilities. The most critical component of EBS is refresher training: following initial trainings, periodic refresher training or sensitization should be offered to local levels, communities, and health facilities on the functions of EBS that they should carry out. These refresher trainings can be combined with ongoing or routine monitoring visits conducted by public health authorities at the intermediate level. Regular training will ensure consistent implementation of EBS across administrative levels.

### 3. Resources

Resources for the implementation of EBS may also be required at the intermediate level. These resources are outlined in Table 2. A training manual should be provided for public health authorities at the intermediate level to use as a reference when conducting training for lower administrative levels. Training curricula should also be developed to facilitate training of lower administrative levels. Additional resources may be allocated to ensure that regular refresher trainings take place. Training of staff at intermediate level should involve risk assessment.

Events reported to public health authorities at the intermediate level can be recorded using existing surveillance data collection tools where available, to ensure that data collected through EBS is integrated into existing data platforms. For the purpose of this document, it is recommended that countries use the District Log of Suspected Outbreaks and Rumours available through the IDSR framework (see Annex 4) to collect data on signals and events. Supervisory or monitoring tools available for similar routine surveillance functions can also be utilized to monitor EBS functions at lower levels.

Resources may also be allocated to establish a clear reporting tool to enable the rapid transmission of information from communities, health facilities, and other sources to designated public health authorities at the intermediate level. These reporting tools may be electronic or paper-based, but should be clearly defined among all administrative levels so as to ensure consistent EBS reporting and feedback.

**Table 2 – Resources recommended for intermediate levels to operationalize EBS.**

Resources for intermediate level
<ul style="list-style-type: none"><li>• EBS training manual for intermediate-level</li><li>• EBS training curriculum/guidelines and associated resources to carry out training and refresher trainings at lower administrative levels (e.g. venue, travel funding)</li><li>• Data collection tool for events and suspected outbreaks</li><li>• Monitoring/supervision tools</li><li>• Reporting tool to ensure rapid reporting from lower levels</li><li>• Reporting tools such as cell phones, software such as District health information system</li><li>• Fuel for vehicles to conduct verification and/or investigation</li><li>• Computers/laptops as needed</li></ul>

### 4. Roles and responsibilities

Table 3 describes the major roles and responsibilities of public health authorities at the intermediate level involved in the implementation of EBS. Authorities should be aware of their roles and responsibilities, and be empowered and encouraged by public health authorities at higher administrative levels to fulfill them.

**Table 3 – Major roles and responsibilities of intermediate-level authorities that actively participate in EBS.**

Level of public health system	Major roles and responsibilities
<p><b>Intermediate-level public health authorities</b></p>	<ul style="list-style-type: none"> <li>▪ Train EBS stakeholders at local levels, communities, and health facilities</li> <li>▪ Triage and verify reports received of signals from health facilities, if applicable</li> <li>▪ Receive reports of events from local level</li> <li>▪ Record events in existing surveillance data tools and platforms</li> <li>▪ Conduct risk assessment of all events to inform response. As needed, work with national authorities to provide data as appropriate to OIE and WHO</li> <li>▪ Investigate and respond to public health events</li> <li>▪ Transmit information to higher levels</li> <li>▪ Supervise EBS stakeholders at local levels, communities, and health facilities</li> <li>▪ Provide feedback to immediate lower levels</li> </ul>

### 5. Multisectoral collaboration

When planning for EBS implementation, public health authorities at intermediate and higher administrative levels should consider collaboration with other programs, sectors, or entities. Pathways for collaboration need to be prioritized, because they can be very useful in detecting and reporting of signals. For example, signals related to the death of animals at the community-level may be detected by animal health authorities, instead of CHVs. Cross-communication between the Ministry of Health and other relevant animal and environmental health sectors ensures that these signals are ultimately reported through EBS. Similarly, collaboration with the Ministry of Education may ensure that school-related illnesses are reported to public health authorities. Collaboration may take many forms, some of which are outlined in Figure 5.

**Figure 5 – Examples of EBS collaboration partners within the Ministry of Health, across sectors, and with other entities.**

#### Collaboration between programs within Ministry of Health

- Expanded Program on Immunization
- Community health education initiatives to promote healthy behaviours such as handwashing
- Programs that utilize community health volunteers, such as maternal and child health preventive interventions, and disease-specific risk reduction initiatives

#### Collaboration across multisectoral, One Health partners

- Ministry of Environment (or similar agency)
- Ministry of Wildlife (or similar agency)
- Ministry of Agriculture, Livestock, and Fisheries (or similar agency)
- Ministry of Education
- Ministry of Labor
- Ministry of Defense
- Veterinary Services Department
- Ministry of Tourism
- Ministry of Mining (or similar agency)
- Other relevant government agencies

#### Collaboration with other entities

- Non-governmental organizations operating at the community-level
- Factories and workers' unions
- Private medical practices
- Other relevant private sector entities

## 6. Information flow

The *information flow* for EBS reporting and feedback should align with national surveillance and reporting structures. Figure 6 describes the flow of information both up the hierarchy of public health administrative levels, as well as feedback down to the reporters of surveillance-related information.

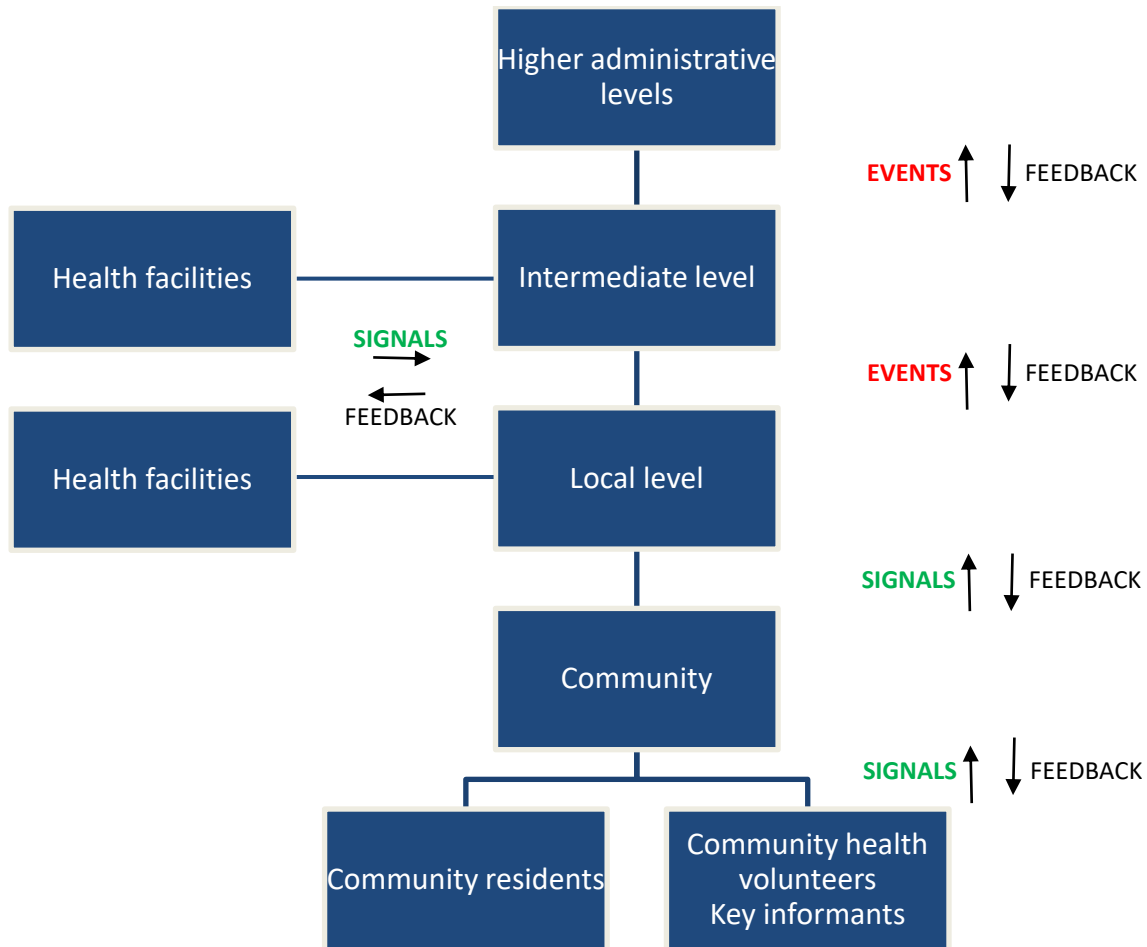
According to this structure, signals detected in communities by community health volunteers, key informants, or other community residents are notified immediately to the local-level. Signals detected in small health facilities may also be reported to the local-level. There, local level authorities triage and verify signals, and report events up to the intermediate-level. Public health authorities at the intermediate level may receive signal information from large health facilities, such as large hospitals, which require triage and verification. These authorities may also receive reports of events from the district-level. All events received at the intermediate level require an assessment of risk, and may require consultation with higher administrative levels. All events must be reported and investigated according to the existing national surveillance and reporting structure.

