MODULE 6

INTERNET EVENT-BASED SURVEILLANCE TRAINING MODULE

U.S. Centers for Disease Control and Prevention

MODULE 6.1

INTERNET EVENT-BASED SURVEILLANCE TRAINING MODULE

FACILITATOR GUIDE

U.S. Centers for Disease Control and Prevention

TABLE OF CONTENTS

ACRONYMS

US CDC	U.S. Centers for Disease Control and Prevention
CBS	Community-Based Surveillance
CHV	Community Health Volunteers
EBS	Event-Based Surveillance
EI	Epidemic Intelligence
EWAR	Early Warning and Response
HEBS	Health Facility Event-Based Surveillance
IBS	Indicator-Based Surveillance
IDSR	Integrated Disease Surveillance and Response
IEBS	Internet Event-Based Surveillance
IHR	International Health Regulations (2005)
MOH	Ministry of Health
MS	Member States
NGO	Non-Governmental Organization
WHO	World Health Organization

GLOSSARY OF TERMS

Community-based surveillance (CBS):

CBS is the systematic detection and reporting of events of public health significance within a community, by community members. Community Health Volunteers (CHV), the public, religious leaders, civil society members, teachers, and similar groups are engaged and trained to detect and immediately report events or health risks occurring in their communities. CBS may also be known as community health surveillance, or community event-based surveillance.

Community health volunteers (CHV):

According to a WHO study group, CHVs 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. They may also be known as community health workers, among other terms.

Event:

The International Health Regulations (IHR) define an event as "[…] a manifestation of disease or an occurrence that creates a potential for disease; […]". This includes 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 the World Health Organization (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.

Geographic Scope:

The observed geographic distribution and rapidity of spread for public health event and is categorized as follows:

High: Events affecting several multi-national regions or continuing spread beyond national borders;

Moderate: Events affecting a multi-national region or continuing spread within national borders;

Low: Events limited to sub-national areas.

Health Event of International Importance:

A verified outbreak or a health threat that meets one of the following criteria, modeled after Annex 2 of the International Health Regulations: Is one of the following: SARS, polio (wild-type), smallpox, or a new subtype of influenza; Presents a serious threat to public health; is unusual or unexpected; poses a significant risk for international spread that potentially requires international intervention; or potentially causes restrictions of trade or travel.

Health Event Under Investigation:	An outbreak or a health threat that potentially meets one of the above criteria, but is not yet verified.
Health Event for Information:	A description of a verified health event that does not meet one of the above criteria but is of interest to the public health community because it poses a potential public health risk.
Health facility:	Defined by WHO as any establishment that is engaged in direct on-site patient care.
Health facility event-based surveillance (HEBS):	EBS that is conducted in health facilities. Healthcare workers are involved as either the primary reporting sources, such as during patient consultations, or as secondary sources, reporting unusual health events or health risks picked up through patient consultations.
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.
Information Credibility Scale:	Combines 1) the credibility of the source with 2) the validity of the information and is categorized as: **High:** evidence from public health agencies, in-country laboratories; not confirmed, but logical and consistent with event information; **Moderate:** Public health agency staff with in-country information without approved laboratory support, but not without some doubt of authenticity, trustworthiness. *Note: that this scale only applies to events categorized as Health Event Under Investigation*
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 other terms.
Internet event-based surveillance (IEBS):	Internet event-based public health surveillance looks at reports, stories, rumors, and other information about health events that could be a serious risk to public health; such information may be described as unstructured information because the information obtained is non-standardized or subjective. WHO: Implementation of Early Warning and Response with a focus on Event-Based Surveillance, Interim Version

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.
One Health:	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.
Public Health Impact:	Refers to actual or potential severity of illness, ease of transmission, public fear, or economic effects and is categorized as follows: **High:** highly pathogenic, highly transmittable, new or emerging, or has significant potential to disrupt travel or trade; **Moderate:** the potential to cause morbidity /mortality, transmit efficiently, or to disrupt travel or trade.
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.
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.
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 need to be triaged and verified before a 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.
Surveillance:	Is the ongoing systematic collection, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know.
Triage:	The process of screening out the data and information that are relevant for early detection purposes (i.e., the screening out of 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". Under the IHR, all State 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 cross-checking of the validity (veracity) of the signals collected by Early Warning and Response, by contacting the original source, additional sources, or by performing field investigation. Verification requires that hoaxes, false rumors, and artefacts are eliminated from further consideration.

INTRODUCTION

Many countries lack the essential resources required to meet the revised International Health Regulations (IHR 2005) requirements to effectively monitor, report, and respond to any disease or other public health threat with the potential to harm the public's health.

The revised IHR is the international agreement designed to help contain or prevent serious risks to public health and discourage unnecessary or excessive restrictions on travel or trade entered into force in 2007. The revised Regulations acknowledge that public health events can pose threats beyond national borders and that Member States have a responsibility to the global community to identify, report, and when possible, contain public health threats before they become "public health emergencies of international concern". While public health burden is assessed by analyses of quantitative data collected via traditional surveillance methods, an estimate of public health can be gleaned via event-based surveillance (EBS) data.

Countries that lack resources could have inadequate health service infrastructures, poorly trained staff, inadequate diagnostic lab capacities, or weak reporting mechanisms. Furthermore, many governments could be reluctant to report public health events to the international community. Both situations - if countries cannot or will not report - are ideal for EBS. EBS is a system of organized and rapid capture of information about potential public health threats that pose a risk to public health.

These are defined at:
WHO: Implementation of Early Warning and Response with a focus on Event-Based Surveillance, Interim Version

An EBS unit includes a director and staff ("Analysts") with expertise in infectious and non-infectious disease, human and veterinary medicine, medical microbiology, epidemiology, and information technology who are responsible for:

- Detection and verification of public health threats,
- Tracking and identifying "mysterious illnesses" for the which etiology is unknown,
- Establishing a subject matter network to assist with threat verification, and
- Partnering with local, regional, and international public health organizations to disseminate information.

This module describes the daily responsibilities of an EBS unit positioned at the central, or federal, level and addresses resources that should be used and applied to successfully conduct EBS.

Background

The mission of an EBS unit should be to provide a single source of reliable, comprehensive, and confirmed information on international disease outbreaks and other public health threats by systematically collecting and analyzing international health event data, conducting risk assessments, classifying the health risks associated with these events, and disseminating health threat information.

This system of risk assessment is particularly effective in detecting public health threats in countries that have weak surveillance and reporting. Sources of data include existing channels of established formal and routine reporting systems, and informal open channels, using internet-based media, social media, and non-governmental organizations.

Analysts in an EBS unit provide prompt, expert analysis and projected impact of public health threats. Data collected from disparate sources are reviewed and verified through refined methodologies and protocols, including the use of sophisticated text-mining and multilingual translating systems.

Events should be triaged and entered into a software application, creating a database of analyzed public health threats. Such a database should ideally be used to create reports to disseminate to shareholders and partner organizations, with reporting frequency determined by the EBS unit and shareholders.

Analysts in an EBS unit should be knowledgeable with regard to the International Health Regulations (IHR). The IHR is an international legal instrument that is binding in 194 countries, including all the Member States of the World Health Organization (WHO). The IHR initially came into being in 1969 and remained relatively unchanged until a revision was completed in 2005.

The aim of the IHR (2005) is to:

- Ensure the international community can prevent and respond to acute public health risks that have the potential to cross borders and threaten people worldwide,
- Provide a legal framework for the prevention, detection and containment of public health risks at source, before they spread across borders, through the collaborative actions of States Parties and WHO, and
- Be inclusive in respect of the public health events under consideration.

All Member States are required to notify WHO for all "events that may constitute a public health emergency of international concern" under the IHR. In this regard, the broad new definitions of "event", "disease" and "public health risk" in the IHR are the building blocks of the surveillance obligations for States Parties and WHO. Within the IHR they define a Public Health Emergency of International Concern (PHEIC) as "an extraordinary event which is determined to constitute a public health risk to other States through the international spread of disease and to potentially require a coordinated international response." Events of potential international concern require States Parties to notify WHO and may extend beyond communicable diseases and arise from any origin or source.

The IHR document itself and information on it can be found here: http://www.who.int/ihr/en/.

Internet event-based surveillance (IEBS)

An EBS unit conducts event-based surveillance, as opposed to indicator or case-based surveillance.

EBS is the organized and rapid capture of information about events that are a potential risk to public health:

- It is designed for early warning and rapid response,
- There is a systematic monitoring of events, event assessment and verification, and data dissemination,
- The collection and collation of information is processed in real time, and
- There is no designated timeline or predefined structure for reporting.

EBS has several advantages over case-based surveillance, because case-based surveillance:

- Produces credible information, but reporting is often delayed,
- Is designed for known diseases; diseases are often not reported until the etiology is known,

- Is not well-established in all countries, and
- Is limited to the health sector, whereas media and other types of open-source reports often originate from highly-motivated entities, such as journalists, which can promptly provide information to open sources

EBS is primarily conducted using the internet: information, or "epidemic intelligence" is collected from formal and informal sources, including media reports, to detect potential public health events to verify and take action on, if necessary. Public health events that include notable human or animal illnesses or deaths, for example, will likely be covered by local media sources which will undoubtedly be posted on the internet, before they are detected, confirmed, and reported by a local public health agency.

Staffing of an EBS unit

A highly trained staff with diverse backgrounds is imperative to the function of an EBS unit.

Director, reports to public health agency leadership

- Leads in a proactive, customer-responsive manner consistent with stakeholders: ascertains needs/ requirements, solicits feedback, and makes appropriate adjustments,
- Ensures a high level of standard and quality of the services and products provided by the EBS unit,
- Identifies the priority and strategy for the EBS unit and plans, organizes, and assigns work,
- Responsible for prudent management of financial resources provided to the EBS unit, and for reporting expenditures,
- Recruits and selects staff,
- Establishes employee performance plans, and completes required reviews and ratings, and
- Leads a daily epidemic intelligence meeting and contributes technical and global health expertise and knowledge.

Analysts, report to EBS Unit Director

- Conducts EBS, including detection, verification and risk assessment of public health events,
- Identifies, collects, and consolidates public health event data,
- Liaises with other units within the agency, and with external public health agencies,
- Prepares and submits reports and other products related to the EBS unit, as well as manuscripts, presentations, journal articles and publications based on scientific findings,
- Supervises interns, students, and guest researchers, and
- Develops new concepts, methods and strategies for conducting EBS.

Analysts should possess specialized training, including medical officers, veterinary medical officers, and doctoral epidemiologists.

Medical officers

- Provides technical expertise on scientific planning, implementation and analysis of medical aspects of scientific research studies,
- Provides agency wide leadership for medical, epidemiologic, and scientific activities, and
- Serves as an expert on clinical human medicine.

Veterinary medical officers

- Provides expert veterinary medical consultation services,
- Provides international zoonotic disease surveillance and epidemiology,
- Provides knowledge of prevention and control of zoonotic disease,
- Integrates veterinary and public health research and practice,
- Coordinates veterinary medical technical assistance on scientific features of zoonotic disease,
- Monitors global human and animal health systems,
- Establishes and maintains channels of information gathering and sharing on animal populations, existing animal surveillance systems, databases and veterinary government contact points, and
- Develops plans for using epidemiologic methods to reduce public health risks associated with the handling, exhibition, production and consumption of animals and their products/by-products.

Medical officers

- Develops policy and objectives, appraising programs and initiating requirements for epidemiologic studies,
- Evaluates data collection, quality control and data utilization methods to study epidemiologic problems,
- Coordinates analytical and data visualization projects, and
- Develops training curricula on core concepts in EBS and leads EBS workshops/mentorships.

OVERVIEW

Purpose

The *Internet Event-Based Surveillance Training Module* will provide public health professionals with the knowledge, skills, and tools necessary to effectively implement EBS using the internet as a primary source of information. The module will additionally help public health professionals to plan, organize and establish an EBS unit in their jurisdiction.

This module is divided into eight sessions, including a case study and post-test to check participant progress after the training.

Audience

This training is targeted to public health professionals, epidemiologists, and scientists who are working at the federal level in their country.

Specific Learning Objectives

By the end of this training module, participants will have the skills, knowledge, and resources to complete the following tasks:

- Supervise and conduct effective EBS activities in health facilities and communities that are in line with routine surveillance strategies,
- Contribute to the flow of surveillance-related information between the community level and the existing public health surveillance system, and
- Establish an EBS unit positioned at the central or federal level.

Facilitator's Training Guide

The *Internet Event-Based Surveillance Training Module* is comprised of a *Participant Guide*, as well as a 'how to conduct the training' *Facilitator Guide*. This component, the *Facilitator Guide*, is to be used by facilitators to provide effective training to federal level public health authorities on EBS implementation using the internet as a primary source of information.

This guide contains content, training materials, and the appendices including the presentations and basic templates.

Agenda

The suggested agenda for this training is a two-day training, split into eight sessions. The proposed agenda may be revised as needed based on EBS implementation and country context.

Materials

Participants should receive a copy of the *Internet Event-Based Surveillance Training Module Participant Guide* at the beginning of the workshop. The *Participant Guide* contains materials for their use both during and after training.

Preparation

All facilitators delivering this training in person should review the content and materials needed to carry out each session, found in each section of this guide. Once facilitators are familiar with the content, they should take the time to develop the prepared flipcharts that are required in the sessions.

LOGISTICS AND SUPPLIES

In-person training

Training location and space setup

Training locations may vary, and can include office spaces, health centers, hospitals, church premises, or others. Five to six tables with a seating capacity of five to six participants per table are recommended (the maximum recommended number of participants is 25 to 30). This will facilitate group work and discussions in the plenary sessions. The facilitator(s) should also be able to move around the tables easily to get close to participants. Arrange the seats so that everybody can see the front and set up one flipchart and several markers for each group.

Preparation checklist

TASK	✓
Obtain an adequate number of flipchart packages, including stands, paper, and markers (one for every team of participants)	
Obtain an adequate supply of sticky notes, pens, and paper	
Verify that the training room is set up with grouped tables with 5-8 chairs at each table	
Make plans to conduct case study on the last day of training	
Make sufficient copies of the *Internet Event-Based Surveillance Training Module Facilitator Guide* for co-facilitators	
Make one copy per-participant of the *Internet Event-Based Surveillance Training Module Participant Guide*	
Make one copy per-participant of the *Internet Event-Based Surveillance Post-Training Evaluation* survey	

Virtual training

Setup

If training is being conducted virtually, the in-person logistical steps here and throughout the *Facilitator Guide* can be disregarded. Trainers should ensure that participants are able to actively participate via the internet using the platform most appropriate for their location and number of participants (e.g., Zoom, Microsoft Teams). Ensure that participants have been sent the *Participant Guide* in advance of the virtual session. The PDF is fillable using Acrobat Reader or can be printed. Group exercises can be run as whole group discussions or individual exercises that participants complete in their *Participant Guides*. Knowledge checks can be delivered via a mobile, online platform such as Poll Everywhere (https://www.polleverywhere.com).

Class preparation checklist

TASK	✓
Send participants the *Participant Guide* ahead of the virtual session	
Send invitation to join the session via the chosen platform (e.g., Zoom, Microsoft Teams)	
Ensure co-facilitators have a copy of the *Internet Event-Based Surveillance Training Module Facilitator Guide*	
If conducting knowledge checks with mobile, online platform such as Poll Everywhere, set up in advance	

INTERNET EVENT-BASED SURVEILLANCE TRAINING AGENDA

DAY 1

SESSION	ACTIVITIES	TIME
1. Welcome and Introductions	Icebreaker	15 minutes
2. Training Objectives and Agenda	Agenda	10 minutes
3. Introduction to Key Concepts in Epidemic Intelligence	Lecture Small group exercise	45 minutes
4. Identifying Signals for Priority Diseases	Lecture Group discussion	1 hour
5. Signal Verification and Rapid Event Assessment	Lecture	1 hour
Internet Event-Based Surveillance Training Day 1		**Total: 3 hours 10 minutes**

DAY 2

SESSION	ACTIVITIES	TIME
6. Registration and Reporting of Events	Lecture Small group exercise Group discussion	1 hour 15 minutes
7. Establishing an EBS Unit	Lecture	45 minutes
8. Training Review, Case Study and Close	Case Study	30 minutes
Internet Event-Based Surveillance Training Day 2		**Total: 2 hours 30 minutes**

SESSION 1

WELCOME AND INTRODUCTIONS

This session introduces the training and any necessary logistics announcements that should be made. In addition, an icebreaker activity is conducted to allow participants to introduce themselves and get to know each other.

Purpose

- Get participants to introduce themselves and get to know each other, and
- Warm up the conversation to the topic of the training.

Materials

Facilitator

- Flipchart paper and markers for each group

Participants

- *Participant Guide*: Introduction questions page 5

Total time: 15 minutes

ACTIVITY 1.1

WELCOME AND INTRODUCTORY ICEBREAKER

Get participants to introduce themselves and get to know each other

Warm up the conversation to the topic of the training

Group formation

15 minutes

Step 1: Introduce yourself

Begin the training module with a warm welcome and some background on your experience working in surveillance and interest in facilitating the training. This should provide a friendly start to the workshop and help to build trust between you and the participants. It is also a way of modelling the introductions exercise ahead.

Step 2: Form groups

After introducing yourself, ask participants to form groups of four. Ask them to try to join groups with different team members than previous event-based surveillance (EBS) training events where possible.

If you are delivering the training online, conduct this exercise as a whole group discussion. Ask participants to record their answers to the questions on page 15 of their *Participant Guide*, then invite them to take turns introducing themselves and sharing their responses.