Timely and routine feedback should be provided in a similar fashion. Higher administrative levels should provide feedback to intermediate-level public health authorities on reported events. Intermediate-level authorities should provide feedback about events and signals to reporters at the local level and large health facilities,

respectively. Feedback on reported signals should be given to smaller health facilities and stakeholders at the community-level by local-level authorities.

The success of EBS implementation is contingent on the early detection and reporting of signals and events through a country's surveillance and reporting structure. Timely and routine feedback can help to encourage reporters and maintain consistent EBS implementation.

**Figure 6 – Flowchart for EBS implementation, indicating the flow of data collected through various EBS sources as well as the feedback loop.**



# 〔 MODULE 4 〕

## HEALTH FACILITY EVENT-BASED SURVEILLANCE



## MODULE 4: HEALTH FACILITY EVENT-BASED SURVEILLANCE

### Executive summary

Traditional indicator-based surveillance (IBS) in health facilities typically encompasses immediate, weekly, or monthly reporting of a pre-determined list of diseases based on case definitions. Event-based surveillance (EBS) in health facilities (HEBS) trains clinicians, nurses, and other relevant healthcare professionals to report on patterns of disease or signals, such as a cluster of illnesses and is not disease specific. Event-based surveillance may allow for the recognition of emerging or re-emerging public health threats because it is not disease-specific, requires immediate notification, and is highly sensitive and broad. Additionally, since reporting does not require laboratory results for reporting, and relies on clinicians' experiences, EBS may be more practical and fairly simple to establish and sustain. This type of surveillance can also be readily extended to private practices or health facilities that may not participate in routine reporting through IBS.

Ideally, health facilities should participate in both IBS and EBS since signals can come from both surveillance systems. Historical data gathered over time in the course of routine sentinel surveillance (IBS) can provide alerts or benchmarks against which to compare the early course of an event, particularly if baselines and thresholds have previously been defined. Sentinel surveillance data should be routinely analyzed to generate seasonal and epidemic threshold alerts to prepare the health facilities and the public health response system. As an example, for influenza-like illness (ILI) surveillance, data gathered through the ILI surveillance system should be able to compare current activity to previous years and to detect periods of increased activity such as the start of an influenza epidemic.

### 1. Steps of HEBS conducted in health facilities

#### 1.1 Signal detection

Signals are broad and allows for a sensitive surveillance system with a requirement for immediate notification. Table 1 provides examples of signals for health facilities. Healthcare professionals, including clinicians, nurses, and infection control officers, should be sensitized to recognize signals and report them immediately. Depending on the structure of the existing surveillance system, clinicians can either directly notify designated public health authorities or *HEBS focal points* identified in their health facilities. In some health facilities, health professionals involved in disease surveillance may already report priority diseases to public health authorities through routine IBS. These people are well positioned to act as HEBS focal points.

**Table 1 – Examples of signals for detection at health facilities.**

#### Examples of HEBS signals

- Any severe illness in health staff after taking care of a patient with similar illness
- Large, sudden increases in admission for any severe illness of the same type
- Any severe, unusual, unexplainable illness including a failure to respond to standard treatment

*Detecting* a signal means identifying or suspecting the occurrence of one of the pre-determined signals designated by national public health authorities. At health facilities, signals are most likely to be detected by healthcare professionals, including clinicians and nurses, because of their close contact with patients.

## 1.2 Reporting signals

Reporting signals involves communicating with a predefined HEBS focal point to inform them of the signal immediately. In large health facilities, where HEBS focal points may not be in direct contact with patients, health professionals who detect signals should immediately report them to the HEBS focal point in their workplace. The HEBS focal point should then immediately communicate the signal to pre-defined, designated public health authorities. Notification of signals must take place immediately after their detection in the health facility. Modes of signal notification may differ depending on available resources and may include telephone, SMS, or verbal notification. Once a signal is notified, public health authorities take further steps to triage and verify signals, and assess the risk of events. Throughout this process, health professionals and HEBS focal points may be asked to assist with information gathering.

## 2. Information flow

The flow of information for notification and feedback on HEBS is illustrated in Figure 1. According to this structure, signals are detected in health facilities. The detected signals are then notified immediately to the designated points of contact of the public health system. Signals detected in small health facilities could be reported to local level public health authorities. Signals detected at large health facilities may be reported to intermediate-level public health authorities.

Public health authorities at these levels triage and verify all signals that come to their attention. Local public health authorities should report all events at the intermediate level where public health authorities can assess the risk of each event and respond appropriately. Intermediate and local public health authorities should encourage those who report to health facilities to continue detection even when certain signals are not real public health events and are discarded.

### HEBS Scenario

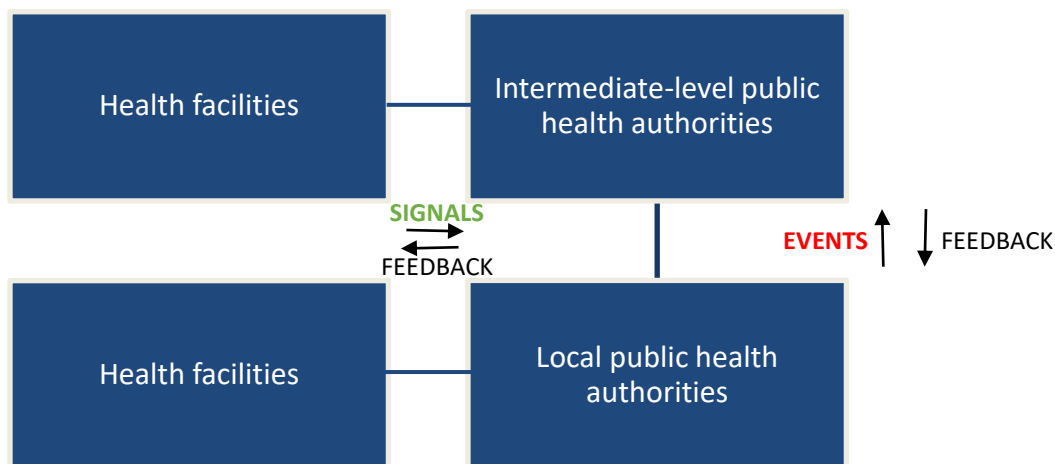
#### Severe illness in health staff

A previously healthy clinician of a large, tertiary hospital develops severe respiratory symptoms a few days after caring for a patient with severe respiratory illness in the emergency ward. The clinician's colleagues should immediately report this as a signal to the HEBS focal point, as it is possible that this clinician acquired an infection from one of his or her patients. If that patient has a highly transmissible disease, other healthcare professionals and patients may be at risk. It is therefore imperative that this signal be reported immediately to ensure minimal risk to healthcare professionals and patients. Immediately upon hearing about this signal, the HEBS focal point should notify his or her designated point of contact at the local or intermediate level. Public health authorities at these levels will then take the necessary steps to triage and verify the signal as an event, assess its risk, and implement appropriate investigation and response measures.

In this scenario, The roles of the ill clinician's colleagues and HEBS focal point are to detect and immediately report this signal to their point of contact at the local or intermediate level.

Feedback to HEBS sources should follow a similar path: intermediate-level authorities can provide feedback to the local-level and to health facilities that report them, and the local-level can make comments to health facilities that notify them. Regular feedback on the signals and events reported is imperative to sustain motivation to report among healthcare professionals and HEBS focal points. Motivation can be maintained through consistent feedback and encouragement.

**Figure 1 – Flowchart for HEBS implementation, indicating the flow of data collected and feedback given.**



### 3. Workforce

A critical component of HEBS is initial training a plan for routine refresher training: following initial sensitization, periodic refresher training should be offered to healthcare professionals and HEBS focal points on signals that should be reported, as well as who to report to. These refresher trainings can be combined with ongoing or routine monitoring visits conducted by public health authorities.

### 4. Resources

The implementation of HEBS does not require many resources at the health facility level. The recommended resources are described in Table 2. Communication materials such as posters and pamphlets can be developed and distributed to help raise awareness about HEBS, particularly about what needs to be reported from health facilities, which signals should be notified, and how the persons receiving the notifications can be reached. Health facilities are advised not to develop registers or signaling tools as this may increase the workload of health professionals, and may decrease their motivation to participate. Health professionals and HEBS focal points should be encouraged to simply detect and report the signals immediately. A clear notification mechanism needs to be established to quickly transmit information from health facilities to the designated public health authorities or those at the higher level. These notification mechanisms can take many forms and can be done through, for example, the telephone, SMS, or mobile applications. Increasingly, social media

applications and platforms are being used to quickly report information between health facilities and the public health system and can be leveraged as a platform for notification and feedback from HEBS.

**Table 2 – Physical resources recommended for HEBS implementation by healthcare professionals and HEBS focal points.**

Resources for HEBS
<ul style="list-style-type: none"><li>• Communications materials (e.g. posters, pamphlets)</li><li>• Established mechanism for rapid reporting (phone, hotline, SMS based or social media platforms)</li><li>• Training materials</li></ul>

## 5. Roles and responsibilities

Like all other forms of EBS, the success of HEBS is based on the early detection and immediate notification of signals. The two general responsibilities of healthcare professionals are the detection of signals and their immediate notification to the HEBS focal point. The main responsibilities of the HEBS focal points are to ensure that health professionals in their health facility understand the types of signals that need to be notified and coordinate the notification of all signals to authorities at higher levels in the public health system.

Annexes 5 and 6 describe the main roles and responsibilities of HEBS focal points and designated public health authorities in the implementation of the HEBS, respectively. Each worker should be aware of their role and responsibilities and, in health facilities, must be empowered by public health authorities to detect and report signals.

## Conclusion

Clinicians and health care workers have a primary role in patient care and management and as such these workers have a heavy workload. An EBS system should not increase the workload for these busy staff, rather allow seamless integration into the existing roles - emphasis should be focused on having healthcare professionals detect and report public health events. Once a healthcare professional report an event, the public health system should ensure proper triage and verification and in case of a true event, provide prompt response. The public health system should also ensure a strong feedback loop that may guide the health care workers in decision-making and may serve as a strong motivator for future reporting. Successful implementation of HEBS requires strong communication between the healthcare system and the public health system.

# ( MODULE 5 )

## COMMUNITY-BASED SURVEILLANCE

## MODULE 5: COMMUNITY-BASED SURVEILLANCE

### Executive summary

The implementation of surveillance in community settings is essential for early detection, reporting, and response to emerging public health events. Traditional indicator-based surveillance (IBS) systems generally collect surveillance data from healthcare sources, and may miss public health events or emerging outbreaks within a community, especially in areas where access to healthcare is low and/or where there is underutilization of formal health services. Community-based surveillance (CBS) has been useful in monitoring diseases that are slated for eradication (e.g., Guinea worm), monitor the baseline occurrence and trends of illness in a community (especially in refugee camps), and to detect outbreaks. This module focuses on the role of CBS as a function of EWAR and includes involving the community in the detection and reporting of signals.

The terminology used to describe surveillance conducted at the community-level has varied in existing scientific literature, and has included community-based surveillance, community event-based surveillance, and community health surveillance, among others. At a meeting convened by the World Health Organization (WHO) in June 2018, a group of technical experts defined community-based surveillance (CBS) as “the systematic detection and reporting of events of public health significance within a community by community members”. This definition encompasses the detection and reporting of events. To ensure consistency with this definition, this module will employ the term CBS.

To be sustainable and effective, CBS needs to be linked and integrated with existing national surveillance platforms. Ideally, the reporting of signals should occur through established public health structures.

### 1. Community health volunteers

#### 1.1 Steps of community-based surveillance

##### 1.1.1 Signal detection

It is important to note that signals are not case definitions. Case definitions are narrow and disease-specific; signals are broad, and indicate the possibility of an emerging public health event. Table 1 provides some examples of signals that can be used for detection of public health events at the community-level. In addition to signals that capture a wide variety of diseases and other events, CBS can also include lay case definitions for priority diseases such as measles and cholera. Such lay case definitions of priority diseases are already available in the Integrated Disease Surveillance and Response (IDSR) framework.

**Table 1 – Examples of signals for detection at the community-level.**

#### Examples of signals for CBS

- Two or more cases of people presenting with similar severe signs/symptoms from the same community, school, or workplace within one week. *(NB: Severe can be elaborated at the community-level as needing to seek medical care)*
- A cluster of unexplained animal deaths within one week.
- An illness with novel or rare symptoms *(NB: Novel and rare can be explained as signs/symptoms that the community has not seen before)*
- Any person with fever and rash

*Detecting* a signal means identifying or suspecting the occurrence of one of the pre-determined signals designated by national public health authorities. At the community-level, signals are most likely to be detected by community health volunteers (CHVs) or key informants because of their connections to community residents and networks. Detected signals can be recorded in a notebook by CHVs, and reported immediately to public health authorities.

#### 1.1.2 Signal reporting

Community residents and key informants should immediately report signals that they witness or hear about to CHVs. CHVs themselves can also detect signals. When CHVs become aware of or detect a signal, they should immediately notify their local-level supervisor. For the purpose of this framework, local-level supervisors are defined as staff employed in the public health system to whom the CHVs report. In most countries, these supervisors are located in local-level health facilities. Methods of signal reporting may differ based on available resources, and may include reporting by telephone, text message, or in-person reporting. Once a signal is reported, public health authorities at higher levels take further steps to triage, verify, and assess the risk of signals confirmed as events. Throughout this process, CHVs may be asked to assist with information gathering.