Step 3: Facilitate small group introductions

Ask participants to introduce themselves by answering the following questions on the flipchart paper (if available) or on page 15 of their *Participant Guide*:

- *What is your name and which organization or agency do you work for?*
- *What is one thing you enjoy about working in public health?*
- *What two words best describe the people your work with in your organization?*
- *Have you taken any previous trainings or workshops related to event-based surveillance?*
- *What is one expectation you have for this training?*

Ask each group to choose someone who will write the answers and another person who will be responsible for introducing each group member and sharing the group's answers with all participants.

Each group should be given two minutes to share with the larger group. Ask participants to be mindful of the time and show respect towards each reporter by refraining from side conversations.

Finish the activity by establishing the expectations for group participation and respect for the ground rules that have been brought up in the Introductions activity.

SESSION 2

TRAINING OBJECTIVES AND AGENDA

This session focuses on reviewing the training objectives, content and agenda.

Purpose

- Contextualize and create interest in the training,
- Communicate the training's general objectives, and
- Give participants a roadmap for the workshop via the agenda, logistics, and materials.

Materials

Facilitator

- Facilitator Guide: Training Agenda pages 16-17

Participants

- Participant Guide: Training Agenda pages 13-14

Total time: 10 minutes

ACTIVITY 2.1

TRAINING OBJECTIVES AND AGENDA

Contextualize and create interest in the training

Communicate the training's general objectives

Give participant's a roadmap for the workshop via the agenda, logistics, and materials

Group discussion

10 minutes

Step 1: Review the training goals and agenda

Ask participants to open their *Participant Guides* to page 16. Go over the purpose of the training and agenda by reading the script below:

The purpose of this training is to provide you—public health professionals—with the knowledge, skills, and tools necessary to conduct event-based surveillance, also known as EBS, in your countries. This training aims to develop your ability to:

- *Supervise and conduct effective EBS activities in health facilities and communities that are in line with routine surveillance strategies,*
- *Contribute to the flow of surveillance-related information between the community level and the existing public health surveillance system, and*
- *Establish an EBS unit positioned at the central or federal level.*

Let's now review the training agenda on pages 13-14. This two-day EBS training is divided into two parts. The first day will focus on:

- Key concepts in epidemic intelligence,
- How to identify signals for priority diseases, and
- Signal verification and rapid event assessment.

The second day will focus on:

- *Registration and reporting of events,*
- *Establishing an EBS unit, and*
- *Training review and post-test.*

On both days, we will have a 15-minute break midway through the training so you can stretch your legs and use the bathroom if needed. The workshop will finish at [time].

Step 2: Go over expectations for the workshop and ground rules

Finish the activity by establishing the expectations for group participation and respect for the ground rules that have been established in the introductions activity. You can use the following script:

Our goal as facilitators is to make this training as informative and interactive as possible. In order for us to successfully meet the expectations you shared during the Introductions activity, we are asking for everyone's participation. We encourage you to share your work experiences and learn from each other. At the same time, we ask that we all respect the ground rules we have discussed (point to the flipcharts if you are using them). If you have any questions or concerns, please feel free to speak to one of us.

Step 3: Ask for questions

Ask participants if they have any questions regarding the content. Clarify and answer any questions before moving on to the next activity.

SESSION 3

INTRODUCTION TO KEY CONCEPTS IN EPIDEMIC INTELLIGENCE

This session focuses on the importance of Internet Event-Based Surveillance (IEBS), including key terms, relevant guiding documents, and the roles of indicator-based surveillance (IBS) and EBS in epidemic intelligence.

Learning Objectives

By the end of this session, participants will be able to:

- Define key terms connected with epidemic intelligence,
- Identify the guiding documents for public health surveillance,
- Describe the roles of IBS and EBS in epidemic intelligence,
- Identify key differences in IBS and EBS in epidemic intelligence, and
- Describe the signal detection process.

Materials

Facilitator

- Prepared flipchart: Key terms in public health surveillance (Appendix 1 of this guide)
- Prepared flipchart: How EBS and IBS contribute to epidemic intelligence (Appendix 2 of this guide)
- Prepared flipchart: EBS and IBS in your community (Appendix 3 of this guide)
- Rwanda case study (Appendix 4 of this guide – for online delivery only)
- Additional blank flipchart paper and markers

Participants

- *Participant Guide* pages 7-24

Total time: 45 minutes

ACTIVITY 3.1

INTRODUCING PUBLIC HEALTH SURVEILLANCE

Define key terms connected with epidemic intelligence

Identify the guiding documents for public health surveillance

Interactive lecture

10 minutes

Step 1: Review the content of this activity

Review the content for this activity prior to conducting the presentation. Ask participants to make notes in their *Participant Guides* as they listen to the lecture.

Step 2: Deliver the interactive lecture on public health surveillance

Open the session by explaining to participants that this activity will be delivered as an interactive lecture, with periodic check points where participants can work in groups to answer a question or brainstorm a definition.

If you are delivering the training online, students can work on this activity individually (recording their responses in their *Participant Guide*), or collectively, as a whole group discussion.

Ask participants to return to the same groups of four that were formed during the introductory icebreaker activity. Distribute the prepared flipchart *Key terms in public health surveillance* (Appendix 1 of this guide) and ask participants to locate the questions on page 17 of their *Participant Guides*.

Each team should select a group member to take notes (recorder) and another to present the group's responses to the audience (presenter). Participants should remain in their groups for both the lecture and discussion parts of this activity.

Read the following statement, then allow 2-3 minutes for groups to make notes on each question. After this time, ask for one volunteer to answer the question, writing the correct answers on a blank flipchart at the front of the room. Once the correct answer has been given, move on to the next block of lecture content and question(s).

We will open this session by going over some key words and concepts used in public health surveillance. Working in your same groups of four, write down your answers for each of the questions that follow.

Q1: What is public health surveillance?

Model answer: *Public health surveillance is the continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice.*

The global context for public health surveillance - International Health Regulations

The IHR represent an international legal instrument that is binding in 196 countries, including all the Member States of the World Health Organization (WHO).

The revised IHR acknowledge that public health incidents can pose threats beyond national borders and that Member States bear a responsibility to the global community to identify, report, and when possible, contain public health threats before they become "public health emergencies of international concern".

What is a public health emergency of international concern?

The IHR define a public health emergency of international concern as an extraordinary event which is determined to constitute a public health risk to other states through the international spread of disease and to potentially require a coordinated international response.

Now let's consider how early warning and response (EWAR) fits in. Let's start by considering how this term is defined. In your same groups, write the definition of EWAR.

Q2: What is EWAR?

Model answer: *The organized mechanisms used by countries to achieve country-specific objectives for the early detection of public health events requiring rapid investigation and response are referred to as EWAR.*

Q3: What do you see as the goal of EWAR?

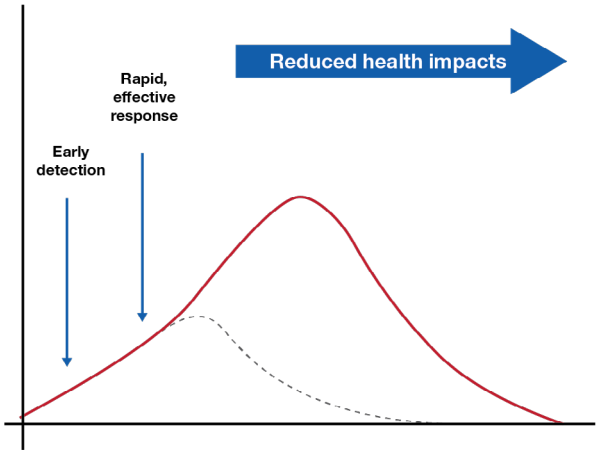
Model answer: *The general objective of EWAR is to rapidly detect and control acute public health events of any origin, with particular attention to nationally prioritized health risks. EWAR aims to increase sensitivity of detection, quality of risk assessment, timeliness, and effectiveness of the response to acute public health risks in order to minimize the negative health consequences to the affected population.*

Flattening the curve

Ask participants to locate figure 1 in their *Participant Guides*.

Flattening the curve is something we've all heard a lot lately…
It means taking action quickly to change an epidemic curve from the red line…to the dotted gray line, reducing the number of cases and the overall impact of the health event.

"flatten the curve..."

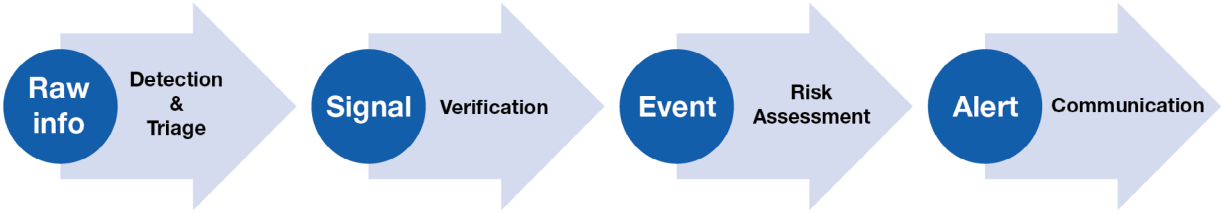


Make sure that the main takeaway is clear – the two lines represent hypothetical epi-curves for an outbreak. The grey dotted line represents the reduced health impacts enabled through early detection and rapid, effective response made possible by knowing sooner.

Q4: What is epidemic intelligence?

Model answer: *Epidemic intelligence is the systematic collection, analysis and communication of any information to detect, verify, assess, and investigate events and health risks with an early warning objective.*

Let's take a look at the figure on page 19 of your Participant Guide.



*As you can see, at each phase, the material/information is moved through different classifications starting with the **raw information** that needs to be reviewed and triaged. Once that data has been screened and triaged, or organized by its importance to public health, those pieces of information that are relevant are classified as **signals**, which require further verification.*

*The relevance of information will vary, depending on the scope of epidemic intelligence prioritized by an organization or community. If a verified signal is then classified as an **event**, a formal risk assessment may be conducted, and if appropriate, an **alert** is issued to trigger communication with affected partners.*

Epidemic intelligence is really a process that integrates information from all sources of public health surveillance.

Step 3: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement, and asking if they have any questions regarding the lecture. Clarify and answer any questions before moving to the next activity.

ACTIVITY 3.2

INDICATOR-BASED SURVEILLANCE AND EVENT-BASED SURVEILLANCE IN EPIDEMIC INTELLIGENCE

Describe the roles of IBS and EBS in epidemic intelligence

Identify key differences in IBS and EBS in epidemic intelligence

Lecture and small group exercise

15 minutes

Step 1: Review the content of this activity

Review the content for this activity prior to conducting the presentation. Ask participants to make notes in their *Participant Guides* as they listen to the lecture.

Step 2: Deliver lecture on IBS and EBS in epidemic intelligence

IBS and EBS in epidemic intelligence

IBS and EBS are complementary sources of information, and both contribute to the early warning function and epidemic intelligence process critical for a prompt and proportioned response.

The two are not necessarily separate surveillance systems. Both IBS and EBS present intrinsic characteristics in terms of processes and the types of data or information collected.

- *The **IBS** process is defined by public health professionals for their own specific programmatic use; data/indicators are developed accordingly and are collected and transmitted routinely (i.e. passively).*
- *Conversely, in most instances, both the content and format of the information collected by **EBS** is not initially designed for this use (that is, it is unstructured information). Some data might have been initially collected in a structured manner, but for a different audience, often with a non-human-health objective. One example might be veterinary data collected for an animal health purpose only.*

IHR and related guidance suggest that countries build capacities for early warning functions through the integration of systems for IBS and EBS.

EWAR can be thought of as the national-level strategy for collecting, processing, and analyzing information from diverse sources to support the rapid detection of public health events. IBS and EBS are the primary tools for achieving EWAR.

Step 3: Set up the small group discussion

Introduce the small group exercise by referring to the flipchart *Small group exercise: how EBS and IBS contribute to epidemic intelligence* (Appendix 2 in this guide, and page 20 of the *Participant Guides*).

Ask participants to join the same groups of four and provide each group with a flipchart and a marker. Each team should select a group member to take notes (recorder) and another to present the group's responses to the audience (presenter). Allow 10 minutes for participants to discuss and record responses to each of the questions below.

Read the following script then ask participants to capture their answers on the prepared flipchart:

Thinking about the differences between IBS and EBS, write down a few key points for each of the following topics:

- The ***processes*** by which IBS/EBS contribute to EI
- The characteristics of IBS/EBS ***data***
- Examples of IBS/EBS ***sources***

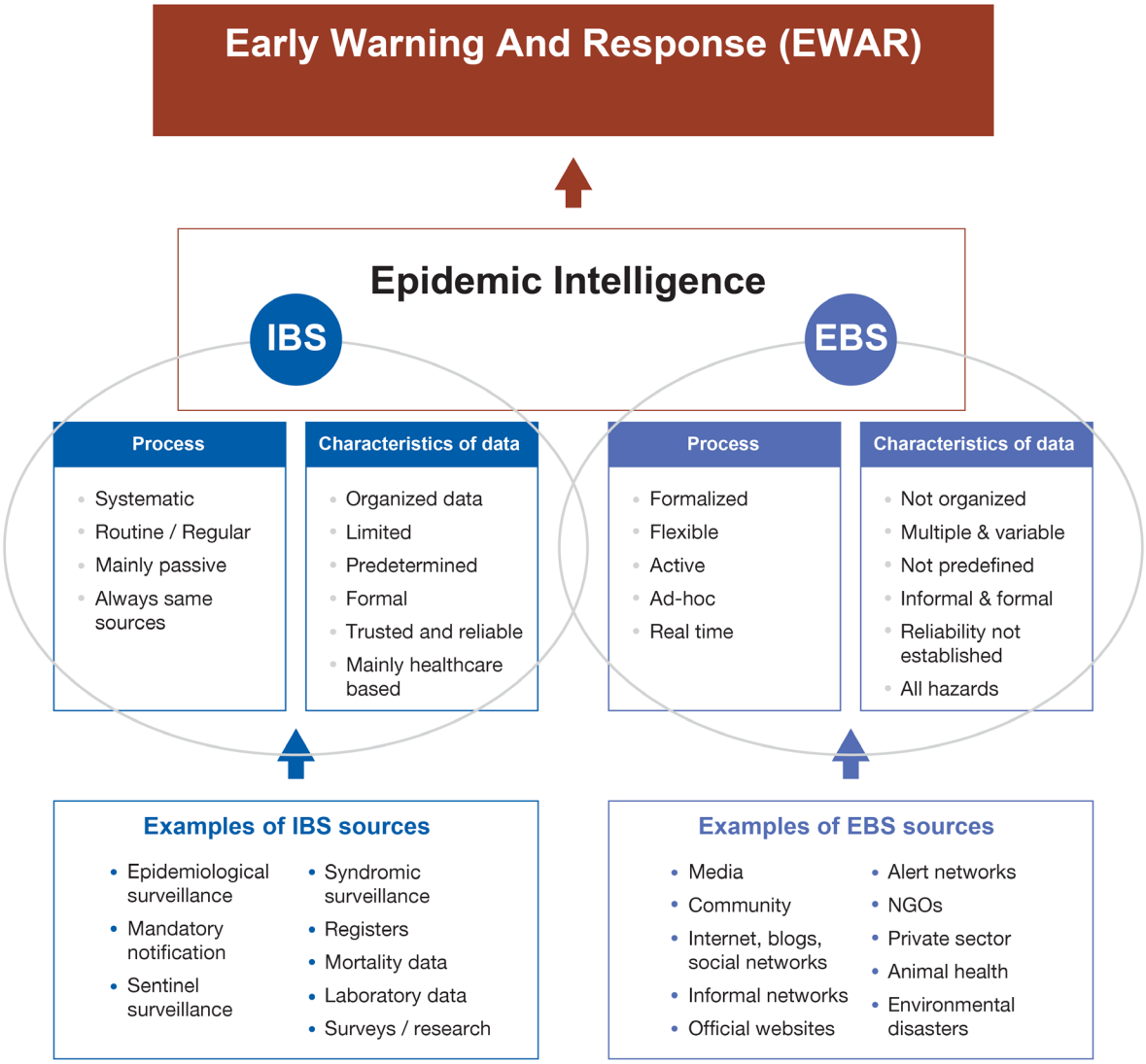
If you are delivering the training online, students can work on this activity individually (recording their responses in their *Participant Guide*), or collectively, as a whole group discussion.

Step 4: Facilitate group discussion

Monitor the timing of the exercise. After 10 minutes, ask the groups to direct their attention to the blank flipchart at the front of the room. Inform participants that they will now work collectively to populate the flipchart with their responses to the questions above.

Ask if there is a group that wants to present first. If no group volunteers, randomly select a group to start. Each group should present three to four points each. Once all groups have contributed, ask the broader group if there are any points missing, and add these to the flipchart.

Refer to the figure below to ensure key points for each flipchart section are covered.



Step 5: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement and asking if they have any questions regarding the lecture. Clarify and answer any questions before moving to the next activity.