A clear and simple reporting structure is a prerequisite for a well-functioning CBS system. Once a comprehensible reporting structure is established, reporting mechanisms need to be considered. When setting up CBS, every effort should be made in developing a cost-effective, rapid mechanism of reporting. Wherever existing CBS systems are enhanced, available reporting mechanisms should be leveraged where possible. Reporting mechanisms may include paper-based reporting, toll-free numbers, social media, electronic reporting platforms, mobile applications, and SMS capabilities through text messaging. While reporting platforms that are not paper-based have several advantages including immediate reporting, automated recording of data, and ease of monitoring, it is important to remember that these reporting mechanisms may all be associated with a cost, including costs for start-up and maintenance. Both of these costs should be carefully considered before the reporting mechanism is put into place. Additional considerations should include the inter-operability of these reporting platforms with existing electronic platforms and databases.

#### 1.2 Workforce

As CBS entails working closely with communities, the most critical component of CBS implementation is the recruitment and retention of those individuals with primary responsibility for signal notification. Those holding





this responsibility may go by different titles in different countries, for instance, community health workers or community health volunteers (CHVs). They may be paid employees of the public health system, paid through disease-specific programs or other donors, or may work as unpaid volunteers. For the purpose of this module, the term CHV will be utilized to describe primary reporters from the community.

Community networks are an important resource for CBS. Traditional healers, schoolteachers, village health chiefs, pharmacists, farmers and small traders, among others, who reside in the community and regularly interact with other residents should form these networks as *key informants*. Such community networks can act as the “eyes and ears” on the ground, assisting CHVs and greatly increasing the chances of signal detection from the community.

Community-based surveillance requires the training of CHVs and community networks to look for and report signals that they witness or hear about. A critical component of CBS is refresher training: following initial sensitization, periodic refresher training should be offered to CHVs and community networks on signals that should be reported, as well as who to report to. These refresher trainings can be combined with ongoing or routine monitoring visits conducted by public health authorities. Many countries also have a field animal health volunteer or field animal health workers who can be engaged with CBS. Community health volunteers are well positioned to act as primary reporters of signals because of their connections to the community. Ideally, CHVs should be community residents selected by their communities to lead CBS activities on a voluntary basis. The recommended criteria for CHV selection are described in Table 2. It is recommended that CHVs be integrated as part of the health care system.

**Table 2 – Criteria recommended for CHV selection to lead CBS activities.**

#### Recommended community health volunteer selection criteria

- Resident in the community
- Well known, trusted, accepted, and respected among other community residents
- If role is voluntary, not expect compensation
- Willing to be a champion of their community
- Selection supported by community residents
- Recognized by all identified groups where ethnic and religious differences exist
- Gender neutral
- Literacy is encouraged, but is not a prerequisite
- Able to communicate in local language(s)

### 1.3 Resources

Aside from human resources, CBS requires minimal resources for its implementation. Recommended resources are described in Table 3. The development and distribution of communication materials such as posters or pamphlets may increase and sustain the awareness of community residents, key informants, and CHVs of CBS, particularly on signals to be reported. These communication materials can either be distributed to community residents, or posted in public spaces, especially outside schools, in local marketplaces, and outside CHVs homes. In addition, these materials can also be used to sensitize community residents to CBS in formal settings, such as during community meetings.





In addition to communication materials, CHVs could be provided with a notebook to enable the collection and recording of signal information. This notebook should not be a register, but rather a place for CHVs to record information before reporting. It should also contain a calendar, and if needed, pictorial representations of signals. An example CHV notebook is provided in Annex 7. Countries may also choose to pay the workers incentives or support the volunteers with phone credits, rain boots, or other items as additional incentives.

**Table 3 – Resources recommended for CHVs, key informants, and community residents to implement CBS.**

<b>Minimum Resources for community health volunteers</b>
<ul style="list-style-type: none"> <li>• Communication materials (e.g. posters, pamphlets)</li> <li>• Notebook to record signal information</li> <li>• Mechanism for rapid reporting (e.g. phone or SMS credits)</li> </ul>
<b>Resources for key informants and community residents</b>
<ul style="list-style-type: none"> <li>• Communication materials (e.g. posters, pamphlets)</li> </ul>

#### 1.4 Roles and responsibilities

Like all other types of EBS, the success of CBS lies in the early detection and reporting of signals. The three main responsibilities for CHVs are to sensitize populations and target groups to recognize signals for reporting, detect these signals, and immediately notify them to designated public health authorities.

Table 4 outlines the major roles and responsibilities of community residents, key informants, and CHVs in the implementation of CBS. Each stakeholder should be aware of their roles and responsibilities, and at the community-level, be empowered by public health authorities to detect and report signals.

**Table 4 – Main roles and responsibilities of community-level stakeholders that actively participate in CBS.**

Level of public health system	Main roles and responsibilities
<b>Community residents and key informants</b>	<ul style="list-style-type: none"> <li>▪ Detect signals</li> <li>▪ Report signals to Community Health Volunteer (CHV)</li> <li>▪ Participate in training on CBS, facilitated by public health authorities</li> <li>▪ Sensitize community residents and key informants on CBS</li> </ul>
<b>Community Health Volunteers</b>	<ul style="list-style-type: none"> <li>▪ Detect signals</li> <li>▪ Record signals in notebook (if available)</li> <li>▪ Report signals immediately to designated local public health authorities (i.e., local-level supervisors)</li> <li>▪ Participate in event investigation as needed</li> <li>▪ Receive feedback about reported signals from public health authorities</li> </ul>

## 2. Local-level supervisors

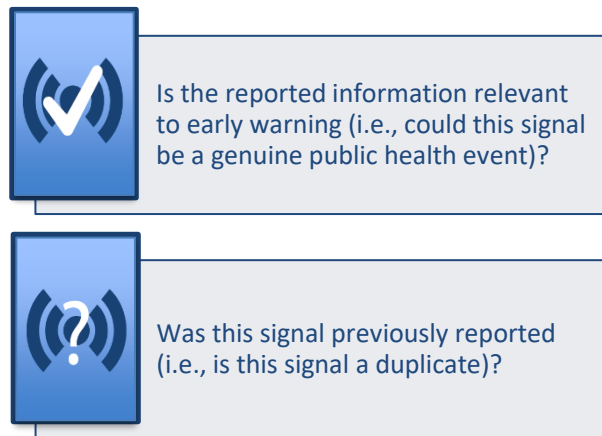
### 2.1 Steps of community-based surveillance

#### 2.1.1 Triage

When local-level supervisors receive information about a reported signal, they conduct *triage*. Because of its high sensitivity, CBS is likely to generate signals from non-events. Therefore, the authenticity of the signal needs to be established. Figure 1 summarizes the triage process, and provides possible questions to ask.

Because CBS operates as a sensitive surveillance system that is capable of detecting unusual occurrences in communities, CHVs should be encouraged to report signals even if they may be later discarded as “non-events.”