ACTIVITY 3.3

EPIDEMIC INTELLIGENCE IN EARLY WARNING AND RESPONSE

Describe the roles of IBS and EBS in epidemic intelligence Describe the signal detection process Identify key differences in IBS and EBS in epidemic intelligence	Lecture	10 minutes

Step 1: Review the content of this activity

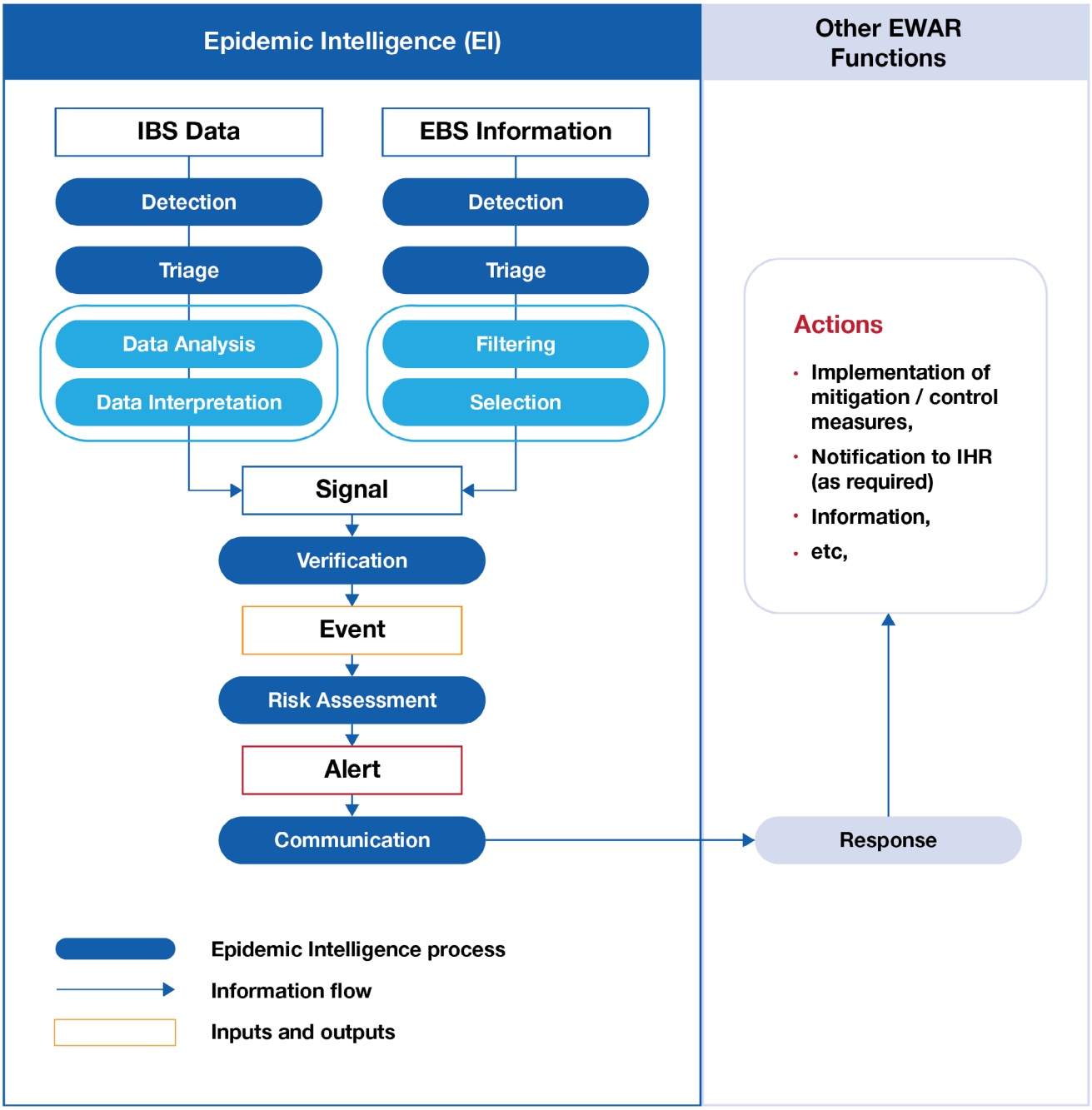
Review the content for this activity prior to conducting the presentation. Ask participants to make notes in their *Participant Guides* as they listen to the lecture.

Step 2: Introduce epidemic intelligence in EWAR

Read the description of epidemic intelligence in EWAR, below. Participants can follow along by viewing the corresponding figure on page 21 of their *Participant Guides*.

Epidemic intelligence within EWAR

Within EWAR, the collection of data (IBS and EBS) with the aim of detecting emerging health threats is part of a single process called epidemic intelligence. This process should be able to monitor all prioritized health events and acute public health risks within a given country, as well as events reported from other countries that have the potential to affect the country.


Epidemic Intelligence (EI)
Other EWAR Functions
IBS Data
EBS Information
Detection
Detection
Triage
Triage
Data Analysis
Data Interpretation
Filtering
Selection
Signal
Verification
Event
Risk Assessment
Alert
Communication
Response
Actions
Implementation of mitigation / control measures,
Notification to IHR (as required)
Information,
etc,
Epidemic Intelligence process
Information flow
Inputs and outputs

Step 3: Deliver lecture on signal detection

Signal detection within epidemic intelligence

Signals are composed of data and/or information considered by the EWAR system as representing a potential acute risk to human health.

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.

Signal detection process

Signals can be detected through any potential source (health or non-health, informal or official) including the media. Raw data and information (i.e., untreated and unverified) are first detected and triaged in order to retain only the information pertinent to early detection purposes (i.e., the signals). Once identified, signals must be verified. Once verified, a signal becomes an "event."

Differences in IBS and EBS signal detection

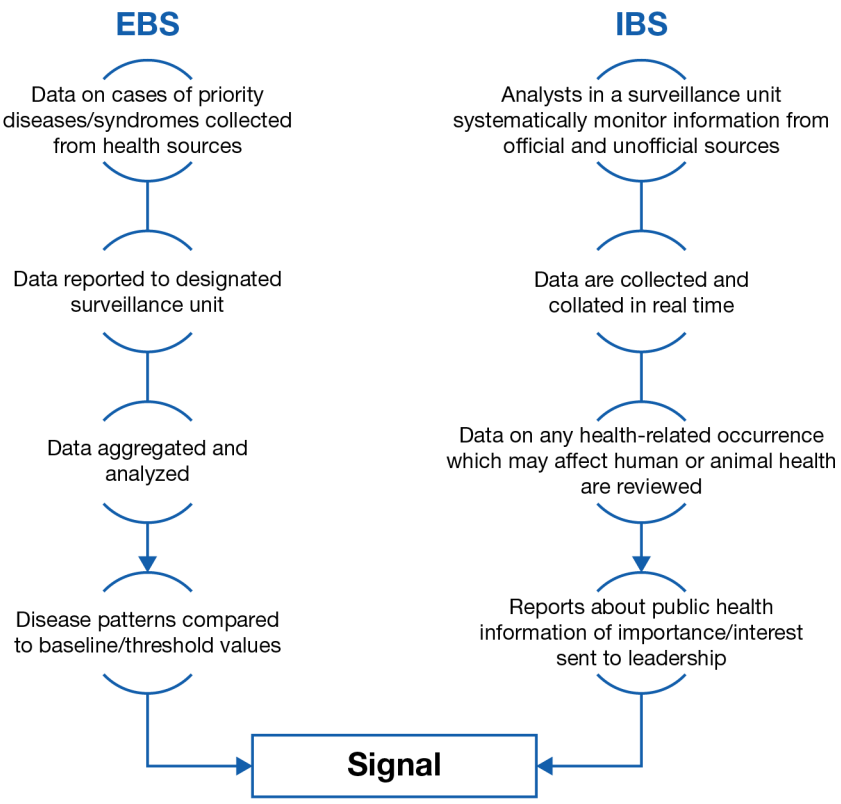
The steps in evaluating information depends on whether the source is IBS data or EBS information.

- For ***IBS***, the detection phase will consist of defining the type and the modality (such as format of collection or mode and frequency of transmission) of the surveillance data to be collected for early warning purposes.
- For ***EBS***, raw information is generally made up of information originating from formal and informal sources that have been collected by a number of mechanisms (i.e., direct communication, internet-based devices, hotlines and literature reviews) that will be defined according to a country's needs.

Ask participants to locate figure 4 in their *Participant Guides*.

The collection of data (IBS and EBS) with the aim of detecting emerging health threats is part of a single process called epidemic intelligence. This process should be able to monitor all prioritized health events and acute public health risks within a given country, as well as events reported from other countries and which have the potential to affect the country.

Epidemic Intelligence - Signal Detection



Characteristics of IBS data

*The collection of **IBS** data is a routine, regular process which is primarily passive. Data are collected according to established case definitions which are either disease-specific or syndromic. They may be collected as individual or aggregated data and originate from either exhaustive or sentinel systems.*

Data are analyzed in comparison with baseline values and thresholds to determine unusual disease patterns. IBS sources of information are mainly health-based (i.e., health-care structures, health professionals, laboratories), but may also include structured non-human health sources such as animal health data (e.g., for zoonoses), meteorological data, or entomological data when these are regularly collected and organized for human health purposes.

Characteristics of EBS data

In contrast, EBS is a system of organized and rapid information capture about potential disease events that pose a risk to public health. This system of risk assessment is particularly effective in detecting disease occurrences in countries that have weak surveillance and reporting.

Advantages of EBS over case-based surveillance

EBS has several advantages over case-based surveillance, because case-based surveillance:

- *Produces credible information but reporting is often delayed,*

- *Is designed for known diseases and diseases are often not reported until the etiology is known,*
- *Is not well-established in all countries, and*
- *Is limited to the health sector, whereas media and other types of open-source reports often originate from highly motivated entities, such as journalists, which can promptly provide information to open sources.*

Unlike IBS, EBS is not based on the routine monitoring of indicators and automated thresholds for action, but rather on the screening of all available information to detect any event happening in the community. These include:

- *Unusual diseases or deaths in humans or animals, and*
- *Unusual or clustering of cases or events/conditions in the community (including environmental conditions).*

Step 4: Wrap up the activity with key message

Prior to moving to the next activity, reinforce the key takeaway message below.

EBS and IBS are components of EWAR and epidemic intelligence, incorporated into the Integrated Disease Surveillance and Response strategy. EBS and IBS complement each other, albeit with separate roles and purposes.

ACTIVITY 3.4

HOW CAN EBS AND IBS BE USED IN YOUR COMMUNITY?

Describe the roles of IBS and EBS in epidemic intelligence

Small group exercise

15 minutes

Step 1: Set up the small group exercise

Introduce the small group exercise by referring to the prepared flipchart *Small group exercise - EBS and IBS in your community* (Appendix 3 of this guide) and ask participants to locate the corresponding handout on page 23 of their *Participant Guide*.

Inform participants that they will be divided into groups and will work to complete all four sections of the flipchart by answering a set of questions. Ask participants to go back to the same groups that were formed during the introductory icebreaker activity. Each group should be made up of at least four participants.

Give each group the prepared flipchart, instructions, and a marker. Each team should select a group member to take notes (recorder) and another to present the group's responses to the audience (presenter).

Step 2: Get participants to discuss and record answers to the questions

Ask participants the following questions and capture their answers in the prepared flipchart with four equally divided spaces:

- What is the purpose and importance of EBS?
- How could EBS be used in your community?
- What is the purpose and importance of IBS?
- How could IBS be used in your community?

Explain that this is a brainstorming exercise and active participation from every group member is important.

Step 3: Facilitate group presentations and feedback

Monitor the timing of the exercise. After 10 minutes, ask the groups to direct their attention to the larger group for the group presentations. Inform the groups that they will each have two minutes to present. Ask if there is a group that wants to present first. If no group volunteers, randomly select a group to start.

Ask participants to be mindful of the time and show respect towards each reporter by not engaging in side conversations. Summarize common points from the presentations by including input from each group on the flipchart.

Step 4: Wrap up session with key message

Prior to moving to the next session, reinforce the key takeaway message below.

Now that we have some ideas about what EBS and IBS are, why they are important, and how they can be applied to your community, we will discuss how to identify signals for priority diseases in Session 4

SESSION 4

IDENTIFYING SIGNALS FOR PRIORITY DISEASES

This session describes information sources for signal detection, methods for filtering and selecting information, and the national context for prioritization of disease types for EBS.

Learning Objectives

By the end of this session, participants will be able to:

- Describe different types of information sources that can be used for signal detection,
- Explain the data collection and verification process,
- Distinguish formal from informal sources of EBS information, and
- Describe methods for filtering and selecting information.

Materials

Facilitator

- Blank flipchart
- Markers

Participants

- *Participant Guide* pages 25-32

Total time: 60 minutes

ACTIVITY 4.1

SOURCES OF EBS INFORMATION

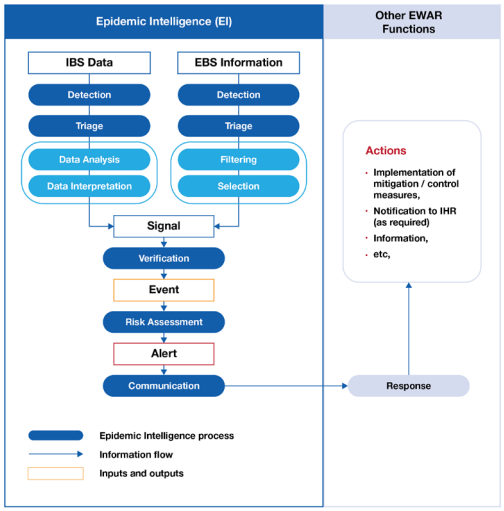
Describe different types of information sources that can be used for signal detection Explain the data collection and verification process	Lecture and group discussion	20 minutes

Step 1: Review the content of this activity

Review the content for this activity prior to conducting the presentation. Ask participants to make notes in their *Participant Guides* as they listen to the lecture.

Step 2: Introduce the context for signal detection

Before we begin this session, let's review the EWAR diagram. If you recall, this diagram depicts the collection of IBS and EBS data with the aim of detecting emerging health threats through a process called epidemic intelligence.



Signals are composed of data and/or information considered by the EWAR system as representing a potential acute risk to human health. When a signal has been verified, a signal becomes an "event."

In this topic we will be discussing the detection of signals for priority diseases.

Step 3: Engage participants to define signals and signal detection

On a blank flipchart, write the following two headings across the top and separate with a line down the middle:

What do signals consist of?	How are signals detected?

Ask for a volunteer to answer each question. Write their answers on the prepared flipchart, then ask the group if they have anything else to add. Fill in any gaps based on the correct answers below:

What do signals consist of?	How are signals detected?
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 can be detected through any potential source (health or non-health, informal or official) including the media.* *Raw data and information (i.e., untreated and unverified) are first detected and triaged in order to retain only the data pertinent to early detection purposes (i.e. the signals).*

If you are delivering the training online, facilitate a whole group discussion to obtain the answers to the two questions above.

Step 4: Deliver lecture on sources of EBS information

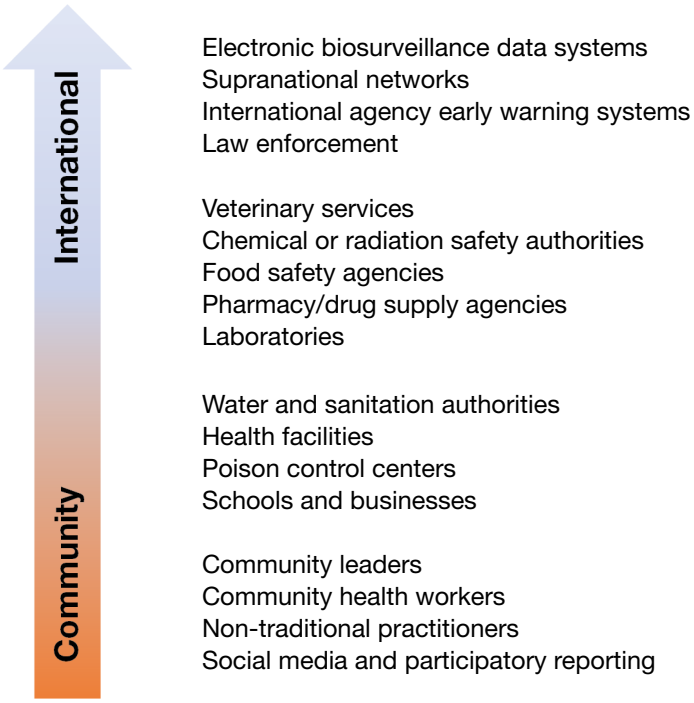
Where does EBS information come from?

Read the following script, then ask participants to answer the two questions that follow. Ask for a few examples for each question, and fill in any remaining gaps verbally based on the sources listed in the graphic that follows.

EBS requires a multisectoral approach and should rely on sources of information beyond traditional health system sources. While these may be directly linked to human health, data can also be provided by the non-human health sector, local communities, media, and international sources. EBS information may come from numerous sources across sectors and levels.

Thinking of your own work, can you think of any examples of EBS sources:

- At the national level?
- What about at the international level?

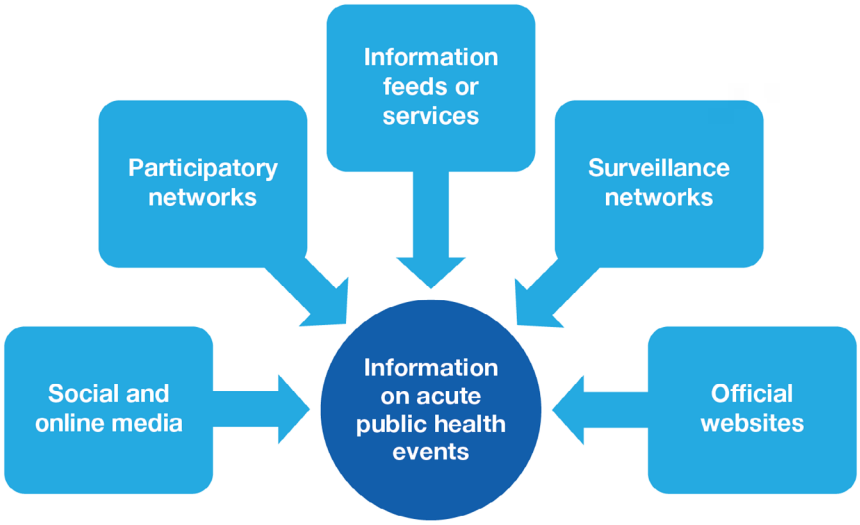


Ask participants to locate figure 5 in their *Participant Guides*.

This figure depicts examples of these sources, from those closest to the community level, at the base of the arrow, to examples of international sources, at the top of the arrow.

Online sources of information for EBS

Various types of electronic or online sources can provide information for EBS:



The increasing interconnection of individual networks operated by government, industry, academia, and private parties, accompanied by the increasing share of the world's population who access the internet, has given rise to a growing number of online outlets that can be used as sources of information for EBS.

Types of electronic or online information that may serve as sources of EBS signals include:

- *Official websites,*
- *Surveillance networks,*
- *Information feeds or services,*
- *Participatory networks, and*
- *Social and online media.*

Data collection and verification process

The nature of data to be collected will influence the process of collection and verification. For example, the arrangement for collecting information from the local press is likely to be very different from that used to collect information from local community or from other ministries. It will also be influenced by the resources available in the countries. For example, attempting to monitor local press via the internet in a country where access to the internet is limited will be of little use. Both the quality and the quantity of information available online must be considered in developing the national strategy for EWAR, and for prioritizing sources for EBS.

Step 5: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement, and asking if they have any questions regarding the lecture. Clarify and answer any questions before moving to the next activity.

ACTIVITY 4.2

FORMAL AND INFORMAL SOURCES OF EBS INFORMATION

Distinguish formal from informal sources of EBS information

Group discussion and lecture

20 minutes

Step 1: Introduce the context for the exercise

Potential sources of EBS signals include both official and unofficial sources:

- ***Official** (or formal) sources are any governmental, subnational, national or international institution accredited to provide information, and*
- ***Unofficial** (or informal) sources are those that are directly involved in an event as either service providers or members of the affected population making inquiries or sharing information via unstructured channels.*

We will now consider examples of both official and unofficial sources.

Step 2: Reflect on the sources of EBS information

Ask participants to individually consider the following questions and capture their answers on page 28 of their *Participant Guides*. Explain that participants should spend 10 minutes (2-3 minutes for each question) brainstorming and writing down their answers.

- *Q1: What are some examples of formal sources of EBS information?*
- *Q2: What are some examples of informal sources of EBS information?*
- *Q3: Can informal sources be useful? Why?*

While participants are answering the questions, write the questions on a blank piece of flipchart paper.

Once the time has elapsed, ask for volunteers to answer the questions. Ask for one volunteer for each question, and once all questions have been answered, ask if any participants would like to add to the answers. Write the answers down on the flipchart as they are presented.

If you are delivering the training online, present the activity as directed but rather than flipchart, this knowledge check could be delivered via a moblile, online platform such as Poll Everywhere. After all questions have been addressed, present a quick snapshot of key points back to the students before moving on to the next section.

Step 3: Present the model answers

Q1: Model answer: What are some examples of official or formal sources of EBS information?

Ask participants to locate figure 7 in their Participant Guides.

*Examples of **non-human health sources** found within the country might include: veterinary services, food safety agencies, environmental surveillance (such as water supply companies and sanitation, or meteorological and air quality agencies), chemical and radiation safety authorities, and police, custom and fraud control.*

***International sources** include WHO, the Food and Agriculture Organization of the United Nations, the World Organization for Animal Health (OIE), and the International Atomic Energy Agency (IAEA), all of which disseminate information to Member States via a mix of open and closed electronic platforms.*

Example of a formal source of EBS information – WHO Disease Outbreak News

Ask participants to locate figure 7 in their Participant Guides.

This example from WHO's Disease Outbreak News (DON) shows the types of information and format typical of WHO official website reports. The reports include a description of the event, measures taken to date, and WHO's risk assessment.

World Health Organization

Health Topics | Countries | Newsroom | Emergencies

Home / Disease Outbreak News / Item / Novel Coronavirus – Japan

COVID-19 - Japan - (ex-China)

16 January 2020

The Japanese Ministry of Health, Labour and Welfare, today informed the World Health Organization (WHO) of a confirmed case of a novel coronavirus (2019-nCoV) in a person who travelled to Wuhan, China. This is the second confirmed case of 2019-nCoV that has been detected outside of China, following confirmation of a case in Thailand on 13 January. Considering global travel patterns, additional cases in other countries are likely.

Coronaviruses are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome. 2019-nCoV is a new strain that has not been previously identified in humans.

Much remains to be understood about the new coronavirus, which was first identified in China earlier this month. Not enough is known about 2019-nCoV to draw definitive conclusions about how it is transmitted, clinical features of disease, or the extent to which it has spread. The source also remains unknown.

Q2: Model answer: What are some examples of unofficial or informal sources of EBS information?

Ask participants to locate figure 8 in their Participant Guides.

This graphic illustrates a range of informal sources of EBS information.

Informal sources also include the communications channels – social media (such as Facebook, Twitter, Weibo, Instagram), traditional media (newspapers and radio), and even privately mediated electronic data networks – that collect, amplify, and circulate information from the local to the international levels.

Q3: Model answer: Can informal sources of EBS information be useful?

The usefulness of unofficial and informal sources may vary. Rumors may be unfounded, duplicative, or too vague to be analyzed for purposes of early warning, but unofficial and informal sources may also provide an early alert of acute public health events before they are detected by official surveillance activities.

Step 4: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement, and asking if they have any questions regarding the lecture. Clarify and answer any questions before moving to the next activity.

ACTIVITY 4.3

HOW DO YOU RECORD SIGNALS?

Describe methods for filtering and selecting information

Group discussion and lecture

20 minutes

Step 1: Review the content of the activity

Review the content for this activity prior to conducting the presentation. Ask participants to make notes in their *Participant Guides* as they listen to the lecture.

Step 2: Group discussion on triage in EBS

Open the lecture by engaging participants in a discussion on triage in EBS. Ask participants to again refer to their EWAR diagram on page 21. Read the following statement, then give participants ten minutes to answer the questions in their workbooks. At the end of ten minutes, ask for volunteers to offer the answer to each question before providing the model answers.

> *We will now consider the two steps that EBS information triage can be divided into: filtering and selection. Open your Participant Guides to page 30 and answer the questions in the space provided. In ten minutes, we will review your answers as a group.*

Q1: What is the goal of information triage?

- ***Model answer:*** *The goal of information triage is to minimize the work burden created by unnecessary verification and investigation of irrelevant signals, and to ensure that genuine events will elicit an effective response.*

Q2: In the context of triage for EBS, how would you define filtering?

- ***Model answer:*** *Filtering is the process of screening out duplicates and information which is not relevant for EWAR. It includes identifying and removing duplicates of the same event by the same source, and identifying and discarding information not relevant to EWAR, such as a generic review of a disease.*

Q3: In the context of triage for EBS, how would you define selection?

- ***Model answer:*** *Selection is the process of sorting out information according to national priority criteria. It involves selecting information that is relevant for early warning, which will depend on the objectives of that EBS unit.*

Emphasize the key point: *Triage of EBS raw inputs helps reduce information that requires follow-up.*

Step 3: Present lecture on filtering and selection

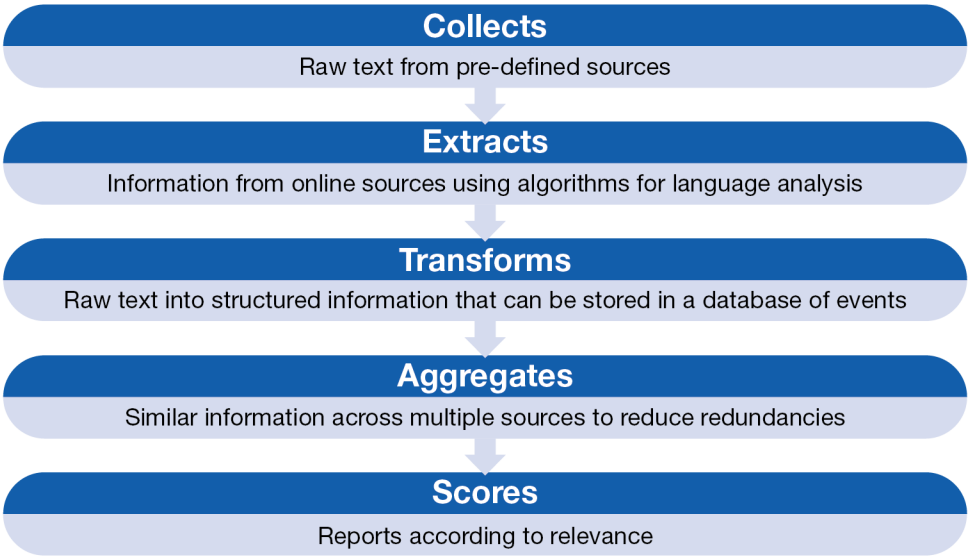
After the question-and-answer exercise, go over the characteristics of filtering and selection in greater detail by presenting the lecture below. Inform participants that they can follow along in their *Participant Guides* (page 31), where they can view figures that help visualize the lecture content.

Filtering

As discussed, filtering refers to screening out duplicates and irrelevant information. Filtering should be designed to ensure adequate sensitivity; in case of doubt, the signal should be sent to the next step (selection).

One example of filtering consists of training secretarial staff to read local and national news and to select relevant health-related articles. These articles will then be sent to the next step, where persons trained in epidemiology can proceed with selection.

The general process of automated analysis using scrapers and aggregators is depicted in figure 10 of your Participant Guide. Most aggregators use similar sources, including other news aggregators and ProMED-Mail. A Source List template with selected examples of media aggregators can be found in Appendix 4 of your Participant Guide.



Ask participants to locate figure 11 in their *Participant Guides*.

Figure 11 shows some examples of IEBS systems.

System Name		Country	No. Languages	Moderated
EIOS		Global	>50	No
GPHIN		Canada	9	Yes
HealthMap		US	7	No
MedISys		EU	26	No
ProMED		US	4	Yes

The process of selection: the national context of priority public health events for EBS

Now let's consider the process of selection. The national EWAR surveillance objectives will depend on the characteristics of the disease or hazard, such as:

- Diseases (e.g. measles),
- Syndromes (e.g. hemorrhagic fevers),
- Hazards (e.g. contamination of drinking water source), and
- Unexpected/unusual events (e.g. unexplained mortality).

The definition of priority events for EBS should take place in the context of a larger national planning process for EWAR, IBS and EBS, and should take into consideration country specificities, the international context, the characteristics of health care, the characteristics of the surveillance systems, and its performances.

The objectives will also depend on the characteristics of the disease or hazard, such as:

- Attack rate,
- Morbidity and mortality,
- Environment,
- Mode of transmission, including but not limited to:
  - Person-to-person,
  - Point source,
  - Toxin exposure, and
  - Public health interventions required to mitigate spread.

For each selected health risk, EWAR's surveillance objectives need to be specified based on the country's context and subsequent signal selection.

Step 4: Wrap up session with key message

Prior to moving to the next session, reinforce the key takeaway message below.

No country, regardless of resources, can monitor every potential source of information for signals of public health events. Therefore, a country-specific list of priority diseases for EBS should be established.

SESSION 5

SIGNAL VERIFICATION AND RAPID EVENT ASSESSMENT

In this session, we will review key steps in the verification process as well as critical outbreak characteristics to consider while conducting a rapid event assessment.

Learning Objectives

By the end of this session, participants will be able to:

- Describe under what conditions verification is required,
- Describe the key steps associated with the verification process,
- Explain the role of SMEs and social media in EBS,
- Explain the IHR Annex 2 and international reporting requirements, and
- Describe how EBS analysts can conduct high-level rapid event assessments.

Materials

Facilitator

- Blank flipchart paper
- Markers

Participants

- *Participant Guide* pages 33-39

Total time: 60 minutes

ACTIVITY 5.1

SIGNAL VERIFICATION

Describe under what conditions verification is required

Describe the key steps associated with the verification process

Explain the role of SMEs and social media in EBS

Interactive lecture

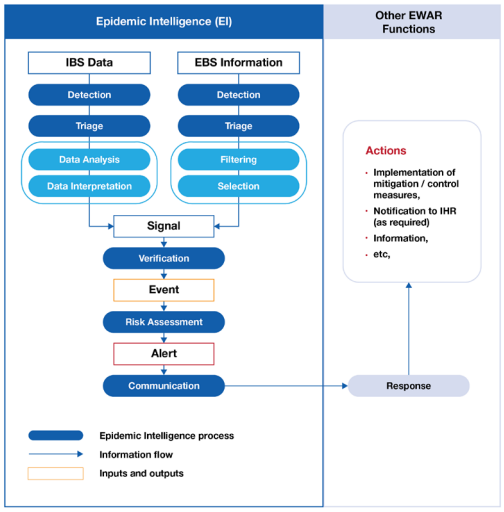
30 minutes

Step 1: Review the content of this activity

Review the content for the interactive lecture prior to conducting the presentation. Ask participants to make notes in their *Participant Guides* as they listen to the lecture.

Step 2: Introduce verification and risk assessment

Ask participants to locate figure 12 in their *Participant Guides*.



Once again, we return to our EWAR diagram. As you now know, this diagram depicts the collection of data (IBS and EBS) with the aim of detecting emerging health threats. This is part of a single process called epidemic intelligence. As covered in the last topic, we now know that signals are composed of data and/or information considered by the EWAR system as representing a ***potential*** *acute risk to human health.*

In this session, we will discuss the next steps along the epidemic intelligence cascade – verification and risk assessment. Once signals have been identified, the information must then be verified. Once a signal is verified it becomes an "event." Events must continuously be assessed to determine if the epidemiological situation is worsening or improving in order to inform appropriate response measures. In this topic, we will review key steps in the verification process as well as critical outbreak characteristics to consider while conducting a rapid event assessment.

Step 3: Present the interactive lecture on the verification process

Ask participants to go back to the same groups that were formed during the introductory icebreaker activity. Give each group a few pieces of blank flipchart paper and a marker. Each team should select a group member to take notes (recorder) and another to present the group's responses to the audience (presenter).

Read the following statement, then ask participants to write their answers on the blank paper provided. Allow five minutes for groups to make notes, then engage participants in a discussion on the steps in the verification process. Ask for one volunteer for each step, and write the correct answers on a blank flipchart at the front of the room.

If you are delivering the training online, ask participants to record their answers in their *Participant Guides*. After five minutes, ask for one volunteer for each step and discuss their answers and the model answer as a group.

Verification is an essential step of the epidemic intelligence process that consists of confirming the reality (authenticity and conformity) of the signal and its characteristics. What are the four steps that should actively be taken in the verification process?

Model answer: The key steps in the verification process are as follows.

- First determine the official or unofficial source of the information.
- Next, search for and collect additional corroborating information if possible.
- Third, actively cross-check the validity of the information using reliable sources, with input from SMEs.
- Finally, analyze the factors that could affect the spread of the disease, individual severity, diagnostic characteristics, and treatment options in order to determine the signal's public health importance.

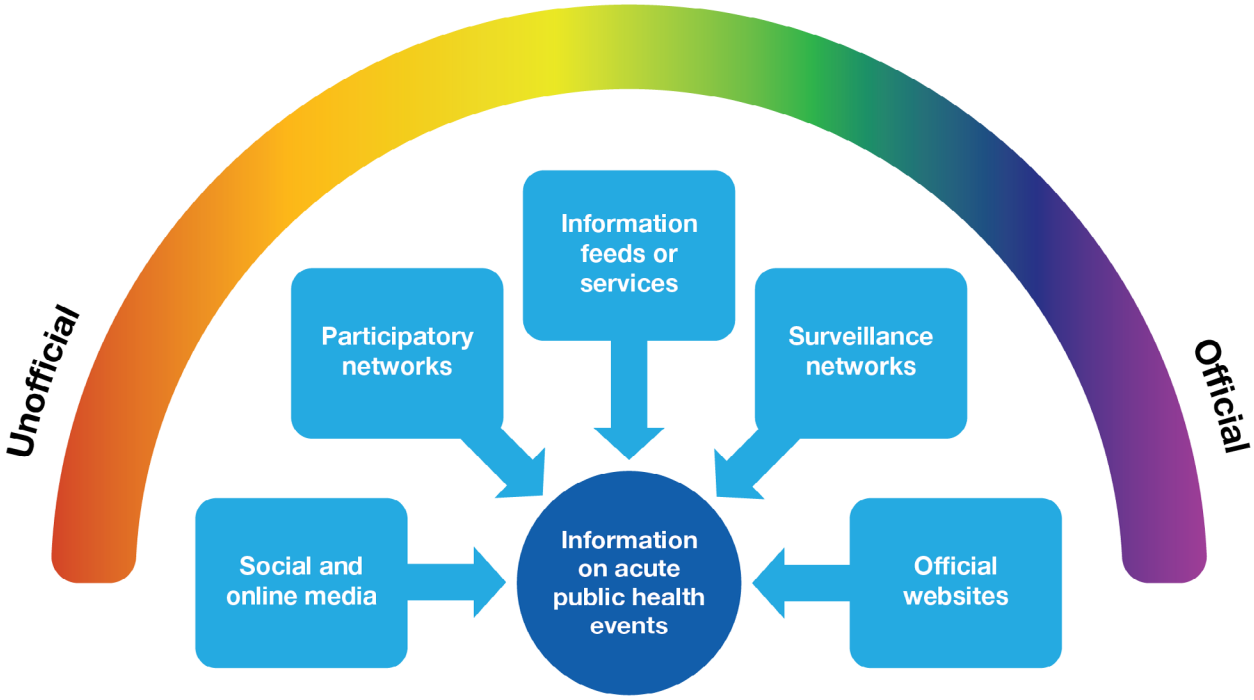
Once you have gone over the steps in the verification process above, ask participants to remain in their groups while you present the interactive lecture on each of these steps. Inform them that they will continue to brainstorm within their groups throughout this activity. Ask participants to select a new group member to take notes (recorder) and another to present the group's responses to the audience (presenter) for each question.

Verification process steps

Now let's look at each of these steps in greater detail.