**Figure 1 – Questions to ask during triage.**

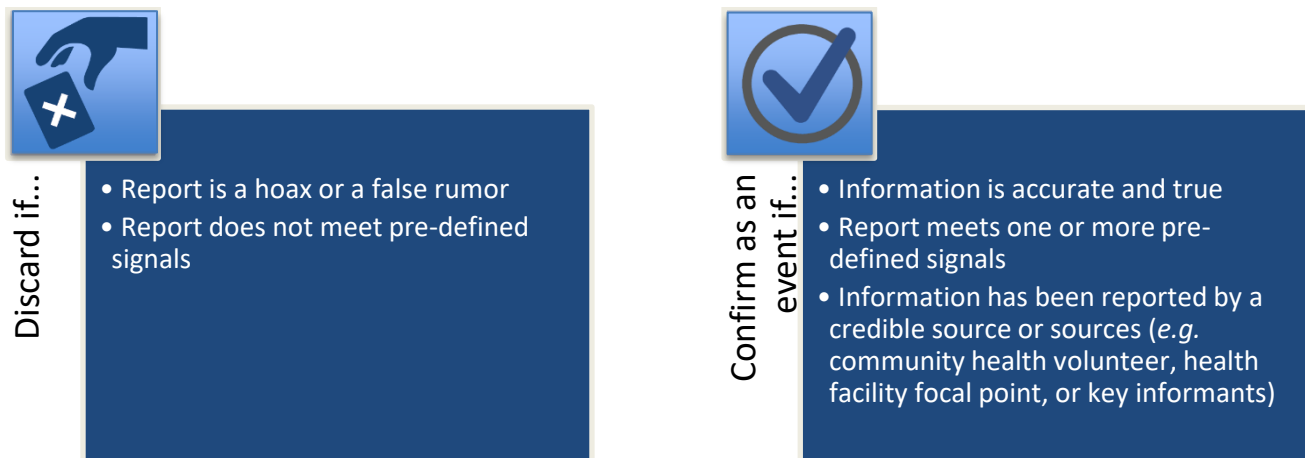


#### 2.1.2 Verification

Local-level supervisors who triage a signal should also verify it. This process may also include community and health facility-level reporters, who may be asked for more information about the nature of the signal. *Verification* is the determination that a signal is valid (i.e. it is not a false alarm or a false rumor), reliable, and that it corresponds to at least one of the predefined signals. We cannot always trust the potential sources of information from CBS or always consider them reliable. Criteria for verification may include asking questions of those who detected the signal, including CHVs, to ensure that they have correctly understood the signal, whether or not the signal has been confirmed by least two different sources, or the fact that the signal has been notified by a person with or without a medical authority (e.g., veterinarian, physician or laboratory assistant). An example verification tool for EBS is provided in Annex 8.

The result of the verification is the confirmation that a signal is true or false. Once a signal is verified, it becomes an event (Figure 2). The result of triage and verification of signals should be recorded in a local register or signal logbook. It is recommended that this tool be simple and limit the collection of data variables to a minimum. Systematic triage and verification of all signals detected through CBS is essential in order not to overburden the public health system with false signals or unreliable information.

**Figure 2 – This model can be used to determine the outcome of signal verification, once sufficient information has been collected.**



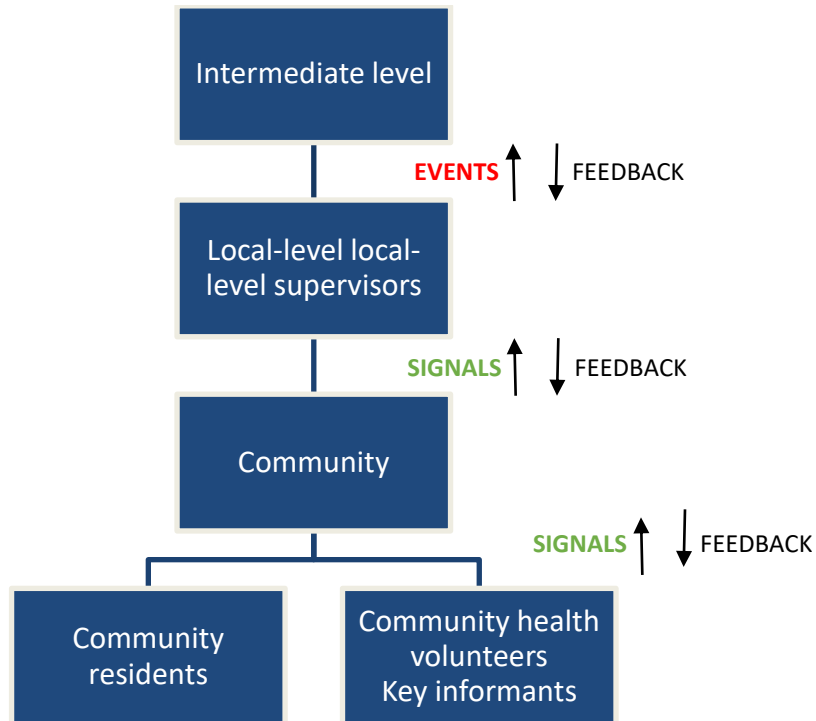
## 2.2 Information flow

The information flow for notification and feedback for CBS is illustrated in Figure 3. According to this structure, signals are detected at the community-level. The detected signals are then notified immediately to local-level supervisors at the local level.

At the local-level, local-level supervisors must verify and triage all signals that come to their attention. All signals verified as events should be reported to the intermediate-level where public health authorities there can assess the risk of each event and respond appropriately. Feedback to community-level reporters should take place in a similar way: the intermediate level should provide feedback on reported events to the local-level, and local levels should communicate back to the communities that notify them of signals.

The success of CBS is based on the early detection and reporting of potential public health events. Intermediate public health authorities and local-level local-level supervisors should encourage those who report to communities to continue detection even when certain signals are found not to be actual public health events. The motivation of CHVs, key informants, and community residents who report can be maintained through feedback and encouragement.

Figure 3 – Flowchart for CBS implementation, indicating the flow of data collected and the feedback loop.



### EXAMPLE: OCCURRENCE OF MANY CASES OF A SEVERE ILLNESS IN A COMUNITY

A community health volunteer (CHV) hears in the market that a few people are very sick with vomiting and diarrhea in the village. Two adults and three children were taken to a health center because they had at least five episodes of vomiting and diarrhea today. Ten other adults and six children are sick. Nobody is sure if any of the sick persons have a fever.

The CHV should immediately report this information to their local-level supervisor as it may be a highly communicable disease and other people may be affected. It is essential that this signal be notified immediately to ensure minimal risk to community residents. Immediately after learning about this signal, local public health authorities will take the necessary steps to record, triage, and verify the signal as an event. Once verified, they will report up to the intermediate-level, where authorities will assess the risk of the event and implement appropriate investigation and response measures.

In this scenario, the role of CHVs is to immediately detect, record, and report this signal to their point of contact at the local administrative level.

### 2.3 Workforce

The implementation of CBS does not necessarily require new infrastructure at the local level; instead, it uses existing resources and networks to ensure its integration into existing national public health and surveillance platforms. Since CBS is set up as part of the existing routine surveillance system, human and physical resources that currently exist for surveillance purposes at the local-level should be used for implementation where possible.

Public health staff who may sit in local health facilities, public health offices, or other structures in close proximity to communities may be selected and trained by higher-level public health authorities as local-level supervisors to carry out select CBS functions. This ensures that CBS implementation is decentralized, and that the intermediate-level is not overwhelmed with information.

### 2.4 Resources

Where they exist, physical resources for surveillance capacity at the local-level can be used for CBS implementation. The recommended resources are described in Table 5.

Relevant information on signals reported to local-level supervisors can be recorded using a simple signal register or logbook. An example signal register can be found in Annex 9. Resources can also be allocated to establish a clear reporting mechanism to enable the rapid transmission of information from communities to designated local-level supervisors. These reporting mechanisms can take many forms and can be done through telephone, SMS, electronic web reporting, or social media platforms. Establishing these clear mechanisms will improve CBS reporting and feedback.

**Table 5 – Resources recommended for local public health authorities to implement CBS.**

Resources for local-level supervisors
<ul style="list-style-type: none"><li>• Signal register or logbook</li><li>• Established mechanism for rapid reporting from lower levels (phone, hotline, mobile applications, SMS or social media platforms)</li></ul>

### 2.5 Roles and responsibilities

Table 6 describes the main roles and responsibilities of local-level supervisors involved in the implementation of CBS at the local level. Supervisors should be aware of their roles and responsibilities, and be empowered and encouraged by public health authorities at higher levels to fulfill them.