First, consider the information source

Ask participants to locate figure 13 in their *Participant Guides.*



The information collected for EBS is diverse in nature and originates from multiple, often not-predetermined sources both official and unofficial, including rumors reported by the media or ad hoc reports from informal networks. The information collection process is mainly active and carried out through a systematic framework specifically established for EBS purposes.

Challenges with social media

Read the following statement, then ask participants to write their answers on the blank paper provided. Allow five minutes for groups to make notes, then engage participants in a discussion on the challenges with using social media to identify disease signals. Ask for one answer from each group, and write the correct answers (as per the model answer, below) on a blank flipchart at the front of the room. Discuss any incorrect answers and fill in any gaps as you go.

If you are delivering the training online, ask participants to record their answers in their *Participant Guides*. After five minutes, ask for volunteers to share one answer each until all of the points have been covered. Discuss their answers and the model answer as a group and fill in any gaps as you go.

Let's now consider the role of social media in identifying disease signals. Can you think of any challenges or issues with using social media to identify disease signals?

Model answer: *There are several issues with using social media to identify disease signals.*

- *Social media can generate a large number of* ***false positives and false negatives*** *due to the low ratio of signal to noise during an event, as demonstrated during the 2014 Ebola virus disease outbreak in West Africa.*
- *Short articles and social media posts may* ***lack sufficient contextual information*** *to understand the scope and relevance of the event being captured.*
- *The penetration of internet infrastructure and access of the population to smart phones affect the ability of internet searches to capture relevant information. This is known as representativeness.* ***Where access is low, signals may not be represented accurately.***
- *While monitoring of social media helped identify an outbreak in a new area of Nigeria ahead of official announcements, repeated tweeting and re-tweeting, along with* ***social "chatter,"*** *made identifying signals of concern difficult.*

Second, search for and collect additional corroborating information

Read the following statement, then ask participants to write their answers on the blank paper provided. Allow five minutes for groups to make notes, then engage participants in a discussion on searching for and collecting additional corroborating information. Ask for one answer from each group, and write the correct answers (as per the model answer, below) on a blank flipchart at the front of the room. Discuss any incorrect answers and fill in any gaps as you go.

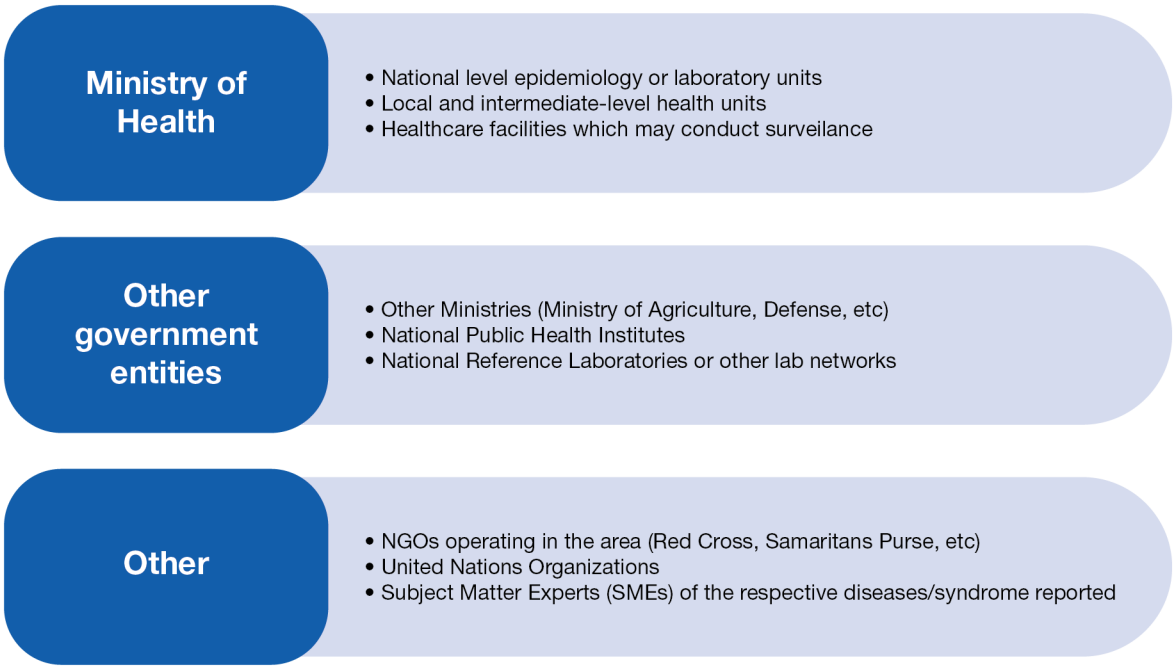
If you are delivering the training online, ask participants to record their answers in their *Participant Guides*. After five minutes, ask for volunteers to share one answer each until all of the points have been covered. Discuss their answers and the model answer as a group and fill in any gaps as you go.

Model answer: *The second step of the verification process involves searching for and collecting corroborating information. This can be done by:*

- *Contacting the original source(s) of information,*
- *Contacting the local authorities,*
- *Reviewing other unofficial sources,*
- *Viewing social media channels,*
- *Viewing blog posts, and*
- *Other tips that have come through call centers/hotlines.*

Third, cross-check information with other official sources/experts

Ask participants to locate figure 14 in their *Participant Guides.*



The EBS unit should develop a list of official points of contact for event verification and to characterize overlapping sources of information, which is also useful for collecting additional information in order to corroborate an event. These contacts can include individuals from the Ministry of Health, other Ministries and government entities, or NGOs, UN organizations, or subject matter experts (SMEs).

The EBS Unit should ask partners across sectors and levels to identify technical resource persons or SMEs who will serve as main points of contact for EWAR on a 24/7 basis.

Name of designated office	Name of responsible individual	Email address Phone numbers Fax numbers

SMEs

Read the following statement, then ask participants to write their answers in the blank space on page 36 of their *Participant Guides*. Allow five minutes for groups to make notes, then engage participants in a discussion on the challenges of using social media to identify disease signals. Ask for one answer from each group, and write the correct answers (as per the model answer, below) on a blank flipchart at the front of the room. Discuss any incorrect answers and fill in any gaps as you go.

If you are delivering the training online, ask participants to record their answers in their *Participant Guides*. After five minutes, ask for volunteers to share one answer each until all of the points have been covered. Discuss their answers and the model answer as a group and fill in any gaps as you go.

SMEs have an important role in EBS and are necessary for a number of reasons. In your same small groups, write a list of areas that SMEs can assist with EBS.

Model answer: *Some of the areas that SME's can be involved in EBS, including:*

- *Assisting in the interpretation of reports concerning outbreaks,*
- *Assisting in the interpretation of new findings during an outbreak,*
- *Assisting in providing historical context with regard to a pathogen, outbreak, or country,*
- *Assisting in the confirmation of a diagnosis,*
- *Participating in outbreak-related conference calls related to the area of the SME,*
- *Assisting in clearing products written by EBS analysts, and*
- *Participating in field responses at request for assistance in outbreaks.*

Reporting information

Practical information for contacting EWAR officers and reporting information on a 24/7 basis should be widely distributed among all partners. This should include a list of phone numbers, fax, email, or other means used for communication with EWAR officers at each level.

Similarly, EWAR should ask each partner at the national and intermediate level, within and outside the Ministry of Health (MoH), to identify technical resource persons as the main point of contact for EWAR. These resource persons are likely to be epidemiologists in charge of surveillance, officers in charge of specific control programs, microbiologists from the public health laboratories, and veterinarians from the Ministry of Agriculture (MoA).

Fourth, begin to characterize the potential event with the information known

Oftentimes, media reports may describe "mystery diseases" or "unknown illnesses" at the onset of the outbreak. As more information is learned, it is important to continuously assess the situation to determine if the event is improving or worsening.

Step 4: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement, and asking if they have any questions regarding the lecture. Clarify and answer any questions before moving to the next activity.

ACTIVITY 5.2

RISK ASSESSMENT

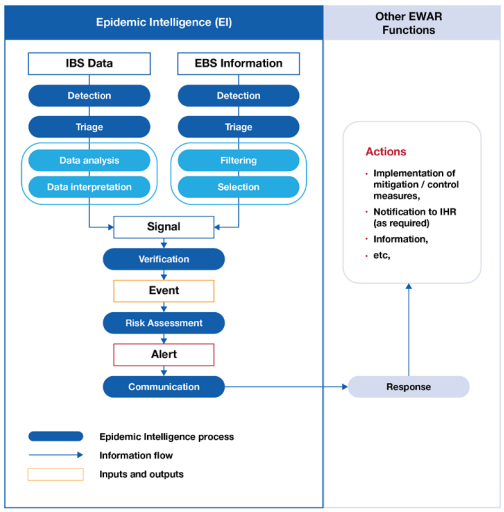
Describe the key steps associated with the verification process Explain the IHR Annex 2 and international reporting requirements Describe how EBS analysts can conduct high-level rapid event assessments	Lecture	20 minutes

Step 1: Review the content of this activity

Start this activity with a quick question and answer session on the who, when, what, and how of signal reporting. Ask participants the following questions:

Step 2: Deliver lecture on the risk assessment process

Ask participants to locate figure 15 in their *Participant Guides.* Point out the position of the risk assessment step, which you will now be introducing.



Risk assessment is not just a single step in the context of epidemic intelligence, but a process that is continually repeated from the first detection of a signal through to the response to a public health event.

The level of risk, as well as the information that is available, may change over time. WHO has recommended that the initial risk assessment be carried out within 48 hours of detection of a signal, and then repeated as new information becomes available.

By continuously updating the risk assessment, decision makers can focus resources on learning more about the event, alerting stakeholders in all relevant sectors, implementing appropriate prevention and control measures, and developing a communications strategy for partners and for the public.

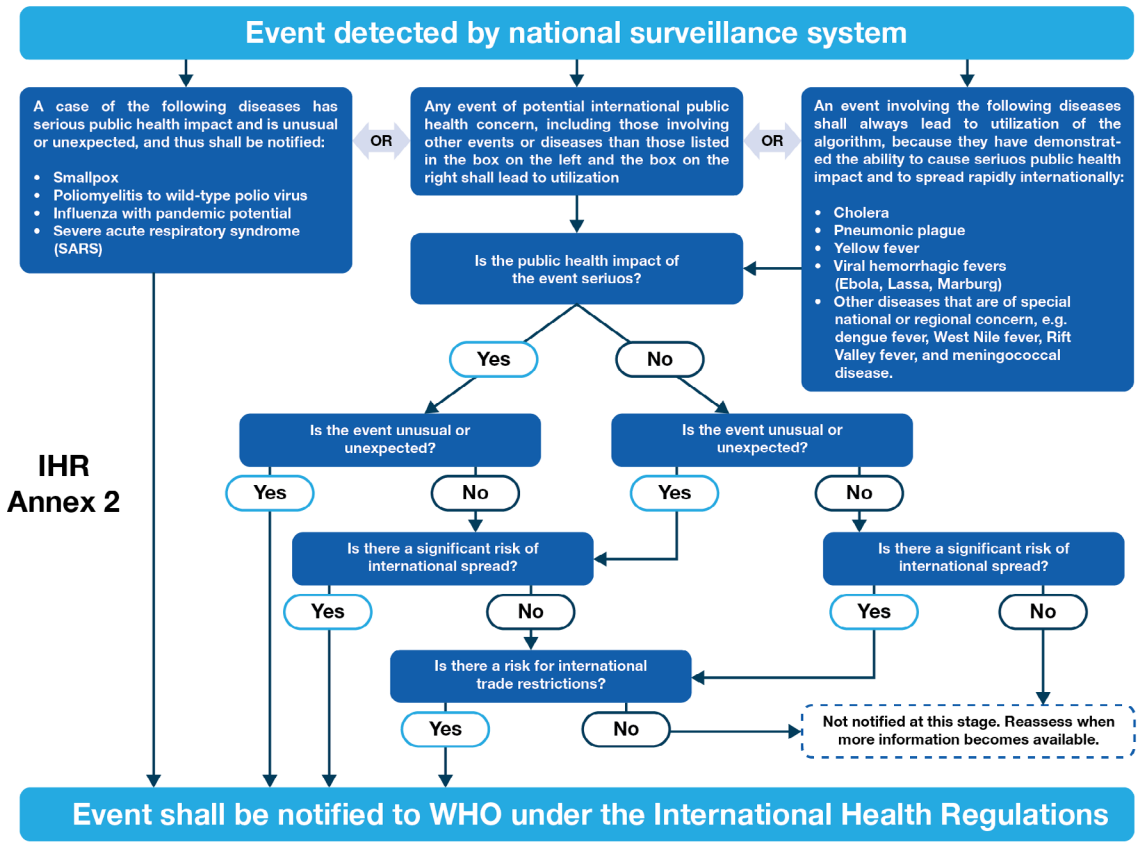
Defining risk assessment

Ask for a volunteer to read out loud the definition of risk assessment from page 37 of their Participant Guide.

***Risk assessment** is an essential element of EBS for EWAR. Risk assessment in this context is defined by WHO as the systematic and continuous process of assessing and documenting information to provide the basis for taking action to manage and reduce the negative consequences of an acute public health event.*

Defining risk assessment

Ask for a volunteer to read out loud the definition of risk assessment from page 37 of their *Participant Guide.*



Just as the IHR define the general obligations for surveillance, the IHR provide a timeline for verification of rumors that reach the national level and may indicate a potential public health emergency of international concern (PHEIC). Any rumor that reaches the surveillance officer and is indicative of a public health emergency of international concern must be verified within 24 hours of its notification, according to the IHR decision matrix in Annex 2.

Characterizing the type of event

Health events can be organized into three categories:

*1) A **Health Event of International Importance** is a verified disease outbreak or a health threat that meets one of the following criteria (IHR Annex 2):*

- *Is one of the following: SARS, polio (wild-type), smallpox or a new subtype of influenza,*
- *Presents a serious threat to the public health,*
- *Is an unusual or unexpected event,*
- *Poses a significant risk for international spread that potentially requires international intervention, or*
- *Potentially causes restrictions of trade or travel.*

*2) A **Health Event Under Investigation** is a disease outbreak or a health threat that potentially meets one of the above criteria, but currently is not yet verified.*

*3) A **Health Event for Information** is a description of a verified health event that does not meet one of the above criteria but is of interest to the public health community.*

Assessing risk level of the event: Geoscope and public health impact

There are two ways to assess the risk level of an event.

*1) **Geographic scope** refers to the observed geographic distribution and rapidity of spread for an outbreak and is categorized as follows:*

- ***High events** affecting several multi-national regions with evidence of continuing spread,*
- ***Moderate events** affecting a national, or bordering multi-national region, with evidence of continuing spread, and*
- ***Low events** limited to sub-national, local areas.*

*2) **Public health impact** refers to the actual or potential severity of an illness, ease of transmission, public fear, or economic affects and is categorized as follows:*

- ***High agent** that is (or potentially is) highly pathogenic, highly transmittable, new or emerging, or has significant potential to disrupt travel/trade, and*
- ***Moderate agent** that has low to moderate potential to cause morbidity /mortality, transmit efficiently, or to disrupt travel or trade.*

Risk assessment: a team effort

Risk assessment is performed by the EBS unit with input from SMEs. The process of risk assessment on behalf of EBS analysts is:

- *routine, oftentimes daily,*
- *well-coordinated with internal and external input, and*
- *consistent in its methodology.*

Step 3: Wrap up session with key message

Prior to moving to the next session, reinforce the key takeaway message in the box below.

WHO recommends that the EBS/EWAR analyst team (with assistance from SMEs where needed) organize daily briefings to examine new signals and new information on ongoing events. Through these daily meetings, the team can use incoming information to conduct risk assessments, and coordinate decisions on reporting and recommendations for the management of acute public health events. The risk assessment should be updated as needed (which may be daily).

SESSION 6

REGISTRATION AND REPORTING OF EVENTS

This session focuses on the next step along the epidemic intelligence cascade – communication.

Learning Objectives

By the end of this session, participants will be able to:

- Define the objectives and process of event registration,
- Identify health events that require immediate reporting,
- Differentiate between information for early warning vs information for health communications purposes,
- Describe key reporting products, and
- Define key data elements and outbreak metrics to be captured by EBS event management systems.

Materials

Facilitator

- Small group exercise – Differentiating information: EBS or public health? (Appendix 5 of this guide)
- Individual exercise: frequency of reporting (Appendix 6 of this guide)
- Individual exercise: EBS reports (Appendix 7 of this guide)
- Blank flipchart paper
- Markers

Participants

- *Participant Guide* pages 40-50

Total time: 75 minutes

ACTIVITY 6.1

PULSE CHECK

Recap first day of training

Group discussion

5 minutes

Step 1: Facilitate group discussion

Open the first session of the day by asking students the four questions, below. The aim of this activity is to provide a friendly start to the second day of training, and to create an opportunity to answer any questions around the content from the first day of training.

Ask the questions consecutively, and allow a few volunteers to answer each question before moving on.

- *How are you feeling today?*
- *What is one interesting thing that you learned yesterday?*
- *What topics from yesterday would you like to learn more about?*
- *What are you looking forward to learning about today?*

If you are delivering the training online, conduct this exercise as a whole group discussion, as described.

ACTIVITY 6.2

KEY INFORMANT ENGAGEMENT

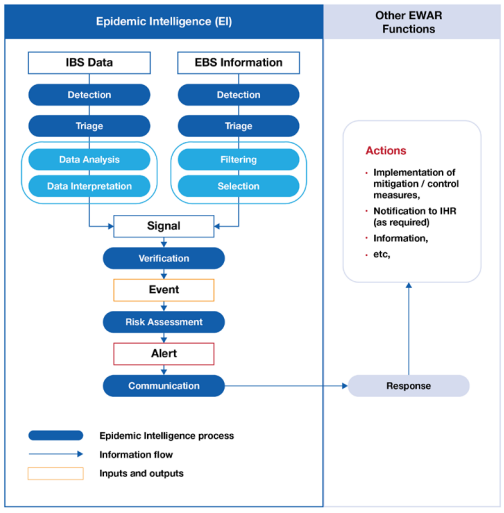
Differentiate between information for early warning vs information for health communications purposes	Lecture and small group exercise	15 minutes

Step 1: Review the content of this activity

Review the content for this activity prior to conducting the presentation. Ask participants to make notes in their *Participant Guides* as they listen to the lecture.

Step 2: Deliver lecture on the role of communication in EBS

Ask participants to locate figure 17 in their *Participant Guides*.



Here again, we return to our EWAR diagram. As you now know, this diagram depicts the collection of data (IBS and EBS) with the aim of detecting emerging health threats which is part of a single process called epidemic intelligence. As covered in the last two topics, we now know that signals are composed of data and/or information considered by the EWAR system as representing a ***potential*** *acute risk to human health.*

In the previous section, we reviewed the process of verification and risk assessment. Remember that once signals have been identified, the information must then be verified. Once a signal is verified it becomes an "event." In the last topic we reviewed key steps in the verification process as well as critical outbreak characteristics to consider while conducting a rapid event assessment.

In this topic, we will discuss the next steps along the epidemic intelligence cascade - communication. It is essential for EBS analysts to document, or register, event information so that events can be effectively tracked over time. It is also essential to communicate outbreak information to key stakeholders to keep them informed of the public health event as it evolves. In this topic we will discuss key data elements to capture when registering events. We will also discuss the importance of an event management system for storing event information. Finally, we will review different formats for epidemic intelligence reporting, including key EBS products such as daily situation reports, maps, dashboards, and other data visualizations.

Step 3: Set up the small group exercise

Part A: Differentiating information for EBS from information for public health/ risk communication

Introduce the small group exercise by reading the following statement.

It is critical to define what will qualify as an "EBS event" to be targeted and captured as part of the EBS process. Working in the same groups as the previous activities, complete the matching activity on page 41 of your Participant Guide.

For each item, discuss with your peers whether the information should be viewed as early warning information (for EBS), or information for public health and risk communication. Circle A for items that meet the criteria for early warning information, and circle B for items that meet the criteria for public health/ risk communication information.

You will have 10 minutes to discuss before we go through the answers as a group.

If you are delivering the training online, introduce the small group exercise by reading the following statement.

It is critical to define what will qualify as an "EBS event" to be targeted and captured as part of the EBS process. Open your *Participant Guide* to page 41 and complete the matching activity on different types of information.

For each item, consider whether the information should be viewed as early warning information (for EBS), or information for public health and risk communication. Circle A for items that meet the criteria for early warning information, and circle B for items that meet the criteria for public health/ risk communication information.

You will have 10 minutes to complete this exercise before we go through the answers as a group.

Allow participants to discuss among their groups for 10 minutes, then go through each item as one group. Read each item off the list below and ask for a volunteer to suggest the correct answer (underlined).

- *A / **B** - Growing public health sentiment or discord*
- ***A** / B - Clusters of an unknown disease*
- ***A** / B - Unusual or excess deaths occurring in a community*
- *A / **B** - Circulating public health misinformation*
- *A / **B** - New public health laws or regulations passed*
- ***A** / B - Unusual die-off of animals*
- *A / **B** - Annual/routine reports of morbidity and mortality*
- *A / **B** - Drug/vaccine developments*
- ***A** / B - Unexpected occurrence of a disease not previously reported from an area*
- *A / **B** - New public health/ministry of health leadership*
- *A / **B** - Chronic or noninfectious disease reports*
- ***A** / B - Accidental or deliberate pathogen release*
- ***A** / B - Toxic chemical releases*
- *A / **B** - Reports on occupational health*
- ***A** / B - Radio-nuclear releases*
- *A / **B** - New motor vehicle or other travel related safety measures*

Part B: Differentiating media headlines for early warning (EBS) from information for public health / risk communication

Introduce the second part of the matching activity by reading the following statement:

> *Working in the same groups, complete the second matching activity by considering the following examples of media headlines. Circle A for headlines that meet the criteria for early warning information, and circle B for headlines that meet the criteria for public health/risk communication information.*
>
> *You will have 10 minutes to complete this exercise before we go through the answers as a group.*

Allow participants to discuss among their groups for 10 minutes, then go through each item as one group. Read each item off the list below and ask for a volunteer to suggest the correct answer (underlined).

- ***A** / B - "50 unexplained deaths"*
- *A / **B** - "A major AIDS awareness campaign launched"*
- ***A** / B - "New bleeding syndrome reported"*
- *A / **B** - "A new Minister of Health elected"*
- *A / **B** - "Crime rates up by 40%"*
- ***A** / B - "High absenteeism at local school"*

- ***A*** / B - *"Farmer reports entire flock die off in Northern province"*
- A / ***B*** - *"New airbag safety measures mandated"*
- A / ***B*** - *"Flooding in Southern province"*
- ***A*** / B - *"Cholera reported for the first time"*
- A / ***B*** - *"Miner killed on the job"*

Step 4: Summarize and wrap-up the activity

Summarize the activity by reading the following:

As you have seen in this activity, information of interest is not the same as information for action. Public health events that are of interest to specific stakeholders may provide information for situational awareness, while public health events requiring investigation and control measures may provide information for EWAR.

The collection, analysis, and reporting of EBS information requires staff time and resources. Collecting all information that is of potential interest but that is not actionable can result in an enormous amount of effort but very low impact on actual preparedness and response actions.

When classifying events according to EBS Unit criteria, think about who will use the information, and how: is the information for situational awareness (i.e., events that are happening, but require no immediate action), or is the information important for mobilizing a rapid and effective response?

The majority of the EBS Unit's effort will typically be focused on identifying information that is actionable, and that can be used by leadership to determine the most appropriate actions. Information for situational awareness can be published in ad hoc reports, with no specific schedule, while more urgent information is reported on a daily basis.

Step 5: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement, and asking if they have any questions regarding the exercise. Clarify and answer any questions before moving to the next activity.

ACTIVITY 6.3

KEY INFORMANT ENGAGEMENT

Define the objectives and process of event registration Identify health events that require immediate reporting	Lecture and group discussion	30 minutes

Step 1: Review the content of this activity

Review the content for this activity prior to conducting the presentation. Ask participants to make notes in their *Participant Guides* as they listen to the lecture.

Step 2: Deliver lecture on recording events

Registration of events

Registration of events is the process by which health events are recorded in a standardized way with regular entries of items or details. Let's take a look at an example of an epidemic intelligence product.

Ask participants to locate figure 18 in their *Participant Guides.*

Type of report	*Frequency*
EBS daily report ▶ *Time-sensitive bullet points to leadership* ▶ *Critical Information requirement type, or "flash" report*	*Daily*
EBS map *(if applicable)*	*Daily*
Weekly summaries for immediate leadership *(if applicable)*	*Weekly (on Thursdays)*
Monthly bulletin for organizational leadership *(if applicable)*	*Monthly*

Different types of reports can be useful to different audiences, and for different purposes. This table presents examples of types of reports that might be used for sharing EBS information for EWAR. The EBS Unit staff and health leadership in each country should work collaboratively to identify how reports will be used (the purpose) and who will use them (the audience) to help develop a set of standard procedures for formatting and transmitting the data collected through EBS.

Once established, the procedures for data transmission (type of data, frequency, and modality of transmission) from local, intermediate, national and international levels should be formalized and correspond to the urgency of responding to various threats (refer participants to figure x in their Participant Guides). These procedures should be widely communicated, practiced and implemented at all levels.

In some cases, IBS will be the source of information for early warning – for example, IBS may provide alerts of priority syndromes even before the diseases are confirmed and reported through standard channels. Deciding ahead of time what types of information will be included in daily reports will help establish a plan and process for data selection and publication.

EWAR ensures the early detection of health events only if data are reported in a timely way. However, EWAR is not restricted to immediate or real-time notification systems. The frequency of transmission should take into consideration the nature of the disease and the urgency of the implementation of the control measures. According to the diseases or syndrome, immediate, daily and weekly reporting can be appropriate and equally contribute to effective responses.

Step 3: Discuss reporting frequencies as a group

Read the following statement, then ask participants to individually write their answers on page 43 of their *Participant Guides* (Appendix 6 of this guide). Allow five minutes for participants to make notes, then engage the group in a discussion on the situations that warrant less or more frequent reporting of events. Read the heading for each model answer, then ask for volunteers to contribute one or two points each. Write the correct answers (as per the model answer, below) on a blank flipchart at the front of the room. Discuss any incorrect answers and fill in any gaps as you go.

If you are delivering the training online, present the activity as directed but rather than using flipchart paper, record responses on a notepad. After all questions have been addressed, present a quick snapshot of key points back to the students before moving on to the next section.

Reporting frequencies should strike a balance between timeliness and accuracy of information, and will depend on the nature of the disease/syndromes to be detected. Take a moment now to consider the types of health events requiring an immediate response compared to health events that should prioritize accuracy over timeliness. Write a few bullet points for each question on page 43 of your Participant Guide.

Q1: *List a few examples of health events that require immediate reporting.*

Model answer*: Health events requiring immediate reporting include:*

- *rare epidemic-prone diseases notified using individual data*
- *diseases posing an immediate threat to the community*
- *unusual clusters of disease*
- *diseases targeted for eradication*
- *non-health events posing an acute threat to health such as earthquakes, floods and industrial accidents.*

Q2: *List a few examples of health events for which accuracy should be prioritized.*

Model answer: *Health events for which accuracy should be considered in determining timeliness of notification include:*

- *Common diseases, and*
- *Endemic diseases subject to seasonal variations including non-bloody diarrhea or flu-like illness. In this case, data may be anonymized and aggregated.*

Step 4: Deliver lecture on how information can be shared, classified and communicated

Information must be shared with key partners

The information collected and analyzed for EWAR must be shared with key partners.

The development and maintenance of effective communication procedures with partners, relying on tools adapted to the context, are critical to ensure that events detected at the periphery are verified, assessed and responded to in a timely fashion, and that information collected and analyzed by EWAR is shared with its partners and the public as required.

Information should be classified by type of access

Information collected by EWAR should be systematically classified by type of access.

Information-sharing is key to EWAR objectives. However, the need to balance timeliness and accuracy creates tensions for reporting. Waiting until an event is verified and assessed comprehensively might introduce delays in alerting decision makers about potential threats, but disseminating incomplete information widely could prompt unnecessary mobilization of resources or generate substantial unfounded risk perception that could result in serious public health damages, such as groundless concerns regarding vaccine safety that result in low immunization coverage.

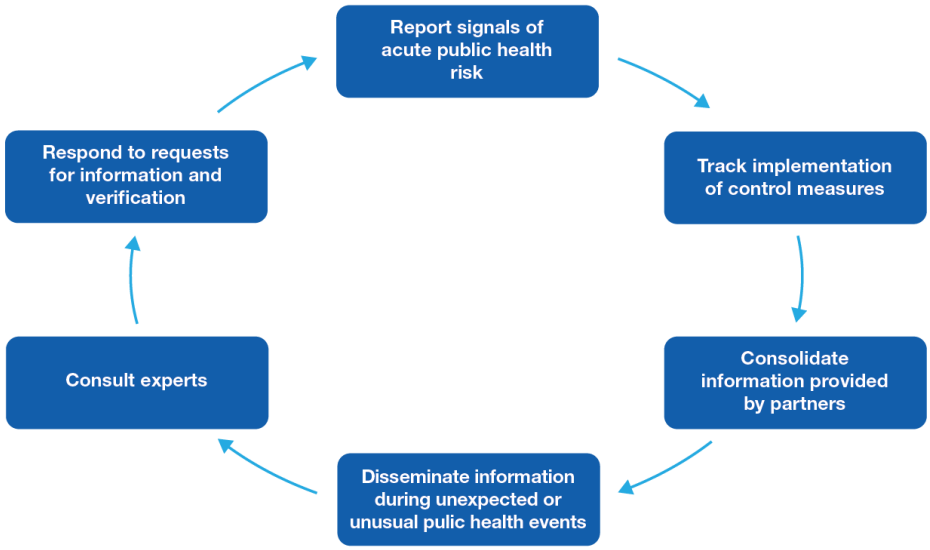
Before any decision is made about its sharing, any information collected by EWAR should be systematically classified as confidential, restricted or public:

- ***Confidential** or operational information is only shared among staff of the EBS unit (e.g. not yet verified information);*
- ***Restricted** information may only be shared among specific groups such as the national and provincial partners, and recipients are requested to avoid further dissemination of the information provided; and*
- ***Public** information is, by definition, shared with everybody and may be disseminated on the website, or in the form of press releases, scientific publications, etc.*

Information classified under each type should be disseminated according to pre-defined mechanisms and distribution lists. On a practical basis, a report can be prepared as confidential (for example, on an unfolding event) for distribution internally, and then edited as necessary to produce a version that can be circulated to partners.

Established channels should be used for bidirectional communications with partners

Ask participants to locate figure 19 in their Participant Guides. Direct them to the text at the top of the figure, and invite them to follow along (arrows to the right) as you review the cyclical nature of communication to partners.



Established channels of communication with partners are used to:

- ***Report*** *to EWAR all signals which may constitute an acute public health risk,*
- ***Track*** *any measure implemented in response - a continuous communication should be maintained,*
- ***Consolidate*** *the information available through data provided by partners to analyze the public health event and associated risk,*
- ***Disseminate*** *information during unexpected or unusual public health events to the IHR NFP and to relevant partners, including those responsible for surveillance and reporting, points of entry, public health services, clinics and hospitals and other MOH departments,*
- ***Consult*** *experts and other relevant information sources on appropriate health measures, and*
- ***Respond*** *to EWAR requests for information and verification.*

Step 5: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement, and asking if they have any questions regarding the lecture. Clarify and answer any questions before moving to the next activity.

ACTIVITY 6.4

PREPARING AN EBS REPORT

Define key data elements and outbreak metrics to be captured by EBS event management systems

Describe key reporting products

Lecture and group discussion

25 minutes

Step 1: Review the content of this activity

Review the content for this activity prior to conducting the presentation. Ask participants to make notes in their *Participant Guides* as they listen to the lecture.

Step 2: Deliver lecture on recording events

Preparing a daily EBS report

We will now discuss some requirements in preparing a daily EBS report. EBS reports should:

- *Adhere to a standardized template for content,*
- *Follow consistent approaches to epidemiological writing,*
- *Be published at the same time each day, and*
- *Be distributed to a consistent (but ever evolving) recipient list and using a consistent dissemination mechanism.*

You can see an example of a prepared EBS report by turning to page 45 of your Participant Guides.

**** Global Disease Detection Operations Center (GDDOC) Daily Report for 07-16-2019 ****

****** FOR INTERNAL CDC USE ONLY ******

At A Glance:

Of International Importance[1]

- Measles (Rubeola) in Jordan (NEW): **23 cases reported in 7 clusters**
- Cholera in Cameroon (NEW): **OCV campaign planned**
- Ebola in The Democratic Republic of the Congo (Update): **Outbreak surpasses 2,500 cases and 700 recoveries**
- Leishmaniasis (Visceral) in Kenya (Update): **New county affected**

FOR INTERNAL CDC USE ONLY

Global Disease Detection Operations Center
U.S. Centers for Disease Control and Prevention
Daily Report for 7/16/2019
Contact: Ray Arthur, PhD
Mobile: (404) 431-6630
gddoutbreak@cdc.gov
EOC: (770) 488-7100 (24 hours / 7 days a week) Contents At A Glance
INTERNATIONAL IMPORTANCE

- Measles (Rubeola) in Jordan (NEW): **23 cases reported in 7 clusters**
- Cholera in Cameroon (NEW): **OCV campaign planned**
- Ebola in The Democratic Republic of the Congo (Update): **Outbreak surpasses 2,500 cases and 700 recoveries**
- Leishmaniasis (Visceral) in Kenya (Update): **New county affected**

PUBLIC HEALTH EVENT OF INTERNATIONAL IMPORTANCE	
Geographic Scope	Public Health Impact Risk
Medium	Medium

The importance of event management systems

The purpose of an event management system (EMS) is to provide a secure focal point for tracking public health data on international health threats detected. This data is analyzed by the CDC's Global Disease Detection Operations Center (GDDOC) and has an 'all-hazard,' One Health-based approach which includes radiological, nuclear, chemical, and environmental threats.

An EMS allows you to input the findings of EBS to prepare CDC to respond to acute, public health emergencies with information captured in a Daily Report.

The GDDOC has an EMS called the Event Analysis Management System (EAMS) and is used by GDDOC to collect international public health event data that focuses on emerging and re-emerging infectious diseases which threatens populations.

Global commitment to standardizing outbreak documentation

In 2018, Ending Pandemics convened representatives from 26 organizations, including national and international public health agencies, NGOs, universities, and foundations, to revise outbreak milestones based on expert knowledge and lessons learned.

This meeting resulted in the establishment of a set of eight outbreak milestones, displayed on page 46 of your Participant Guide, for use by public health agencies and other interested organizations. However, even with clear and precise definitions for outbreak metrics, obtaining the relevant data points remains challenging.