**Table 6 – Roles and responsibilities of stakeholders at local-level that actively participate in CBS.**

Level of public health system	Main roles and responsibilities
<b>Local-level (local-level supervisors)</b>	<ul style="list-style-type: none"> <li>▪ Participate in CBS training, facilitated by public health authorities at intermediate-level</li> <li>▪ Assist in sensitizing community stakeholders involved in CBS</li> <li>▪ Receive reports of signals from CHVs</li> <li>▪ Record signals in signal register or logbook</li> <li>▪ Triage and verify all signals to determine whether they are events</li> <li>▪ Report all events to intermediate-level</li> <li>▪ Participate in investigation</li> <li>▪ Provide feedback to immediate lower level</li> </ul>

### Conclusion

A successful CBS system needs to find the means to keep CHVs motivated. Most CHVs are volunteers that are tasked with the delivery of a number of activities. Motivation can take two forms: financial and non-financial. Financial incentives include the payment of allowances or the allocation of physical resources such as mobile phones or bicycles, and require sufficient and sustainable funding to cover the related costs. Non-financial incentives may include participation in refresher trainings, continuous feedback, and community stakeholder recognition by public health authorities. By recognizing the full value of community residents, key informants, and CHVs in conducting CBS, these incentives help to build trust between community-level stakeholders and the public health system in a sustainable way.

Routine supervision of CHVs are key to the success of CBS; supervisory visits can be used as a way to provide refresher training to CHVs, and can serve as a form of motivation. Local-level supervisors should ensure that regular feedback be provided to CHVs on the status of signals that were reported from their communities.

Finally, CBS should be seamlessly integrated into existing public health surveillance and reporting structures. This streamlined form of surveillance can help detect potential acute risks to public health, which can facilitate a rapid response to new public health events.

[ Annexes ]

## ANNEXES

### Annex 1. Signal Logbook for Hotlines and/or Media Scanning (Sample)

#### 1) Source of Information:

Source: CBS, HEBS, Media Scanning, Hotline (this can further categorized if needed)

Reporter info: Employee at national team, community health volunteer, healthcare worker

Date-Time: of detection/receiving the signal

Reference/Contact: link, contact name, and phone number

#### 2) Signal Information:

Signal Type: Human; Animal; Environmental

Signal: from the countries list of signals

Location: details about the location that can follow the administrative levels

Date of start: when did this start?

Cases: number of cases

Deaths: number of deaths happened (if any)

Description: narrative text for any further information including any response activities (by community or health authority or else)

#### 3) Follow up activities

Follow up: Discard, Monitor, Verify

Sent for Verification: Yes; No

Date-Time:

Verified: Yes; No

Date -Time:

Risk Assessment: Very Low; Low; Moderate; High; Very High

Sent to Response: Yes; No

Date-Time:

Response Status: Not Started; Ongoing; Completed

Date-Time:



## Annex 2. Questions for detected signals

	ASSESSMENT QUESTION	YES	NO
<b>Human health events</b>	Does the event involve a notifiable disease or syndrome (i.e. diphtheria, watery diarrhoea)?		
	Can the suspected disease cause outbreaks with a high potential for spread (i.e. cholera, measles)?		
	Is there a higher than expected mortality or morbidity from the disease?		
	Is the disease unusual/unexpected in the community?		
	Is there a cluster of cases or deaths with similar symptoms (i.e. bloody diarrhoea, haemorrhagic signs and symptoms)?		
	Could the disease be caused by a contaminated, commercially available product (i.e. food item)?		
	Does the disease have possible consequences for trade or travel (i.e. SARS)?		
	Is there suspected nosocomial spread of the infection (i.e. is the infection being transmitted within a health care setting)?		
<b>Non-human health events</b>	Does the event have a <b>known</b> consequence for human health (i.e. chemical spill, suspected Nipah outbreak in animals, unexplained deaths in animals)?		
	Does the event have a <b>possible</b> consequence for human health (i.e. suspected zoonotic disease outbreak in animals)?		

Adapted from: World Health Organization. 2014. Early detection, assessment and response to acute public health events: Implementation of Early Warning and Response with a focus on Event-Based Surveillance. Interim Version.

### Annex 3. IDSR District Log of Suspected Outbreaks and Rumours

The IDSR District Log of Suspected Outbreaks and Rumors may be adapted by intermediate-level public health authorities to record information about events detected through event-based surveillance. Note that signal information should not be entered in this logbook.

#### PROPOSED TABLE INFORMATION KEY FOR EBS INFORMATION

1. 'Condition or Disease or Event' should be completed with a brief description of the event (e.g., suspected measles, cluster of suspected cholera, earthquake).
2. 'Number of cases initially reported' indicates the number of cases reported when the initial signal was reported.
3. Please state the name of the location where the event is occurring, as precisely and exactly as possible. If an address is available, please record it.
4. 'Date district notified' is the date that the intermediate-level public health authorities were notified about the event. Please enter date in the DD-MM-YYYY format.
5. 'Date suspected outbreak was investigated by the district' is the date that the intermediate-level public health authorities began investigation of the event reported. Please enter date in the DD-MM-YYYY format.
6. 'Result of district investigation' asks public health authorities to state whether the event was ruled out or confirmed as a suspected outbreak requiring a response, or whether the status is still unknown.
7. 'Date outbreak began' is the date that the event began, or the date of symptom onset of the index case. Depending on the event occurring, this may also be the date the threshold was crossed for a seasonal disease, or the date the first cluster of cases was recognized. Please enter date in the DD-MM-YYYY format.
8. 'Date a case was first seen at a health facility' is the earliest known date that a case sought medical care. Please enter date in the DD-MM-YYYY format.
9. 'Date specific intervention began' is the date a response was initiated. Please enter date in the DD-MM-YYYY format.
10. 'Type of concrete intervention that was begun' asks public health authorities to describe what was conducted as part of the response.
11. 'Date district notified national level of the outbreak' is the date that the intermediate-level public health authorities communicated with higher levels about the occurrence of an outbreak. Please enter date in the DD-MM-YYYY format.
12. 'Date district received national response' is the date that intermediate-level public health authorities received response support from the national-level. Please enter date in the DD-MM-YYYY format.
13. Please enter any further comments in this field.

## 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)

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Source: World Health Organization Regional Office for Africa. 2010. Technical guidelines for integrated disease surveillance and response in the African region.

## Annex 4. HEBS Standard Operating Procedures: HEBS focal points

### Introduction

The national surveillance and reporting structure is essential for the early detection of public health events and suspected outbreaks. All levels of the public health system contribute to collecting and reporting data through this structure. Event-based surveillance (EBS) should be integrated into the national surveillance and reporting structure. Event-based surveillance helps to rapidly identify:

- Outbreaks of disease
- Rare and new events that are not outbreaks (including animal die-offs and natural disasters)
- Events that threaten public health that occur in places where people seek healthcare

Health facility EBS (HEBS) focal points are an essential component of this system, because they are closely connected to the health system. HEBS focal points can identify any threat to public health in their workplaces and can rapidly share this information with public health authorities.

### Objective

This document describes the standard operating procedures for HEBS focal points to conduct EBS, namely how to detect and report signals from health facilities.

### Role

HEBS focal points:

1. Participate in EBS training
2. Sensitize their fellow health facility staff routinely
3. Detect signals
4. Report signals to the designated public health authorities at the local or intermediate level
5. Participate in any public health investigation as needed

### Signals

*Signals selected by national public health authorities should be included here. These signals represent potential public health events and outbreaks that should be detected and reported immediately to the designated public health authorities at the local or intermediate levels, by HEBS focal points.*

### Procedures

#### 1. Participate in an EBS training

- The HEBS focal point will participate in an EBS training

#### 2. Sensitize other health facility staff to look for signals

- HEBS focal points are strengthened by their connections to their places of work. HEBS focal points will talk to other staff at their workplaces (including other clinicians, nurses, infection control personnel, etc.) to explain the signals and the need to report immediately if a signal is recognized



- Sensitizations for other staff should occur on a routine basis to refresh staff knowledge on what to report and who to report to
- HEBS focal points will display and/or distribute any communications materials (i.e., posters, pamphlets etc.) in the health facility that illustrate the signals

### **3. Detect signals**

- HEBS focal points must inform other staff to immediately notify them when they see or hear about one of the signals happening in their workplace
- A signal is detected when the HEBS focal point learns that a signal that is happening

### **4. Report signals to the designated public health authorities**

- HEBS focal points must immediately communicate the signal to the designated public health authorities at the local or intermediate level
- This can happen by telephone, SMS, or in person, but it must happen immediately: on the same day, and as soon as possible
- The authorities may tell you that the report does not match one of the signals. This will happen occasionally, and it is okay. It is better for the HEBS focal point to be overly cautious and report when a signal is happening, than not to report

### **5. Participate in any public health investigation as needed**

- Public health authorities may ask questions or even visit the health facility to see the signal
- The HEBS focal point should cooperate and assist authorities with any questions, investigation, or response they may conduct

## Annex 5. HEBS Standard Operating Procedures: Local and intermediate public health authorities

### Introduction

The national surveillance and reporting structure is essential for the early detection of public health events and suspected outbreaks. All units of the public health system contribute to collecting and reporting data through this structure. Event-based surveillance (EBS) should be integrated into the national surveillance and reporting structure. Event-based surveillance helps to rapidly identify:

- Outbreaks of disease
- Rare and new events that are not outbreaks (including animal die-offs and natural disasters)
- Events that threaten public health that occur in places where people may not have access to healthcare

Local and intermediate public health authorities serve a very important role in the public health system, because they receive all notifications from health facility EBS (HEBS) focal points about signals of potential public health threats. Signals must be triaged (confirms that they are pertinent to EBS and are not duplicates) and verified (determines if the signal is actually a public health event). Public health events must be reported immediately to higher levels. False signals are not reported so as not to overwhelm the public health system.

### Objective

This document describes the standard operating procedures for the local and intermediate public health authorities to conduct HEBS, namely how to triage signals, verify signals to determine if they are events, and to report events to higher levels. The process of triage, verification and reporting must take place as soon as possible, within 24 hours of signal detection.

### Role

Public health authorities at local and intermediate levels must:

1. Train the actors of EBS at the local level and in health facilities
2. Collect signals reported by HEBS focal points
3. Collect notified events at the local level (pertinent intermediate-level only)
4. Document events in existing data collection tools and databases/platforms
5. Conduct a risk assessment of all events to inform the response
6. Investigate and respond to public health events
7. Transmit information to higher levels
8. Supervise EBS actors at the local level and in health facilities
9. Provide feedback to lower levels on a regular basis

## Signals

*Signals selected for health facilities by national public health authorities should be included here. These signals represent potential public health events and outbreaks that should be detected and reported immediately to local or intermediate public health authorities by HEBS focal points.*

## Procedures

### 1. Participate in an EBS training

- Local and intermediate public health authorities will participate in an EBS training

### 2. Assist in training HEBS Focal Points

- Public health authorities at the intermediate and local levels will sensitize HEBS focal points to rapidly report signals
- Public health authorities will assist in conducting these trainings within the geographic area covered by the local or intermediate level
- Public health authorities will assist in distributing any communication materials to HEBS focal points

### 3. Receive and document signal reports

- Local and intermediate level public health authorities will receive notifications of a signal being reported from a HEBS focal point
- All reports of signals should undergo a process of triage and verification

### 4. Triage signals

- Local and intermediate level public health authorities will triage all signals they receive
- Triage can be conducted by asking questions of the person who has identified the signal, asking other people about the reported signal, and/or visiting the person or location where the signal is taking place. Public health authorities must confirm that:
  - The information being reported is pertinent to EBS, and
  - What is being reported is not a duplicate
- Triage can take place in person, by text message or over the telephone
- After triage:
  - If the report is not relevant or is a duplicate, then it can be discarded. There is no further action that is needed to be taken
  - If the information is to be discarded, communicate the following information to the HEBS focal points who reported the signal
    - They should continue to monitor the situation and notify the public health authorities if the situation changes and a signal is met
    - It is okay that they have reported a signal that has been determined to be a false signal, and they are encouraged to continue reporting signals when they are detected
  - If the report is pertinent and is not a duplicate, then the information must be verified by the same public health authorities who received information about the signal



## 5. Verify signals

- Public health authorities will verify all triaged signals that are pertinent to EBS
- To conduct verification, public health authorities will ask questions of the person reporting the signal, and possibly other people as well. This can include the patient, the family and friends of the patient, and/or other people within the community.
- Verification can take place in person or over the telephone
- The EBS Verification Tool (Annex 8) can help to determine if the signal is a public health event
- After verification:
  - If the signal is considered to be a public health event by local public health authorities, it should be reported immediately to the intermediate public health authorities
  - If the signal is not considered to be a public health event, the situation will be monitored to ensure it does not become a public health event

## 6. Report signals

- Public health authorities who receive signals at the local level must immediately communicate to the intermediate level that one of the signals has been detected, following triage and verification
- This communication can happen by telephone, by text message or in person, but it must happen as soon as possible, within 24 hours of the original signal detection

## 7. Participate in any public health investigation

- Public health authorities at the local and intermediate levels may ask questions and even visit the health facility where the signal was detected
- Public health authorities at the local level should cooperate and collaborate with authorities at the intermediate level with any questions, investigation, or response they may conduct

## 8. Conduct supportive supervision of HEBS focal points

Supervision is necessary in order to ensure that the HEBS focal points are correctly fulfilling their responsibilities. Local and/or intermediate public health authorities will conduct supervisory visits regularly to HEBS focal points as scheduled by national public health authorities. Supervision should also incorporate refresher training for HEBS focal points and healthcare professionals on what to report as well as the importance of reporting signals



## Annex 6. CHV Notebook (Sample front pages)

### General Information

Name: \_\_\_\_\_

Telephone: \_\_\_\_\_

Name of CBS Supervisor: \_\_\_\_\_

Telephone: \_\_\_\_\_

### Instructions

When you detect one or more signals in your community, please report immediately to your local-level supervisor. Use this notebook to record the following information and communicate it to the local-level supervisor:

- Date the signal began
- Date/time the signal was detected
- Description of the signal, including number of people/animals affected
- Location of the signal