Outbreak Milestones	Definition
Outbreak Start	*Date of symptom onset in the primary case or earliest epidemiologically linked case*
Outbreak Detection	*Date that the outbreak or disease-related event is first recorded by any source or in any system*
Outbreak Notification	*Date the outbreak is first reported to a public health authority*
Outbreak Verification	*Earliest date of outbreak verification through a reliable verification mechanism*
Laboratory Confirmation	*Earliest date of laboratory confirmation in an epidemiologically-linked case*
Outbreak Intervention	*Earliest date of any public health intervention to control the outbreak*
Public Communication	*Date of first official release of information to the public from the responsible authority*
Outbreak End	*Date that outbreak is declared over by responsible authorities*

In June 2019, the WHO convened an EBS coordination group meeting at The World Organization for Animal Health (OIE) in Paris, France, whereby the need for the development of a low maintenance yet high performing event management system to effectively track these milestones among others was vehemently underscored.

International partners are now looking to EBS technical experts, including US CDC's GDDOC, to guide the development of an EMS in order to support countries across low resourced, low bandwidth settings in attaining higher standards for EBS so as to enhance IHR compliance, Joint External Evaluation (JEE) performance, and activities surrounding the Global Health Security Agenda (GHSA).

Defining and capturing timeliness metrics

A set of standardized outbreak milestones allow countries or organizations to define and calculate relevant timeliness metrics to address their own needs.

A timeliness metric is measured as the time interval between two relevant outbreak milestones. Some countries or partners may not have the capacity or intent to measure all the outbreak milestones, and therefore may not measure every possible time interval. While timeliness metrics may be defined differently by countries and organizations, maintaining consistent definitions over time will allow for valid comparisons to capture trends.

Ask participants to locate figure 20 in their *Participant Guides*.

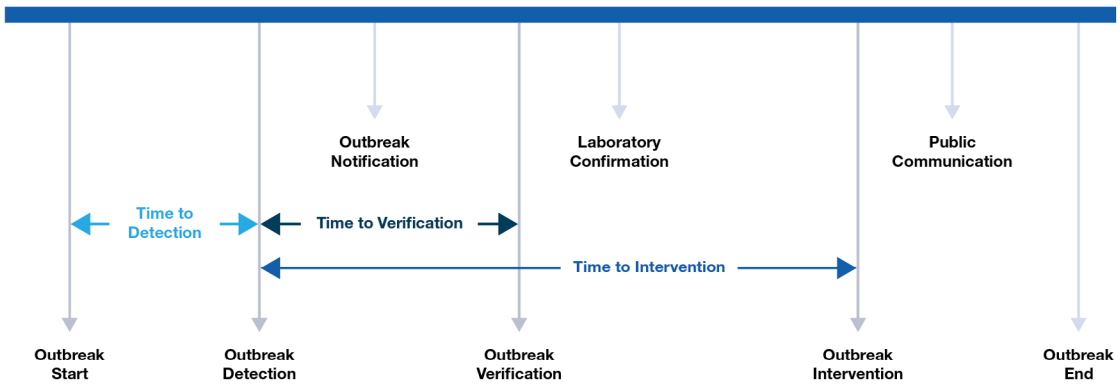


Figure 20. The eight outbreak milestones shown in the above figure are for illustrative purposes only as the actual sequencing may vary. For example, laboratory confirmation may occur simultaneous to outbreak verification. In another case, public communication may be the first outbreak intervention. As an example, Ending Pandemics' timeliness metrics are shown as the intervals between the relevant outbreak milestones.

As a case in point, Ending Pandemics is using four outbreak milestones to define timeliness metrics relevant to monitoring the impact of our work.

- *We define time to detection as the time interval between outbreak start and outbreak detection.*
- *Time to verification is defined as the time interval between outbreak detection and outbreak verification.*
- *And finally, time to intervention is defined as the time interval between outbreak detection and outbreak intervention.*

Step 3: Set up the activity on identifying the key elements of an EBS report

Inform participants that they will now do two short activities in their *Participant Guides* (see Appendix 7 of this guide). Ask participants to turn to page 47 in their *Participant Guides* and complete both questions. Inform them that they will have five minutes to complete each task, and may work individually or with a peer.

Start the activity by asking participants to write a bulleted list of information that should be included in an EBS report (Q1). After five minutes, ask for volunteers to contribute one or two points each. Write the correct answers (as per the model answer, below) on a blank flipchart at the front of the room. Discuss any incorrect answers and fill in any gaps as you go.

If you are delivering the training online, present the activity as directed but rather than flipchart, record responses on a notepad. After all questions have been addressed, present a quick snapshot of key points back to the students before moving on to the next section.

Q1: *What information should be included in an EBS report?*

Model Answer: *Basic information needed for an EBS report:*

- *New or updated report?*
- *Who provided the information?*
- *When did they provide it?*
- *What is the event about, including key outbreak milestones?*
  - *Outbreak Start*
  - *Outbreak Detection*
  - *Outbreak Notification*
  - *Outbreak Verification*
  - *Laboratory Confirmation*
  - *Outbreak Intervention*
  - *Public Communication*
  - *Outbreak End*
  - *Who/How many are affected? Cases/deaths*
  - *Where are they located?*
  - *What is being done about it and by whom?*
- *Background information*
- *Will there be future reports on this event?*
- *Source documentation*

Now ask participants to turn to page 47 in their *Participant Guide*, then read the following statement:

Let us now take a look at an example taken from the GDDOC daily report of a measles outbreak in Romania. Underline what you think are the key elements that should be included in every EBS report.

Give participants five minutes to complete this task. Once the time is elapsed, ask for a different volunteer to read out each statement and identify what they see as the key elements. Go through the correct answers (underlined below) as a group.

Q2: *Identify the key elements in this sample CDC EBS report.*

- *The Global Disease Detection Operations Center (GDDOC) has learned of an outbreak of measles in Romania.*
- *On 21 September 2016 the Romanian Ministry of Health (MOH) reported that in the first eight months of this year, they have recorded 675 confirmed cases of measles in 23 counties, with two deaths. A third suspected measles death was reported but is undergoing final confirmation. The two confirmed and one suspected death all occurred in children younger than one year, which is under the age of routine measles vaccination. The MOH attributes the resurgence of measles to failure of some parents to adhere to the routine vaccination schedule.*

- *The National Institute of Public Health recommends vaccinating children in the affected areas of the country at the age of seven months with resumption of the normal vaccination schedule at one year of age.*
- *In 2015 Romania reported only seven confirmed cases of measles and no deaths. Measles vaccination coverage has gradually declined from a high of 98% in 2000 - 2002, to 86% in 2016. Officials report that there is no shortage of MMR vaccine in the country.*
- *GDDOC will continue to follow this outbreak and report updates as they become available.*

Step 3: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement, and asking if they have any questions regarding the lecture. Clarify and answer any questions before moving on to the next activity.

ACTIVITY 6.5

RECORDING EVENTS

Describe key reporting products

Lecture

15 minutes

Step 1: Review the content of this activity

Review the content for this activity prior to conducting the presentation. Ask participants to make notes in their *Participant Guides* as they listen to the lecture.

Step 2: Deliver lecture on key reporting products

Weekly review of active events

Let's now consider an example of what a weekly review of active events in the EMS might look like.

- *If an active event is ongoing, and no updated information is available,* ***inquire****. Reach out to SMEs, field teams, or local staff to gather more information.*
- *Continue to* ***monitor*** *for new information in an ongoing outbreak.*
- ***Respond*** *by supporting field investigations or control measure to interrupt transmission.*
- ***Close*** *when the outbreak is finished (or at least dropped to baseline) and no further monitoring is needed.*

Business Intelligence (BI) tools to assess EBS performance

Business intelligence (BI) loosely refers to tools that retrieve, analyze, and transform data into meaningful information that helps businesses make more intelligent decisions. BI tools cover a range of technologies, including Tableau and Microsoft Power BI.

Example of a CDC EBS product – the Daily Map

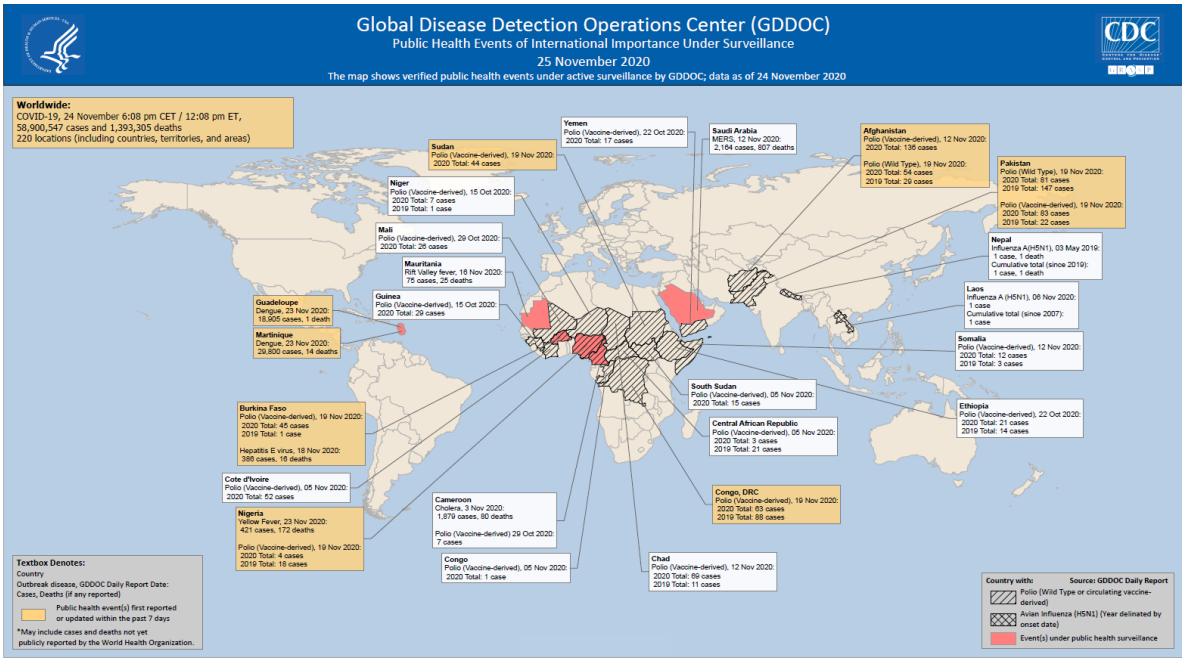
Ask participants to locate figure 21 in their *Participant Guides*. Read the following statement and ask the question that follows.

Let us now consider a CDC EBS product, the Daily Map. This global map shows active (verified) events that are under surveillance. It includes events reported in the past seven days, the location, the disease, the date of the most current report, and epidemiologic data such as counts. GIS experts compile the map daily using lists of data, and the map is viewed by CDC program leadership, SMEs and select HHS leaders.

How do you see this map being used?

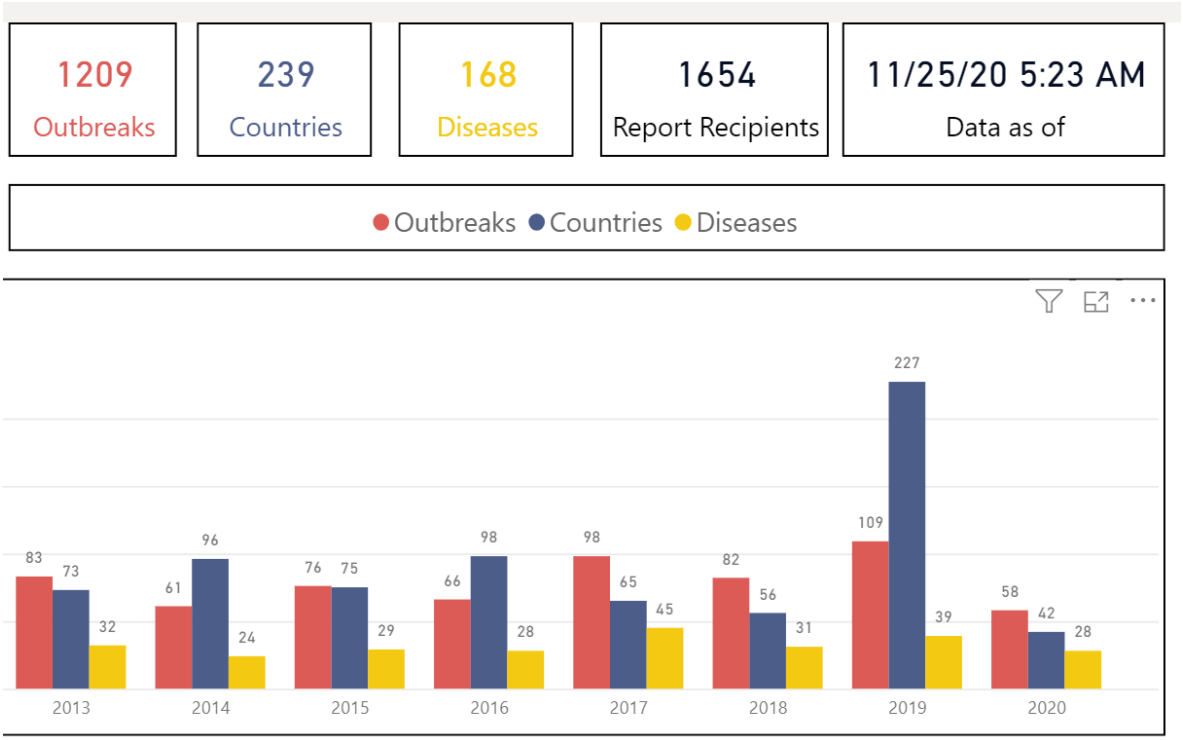
Accepted answer: *The map can be used as:*

- *An analytical tool,*
- *An internal communications tool in the CDC,*
- *A public relations tool (presented by leadership, SMEs, etc), and*
- *A pictorial/cartographic depiction of our work.*



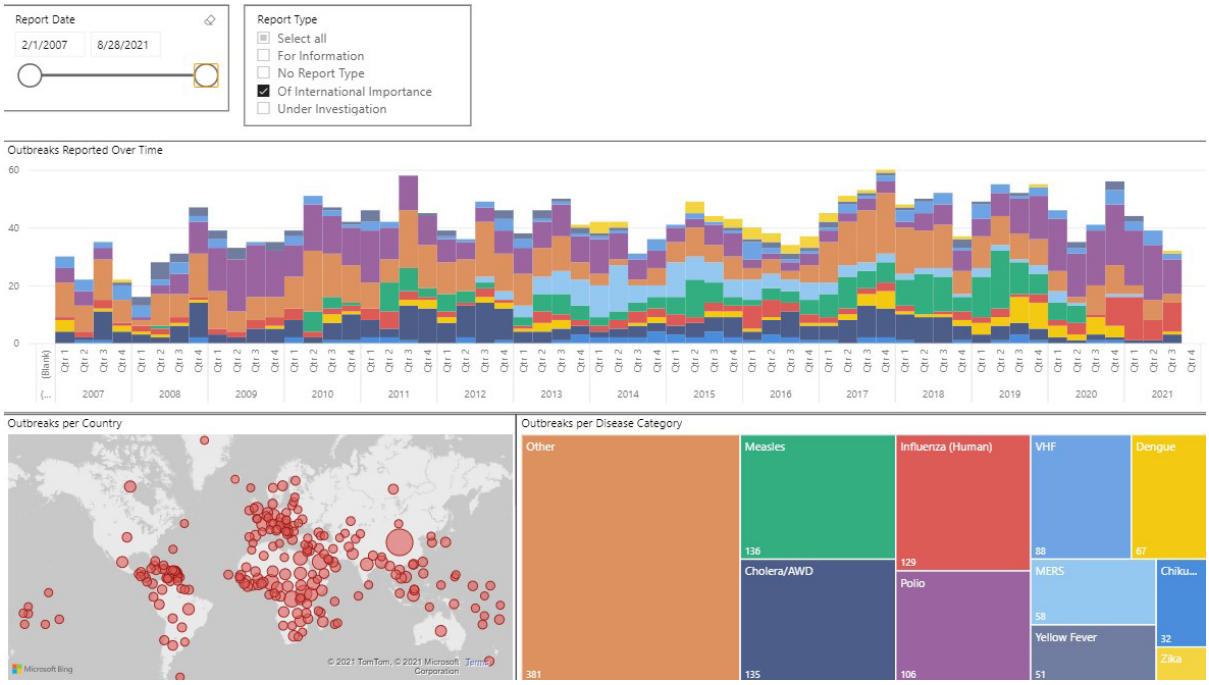
Ask participants to locate figure 22 in their *Participant Guides.*

Looking at figure 22, you can see that from January 1, 2008 to November 25, 2019, the GDDOC monitored ***1,209 outbreaks*** *of* ***168 diseases*** *in* ***239 countries.***



Ask participants to locate figure 22 in their *Participant Guides*.

Now let's take a look at the outbreaks monitored by the US CDC GDD Operations Center over several years.



Ask participants to locate figure 24 in their *Participant Guides*.

Health Security
Volume 15, Number 5, 2017 Mary Ann Liebert, Inc.
DOI: 10.1089/hs.2017.0004

What We Are Watching—Top Global Infectious Disease Threats, 2013-2016: An Update from CDC's Global Disease Detection Operations Center

Kira A. Christian, A. Danielle Iuliano, Timothy M. Uyeki, Eric D. Mintz, Stuart T. Nichol, Pierre Rollin, J. Erin Staples, and Ray R. Arthur

Here is another helpful resource you can refer to that looks back at EBS detection from 2012-2016. It also discusses GDDOC and the Global Health Security Agenda more broadly, and includes highlights of some of the top threats monitored during that period including: avian influenza, cholera, Ebola virus disease, yellow fever, chikungunya, Zika, MERS, and polio.

Step 3: Wrap up session with key message

End the discussion by reviewing the definition of EBS, below.

EBS is defined as the organized collection, monitoring, assessment, and interpretation of unstructured information regarding public health events that may represent an acute risk to human health. Conducting EBS includes establishing an EBS unit to better track public health events of concern.