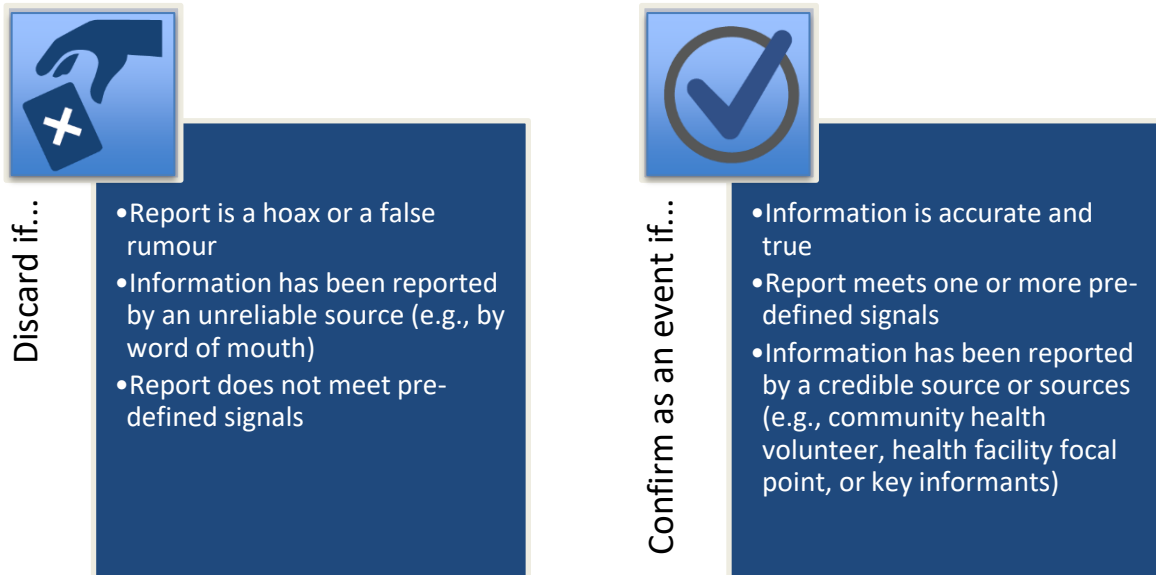
Signals to be reported (examples)	Image
Two or more persons presenting with similar signs/symptoms from the same community, school, or workplace, within one week	<i>Pictures or images of the signals can be included on the front page to assist in detection at the community-level.</i>
A cluster of unexplained deaths of animals within one week	
Any person presenting with new or rare signs/symptoms	
Any person with fever and rash	

## Annex 7. Event-based Surveillance: Verification Tool

As event-based surveillance (EBS) is highly sensitive, it is essential to verify the authenticity of a reported signal and its characteristics. This process of verification involves actively cross-checking the validity of available information, and collecting additional information about the report using reliable sources as needed. The process of signal verification should answer three main questions:


1. Is the report accurate (i.e., true)?
2. Has the information been reported by a reliable source or sources?
3. Does the report meet the criteria for one or more signals?

The graphic shown below can be used to determine the outcome of signal verification, once sufficient information has been collected and validated.




The examples on the following pages demonstrate the process of signal verification using specific signals that may be utilized in community-based surveillance (CBS) or health facility event-based surveillance (HEBS).

Two or more persons presenting with similar severe illnesses in the same setting (e.g., household, workplace, school, street) within one week



Discard if...


- There is only one person presenting with illness
- The persons present with dissimilar signs and symptoms
- There is no temporal association, and >1 week separates the patients' illness
- The persons presenting with similar symptoms reside in different settings that are physically well-separated



Confirm as an event if...


- There are two or more persons presenting with similar signs and symptoms who live or work in the same setting
- The ill persons had an opportunity for exposure or close contact with one another
- The persons' illness requires hospitalization
- One or more persons has died
- There is a common source of exposure

Unexpected large number of deaths of poultry, livestock, other domestic animals or wildlife



Discard if...

- The number of animal deaths is what is normally expected
- There is a reasonable explanation for the animal deaths



Confirm as an event if...

- The number of animal deaths is not what is usually expected
- There are multiple clusters/groups of animal deaths
- There is no explanation for the animal deaths

## Severe illness of a healthcare worker after exposure to patients with similar symptoms



Discard if...

- The ill healthcare worker did not have exposure to patients with similar symptoms
- The healthcare worker's illness does not require hospitalization
- The healthcare worker did not have exposure to patients



Confirm as event if...

- The ill healthcare worker had exposure to patients with similar symptoms
- There are multiple clusters/groups of severely ill healthcare workers with exposure to patients with similar symptoms
- The healthcare workers' illness requires hospitalization
- One or more patients have died
- One or more healthcare workers have died

## One or more hospitalized patients with unexplained severe illness, including failure to respond to standard treatment



Discard if...

- The patient is not severely ill (i.e., does not require hospitalization)
- There is a reasonable explanation for the patient's illness
- The patient is responding to standard treatment



Confirm as event if...

- The patient is severely ill (i.e., requires hospitalization)
- There are multiple clusters/groups of severely ill patients and/or deaths with similar symptoms
- There is no explanation for the patient's illness
- The patient is not responding to standard treatment
- One or more patients have died

## Annex 8. Signal Register for Community-based Surveillance (Sample)

This Signal Register may be completed by community-based surveillance (CBS) supervisors upon receiving reports of signals detected at the community-level.

### TABLE INFORMATION KEY

1. 'Date identified' is the date that the person reporting became aware that a person (or persons) showed signs/symptoms of one or more of the signals. Please enter date in the DD-MM-YYYY format.
2. 'Date reported' is the date that the reporter informed a local-level supervisor about the signal. Please enter date in the DD-MM-YYYY format.
3. 'Source of report' is the individual reporting to the local-level supervisor. A source may be: a community health volunteer (CHV), school teacher, traditional healer, community resident, healthcare professional, among others.
4. Please state the location of the patient's home, hospital, or place where the incident is occurring, as precisely and exactly as possible. If an address is available, please record it. If an address is not available, please describe the relationship between the patient's location and a landmark. If necessary, please describe the appearance of the setting. For example, a patient's home might be the brown house with a red door that is four buildings away from a specific church.
5. Please use the following codes to show the type of signal that is reported:

Code	Example signals
1	Two or more persons presenting with similar signs/symptoms from the same community, school, or workplace, within one week
2	A cluster of unexplained deaths of animals within one week
3	Any person presenting with new or rare signs/symptoms
4	Any person with fever and rash

6. '# of people affected' is the number of individuals who show signs of the signal being reported. Any deaths should be included in this value.
7. 'Reported by multiple sources?' asks the local-level supervisor to state whether the signal has been reported by other individuals at any level of the health system.
8. 'Any recent travel history?' asks the local-level supervisor to state whether or not the person(s) affected by the signal have travelled to another community, sub-national jurisdiction, or country in the 21 days preceding identification of the signal.
9. 'If travel history, where?' asks the local-level supervisor to state the location of travel of person(s) affected by the reported signal. More than one location may be stated here.
10. 'Signal Verification' asks the local-level supervisor to authenticate the report and record the date of report authentication. If the information has been reported by a credible source in the community (e.g., CHV, village leader, etc.), and/or by multiple sources, and meets one or more pre-defined signals, it is an event. If the report does not meet these criteria, it is false. All events should be communicated immediately (within 24 hours) to the sub-national jurisdiction.

11. 'Date signal verified' is the date that the local-level supervisor verified the signal. Please enter date in the DD-MM-YYYY format.
12. 'Date event reported' is the date that the local-level supervisor communicated events (i.e., signals verified as true) to the local-level. Please enter date in the DD-MM-YYYY format.

**Annex 9:**

**SIGNAL REGISTER**

YEAR: 20\_\_

Name of local-level supervisor: \_\_\_\_\_

Health Facility (if applicable): _____	Name of administrative level: _____
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#	Date identified <sup>1</sup>	Date reported <sup>2</sup>	Name of person reporting	Source of report <sup>3</sup>	Phone number of person reporting	Location of signal <sup>4</sup>	Signal Code <sup>5</sup>	# of people affected <sup>6</sup>	Any recent travel history? <sup>8</sup> (Y/N)	If travel history, where? <sup>9</sup>	Signal Verification <sup>10</sup>		Date signal verified <sup>11</sup>	Date event reported <sup>12</sup>
											False	True		

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