SESSION 7

ESTABLISHING AN EVENT-BASED SURVEILLANCE UNIT

This session focuses on the process of putting theory into practice by considering how an EBS unit is operationalized. The goal of the EBS unit is to provide leadership, a skilled workforce, and consistent guidance to promote structured and systematic data collection.

Learning Objectives

By the end of this session, participants will be able to:

- Describe the daily workflow of an EBS unit,
- Identify the core competencies and specialized skillsets required to conduct EBS,
- Define the key resources and tools necessary for an EBS unit,
- Describe "mystery" diseases and how to assess their risk, and
- Describe the role of SMEs and SME lists in EBS.

Materials

Facilitator

- Markers

Participants

- *Participant Guide* pages 51-59

Total time: 45 minutes

ACTIVITY 7.1

INTRODUCTION TO THE EBS UNIT

Describe the daily workflow of an EBS Unit

Identify the core competencies and specialized skillsets required to conduct EBS

Group activity

5 minutes

Step 1: Introduce the activity

Open the session by reading the following statement, then ask participants to brainstorm their responses in the space provided in their *Participant Guides*. After a few minutes, ask for volunteers to contribute one or two points each. Record the correct responses on a blank piece of flipchart paper and wrap up the exercise by reading the model answer.

> *The **mission of an EBS unit** is to provide a single source of reliable, comprehensive, and high-quality information on international disease outbreaks and other health threats. How do they accomplish this? List a few ways that EBS units fulfil their objective.*
>
> ***Model answer: An EBS unit provides reliable, high-quality information by:***
>
> - *Systematically collecting and analyzing international health event data for early detection,*
> - *Classifying the health risks associated with these events,*
> - *Disseminating event information,*
> - *Facilitating appropriate and rapid interventions, and*
> - *Leveraging existing expertise in-country via formal and informal networks, within the context of an overall surveillance system, to include EBS.*

Regardless of the mode of acquisition of information, not all information, even information collected primarily by IBS, corresponds to genuine acute public health events. Some information might correspond to mild diseases or hazards for which no control measure is available, or to the modification of long-term trends for endemic diseases that would require further investigation.

Step 2: Deliver lecture on EBS Unit resources

Staff are the most important resource

Staff of an EBS unit are the most important resources, who efficiently and effectively use the rest of the resources to fulfill mission objectives. Well-coordinated teamwork, work sharing, transparency, and flexibility within a structured work plan allow for an environment of efficiency to make effective use of all resources.

The EBS Unit staff bring technical backgrounds to EBS functions, which require a combination of skills and core competencies. These include technical competencies such as data collection, and analysis; these can be thought of as "hard" skills that can be measured and improved continuously through formal training. Other competencies depend on context that is specific to the EBS Unit and to the country setting; these can be thought of as "soft" skills gained primarily through on-the-job training and hands-on demonstrations.

EBS Unit staff typically comprise an EBS director or team lead, EBS analysts with diverse backgrounds, and emergency response coordinators and/or administrative assistants.

Other resources

In addition to staff, an EBS Unit should also include:

- *Information sources, such as SMEs, public health agencies, WHO and WHO Regional Offices, partner country Ministries of Health, Agriculture, or other relevant Ministries, and non-governmental organizations,*
- *Communication tools, and*
- *Information technology tools.*

Step 3: Set up small group brainstorming activity

Instruct participants to form the same groups of four as earlier exercises and provide each group with a flipchart and marker. Each team should select a group member to take notes (recorder) and another to present the group's responses to the audience (presenter). Allow 10 minutes for participants to discuss and record responses to each of the questions below (and on page 52 of their *Participant Guides*).

After this time, ask for one volunteer from each group to offer a few points to either question, writing these on the prepared flipchart. Once all groups have contributed, review the complete list and add any other missing points from the model answer below.

If you are delivering the training online, ask participants to record their answers in their *Participant Guides*. After 10 minutes, ask for volunteers to share one answer each until all of the points have been covered. Discuss their answers and the model answer as a group and fill in any gaps as you go.

Read the questions out loud before participants start the activity:

- ***Q1:*** *What are the required skills of an ideal EBS Unit analyst?*
- ***Q2:*** *What are the desired skills and attributes of an ideal EBS Unit analyst?*

Model answer

Required skills	***Additional desirable skills and attributes***
Advanced epidemiology/public health training and related analytical skills *General public health expertise* *Previous experience in infectious disease surveillance or environmental health* *Good knowledge of the national public health structure and mechanisms* *Good knowledge of international public health and mechanisms (when applicable)* *Good written and verbal communication skills for preparing and presenting reports* *Interpersonal skills to interact with different stakeholders including SMEs* *Good knowledge of data management and of existing IT tools, particularly internet searches*	*Good knowledge of infectious diseases, particularly zoonotic diseases* *Flexibility & adaptability to cope with a wide range of health events and tasks* *Ability to work under time pressure* *Well organized and able to handle high volume of information* *Good knowledge of geographic medicine (when applicable)* *Curious and always eager to learn*

The EBS team

Practical applications can help the EBS team function as one unit. These include shared electronic resources, such as:

- *A shared email account,*
- *A shared mechanism, such as a resource portal or network drive, for research and reference documents, and*
- *An outbreak database accessible to all for logging, managing, and reporting events.*

Step 4: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement, and asking if they have any questions regarding the lecture. Clarify and answer any questions before moving to the next activity.

ACTIVITY 7.2

EBS UNIT ANALYST RESPONSIBILITIES

Describe the daily workflow of an EBS unit

Identify the core competencies and specialized skillsets required to conduct EBS

Describe "mystery" diseases and how to assess their risk

Lecture and group discussion

10 minutes

Step 1: Review the content of this activity

Review the content for this activity prior to conducting the presentation. Ask participants to make notes in their *Participant Guides* as they listen to the lecture.

Step 2: Deliver lecture on the daily responsibilities of analysts

Create, review, and revise EBS Unit Standard Operating Procedures

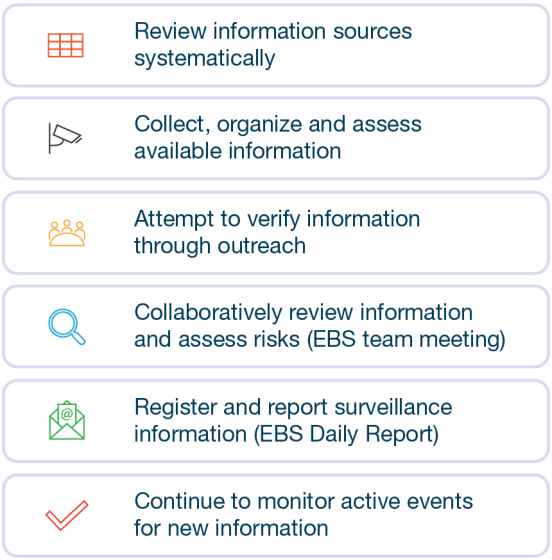
Standard Operating Procedures (SOPs) should be written, reviewed, and followed by the EBS unit, and updated at a frequency determined by the Director (e.g., annually). One analyst should be the lead on the development and annual review of the SOPs.

Daily general workflow of an EBS Unit

Although the sources of information and the priority diseases and events will vary according to country-specific needs, the actual processes of data collection, analysis, and reporting can be standardized in a daily workflow plan that promotes teamwork and consistent, systematic analysis. Please see Appendix 2 of your Participant Guide for a sample daily report.

Ask participants to locate figure 25 in their *Participant Guides.*

This schematic outlines the sets of tasks that the EBS unit staff use routinely to identify, verify, and communicate with key stakeholders about acute public health events. We will now go over each of these in turn.



Review information sources systematically

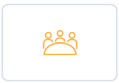
Analysts begin the workday by screening multiple sources to see if there is a new public health event of interest or an update to a previously identified event. Most importantly, all analysts will verify events and conduct risk assessments for the specific events they are following as well as identify and verify new signals as they are found. These signals must be verified through reliable sources as described in Module 4.

Collect, organize and assess available information

Once an EBS analyst has detected a signal, the analyst should follow the appropriate steps to contextualize this information:

- *Check additional sources for corroborating reports,*
- *Check baseline disease epidemiologic data to determine if this information is unusual or unexpected (consider geographic locations, seasonality, etc.),*
- *Determine whether an event meets reporting criteria, and*
- *Determine whether an event requires alert and response actions (including EBS unit coordination).*

Most importantly, all analysts will verify events and conduct risk assessments for the specific events they are following as well as identify/verify new signals as they are found.



Attempt to verify information through outreach

Verification is an essential step of the epidemic intelligence process that consists of confirming the reality (authenticity and conformity) of a possible public health threat. This is done by actively cross-checking the validity of the information using reliable sources, or verifying pertinence in order to confirm and, when possible, to characterize the nature of the event.

Collaboratively review information and assess risks in the EBS team meetings

The daily meeting is the heart of the collaborative, coordinated process of analyzing EBS data as a cohesive team. Once per week, during the EBS Unit Daily Meeting, analysts meet to determine whether each event warrants continued active surveillance and "inactivate" (cease to monitor) events that do not warrant continued active surveillance. These include events with few or no new cases reported or where no additional information is available.

During the mid-day EBS Unit Daily Meeting, analysts share and discuss unverified signals or verified events discovered over the past 24 hours to decide if reporting or updating is warranted. An algorithm should be developed for monitoring of frequently reported diseases (for example, one week after the last case).

Larger or notable events should have a lead analyst assigned who has primary responsibilities for conducting surveillance for that event to keep appropriate Ministry units apprised of developments, and also for reporting purposes. Information is shared with all analysts so that another can step in and serve as lead when the assigned lead is not available.

These meetings are also used to identify information to be conveyed in the daily report, discuss policy, logistics, administrative, or other issues, and discuss and characterize a high-level risk assessment based on all available information and contextualized data.

Register and report surveillance information

After the Daily Meeting, analysts continue their routine duties as necessary (including continuing surveillance activities throughout the rest of the day) and develop and share their reports according to the EBS Unit's reporting strategy. Analysts should record information in an outbreak database, according to the criteria of the EBS unit. While compiling the daily report, analysts should solicit and compile comments and feedbacks from SME colleagues before publishing the Daily Report, if warranted (for example, if a particular report is overly technical and requires such a review).

Continuous monitoring of events for new information

Events should be continuously monitored for new information. This includes following-up on information sources and feedback until the event is "closed" or no longer actively being followed; regularly checking websites for updates; continuously checking email (EBS group mailbox) or other communications from reliable sources to verify event information; continuing to share updated information in daily EBS team meetings; and providing updates on the EBS Daily Report.

Step 3: Deliver lecture on the "mystery" diseases

Start the lecture on "mystery diseases" by reading the content below, then ask participants to brainstorm the answer to the question that follows in their same groups of four. Instruct participants to make notes on page 55 of their *Participant Guides*.

After a few minutes, ask for volunteers to contribute one or two points each. Record the correct responses on a blank piece of flipchart paper and wrap up the exercise by reading the model answer.

If you are delivering the training online, ask participants to record their answers in their *Participant Guides*. After a few minutes, ask for volunteers to share one answer each until all of the points have been covered. Discuss their answers and the model answer as a group and fill in any gaps as you go.

Conduct risk assessments for undiagnosed "mystery" diseases

Some reports describing outbreaks will not have an etiology. These reports may refer to the outbreak as "mystery", "unknown", or "unidentified" outbreaks. Analysts should take steps to assess these reports in order to verify and determine a diagnosis.

If the source is verified *(e.g., WHO, UN Organizations, MOH/MOA):*

- *Confirm case and death numbers,*
- *Confirm whether laboratory testing was conducted and results obtained or pending, and*
- *Inquire whether there has been a public health response.*

If the source is unverified *(e.g., media, blog, or social media), search other sources to seek corroborating media reports ("triangulating" multiple media reports).*

If additional media reports confirm information contained in the original media report, you should verify that the additional media reports are original publications and not just redistributions of the first report through media recycling.

Q1: What should you do if the "mystery" disease etiology remains unconfirmed?

Model answer: *If the "mystery disease" etiology remains unconfirmed:*
Discuss the possible etiologies based on case and death counts, location, ecology, and clinical signs or symptoms described in media reports with team members. From this information, identify the appropriate SMEs to consult then coordinate a conference call with all stakeholders to discuss the outbreak and narrow the possible etiologies.

If you are unable to determine the "mystery" disease etiology, continue to actively monitor the original source and others for additional information. If no further reports are identified, discontinue active surveillance.

Step 4: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement, and asking if they have any questions regarding the lecture. Clarify and answer any questions before moving to the next activity.

ACTIVITY 7.3

THE ROLE OF SUBJECT MATTER EXPERTS

Describe the role of SMEs and SME lists in EBS

Interactive lecture

10 minutes

Step 1: Open lecture with small group discussion on SMEs

Open the lecture by explaining to participants that this activity will be delivered as an interactive lecture, with periodic check points where participants can work in groups to brainstorm the answer to a question.

For each of the following questions, start the activity by reading the question statement, then asking participants to work in their same groups of four to brainstorm an answer. After a few minutes, ask for volunteers to contribute one or two points each. Record the correct responses on a blank piece of flipchart paper and wrap up the exercise by reading the model answer.

If you are delivering the training online, ask participants to record their answers in their *Participant Guides*. After a few minutes, ask for volunteers to share one answer each until all of the points have been covered. Discuss their answers and the model answer as a group and fill in any gaps as you go.

An SME is a person who is considered to be highly trained in a particular subject or disease or has obtained significant experience in a particular country or region of the world. The information provided by SMEs greatly contributes to risk assessments, and SMEs have an important role in EBS

In your small groups, brainstorm some of the ways that SMEs can contribute to EBS. Record your answers in the space provided on page 55 of your Participant Guides.

Model answer: *SMEs contribute to many different areas in EBS, including:*

- *Assisting in the interpretation of reports concerning outbreaks,*
- *Assisting in the interpretation of new findings during an outbreak,*
- *Assisting in providing historical context with regard to a pathogen, outbreak, or country,*
- *Assisting in the confirmation of a diagnosis,*
- *Participating in outbreak-related conference calls related to the area of the SME,*
- *Assisting in clearing products written by EBS analysts, and*
- *Participating in field responses at request for assistance in outbreaks.*

SME list

All EBS analysts should develop and maintain SME lists that can be used to quickly identify and find contact information for SMEs that can be consulted for assistance during an event.

SME lists can be maintained in a straightforward manner using programs such as Microsoft Excel, or on a shared network drive. The list should be updated at regularly defined intervals. An SME list template can be found in Appendix 3 of your Participant Guide.

This list should be used by all analysts to identify and find contact information quickly for SMEs who can be consulted for assistance during an event. Key information that should be gathered on an SME include:

- *Disease/area of expertise,*
- *Contact name,*
- *Organization/unit, and*
- *Contact information (office phone, mobile phone, email).*

Anthropologic expertise

Now read the following statement, then ask participants to work in their same groups to brainstorm the answer in the space provided on page 56 of their Participant Guides.

If you are delivering the training online, instruct students to record their responses in their *Participant Guides*.

When analysts are investigating a public health threat such as a disease outbreak in specific ethnic groups, an EBS unit would benefit from the advice of a medical anthropologist or social behaviorist on the cultural practices of that specific group. Why do you think this is important?

Model answer: *Including medical anthropologists or social behaviorists is important in this context because:*

- *It aids in understanding community practices that could promote the transmission of pathogens,*
- *It assists in developing appropriate public health messages based on the community's belief system and culture, and*
- *It gains community acceptance of messages and promotes appropriate action.*

Note that a medical anthropologist or social behaviorist should be considered an SME and included on an SME list.

Step 2: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement, and asking if they have any questions regarding the lecture. Clarify and answer any questions before moving to the next activity.

ACTIVITY 7.4

SOURCE LISTS

Define the key resources and tools necessary for an EBS unit

Interactive lecture

10 minutes

Step 1: Open lecture with small group discussion on source lists

Open the lecture by explaining to participants that this activity will be delivered as an interactive lecture, with periodic check points where participants can work in groups to brainstorm the answer to a question.

For each of the following questions, start the activity by reading the question statement, then ask participants to work in their same groups of four to brainstorm an answer. After a few minutes, ask for volunteers to contribute one or two points each. Record the correct responses on a blank piece of flipchart paper and wrap up the exercise by reading the model answer.

If you are delivering the training online, ask participants to record their answers in their *Participant Guides*. After a few minutes, ask for volunteers to contribute a few points each, then discuss their answers and the model answers as a group.

Source lists

All analysts will begin the workday by conducting EBS via systematic screening of multiple sources to see if there is a new public health event of interest or an update to a previously identified event. To facilitate this systematic review, analysts should use a "Source List" to save a source list of website names including URLs and corresponding passwords. These can be stored in a password-protected database such as an MS Excel spreadsheet if required.

Source lists should be maintained in two separate databases: one to include primary sources which include information originating from that source or agency, and another to include sites that are considered to be "media aggregators". These are designed by users using keywords to collect posts from targeted websites and display collectively on one portal. Source lists should be shared among all analysts, and should be accessed frequently each day by analysts to conduct EBS.

A source list with selected examples of primary sources can be found in Appendix 1 of your Participant Guides.

Now read the following three questions, then ask participants to work in their same groups to brainstorm the answers in the space provided on page 56 of their *Participant Guides*. After 10 minutes, ask for volunteers to contribute one or two points each. Record the correct responses on a blank piece of flipchart paper and wrap up the exercise by reading the model answer.

Q1: What are some formal, or official verified sources that provide verified information?

Model answer:

- *National level, Institutions of Public health and related fields,*
- *Provincial or State Departments of Health,*
- *MoH or State affiliate Institutions at the State level,*
- *Ministry of Health of neighboring countries,*
- *MoH affiliate Institutions in the neighboring countries, and*
- *WHO (country and regional office).*

Q2: What are some informal sources that provide information?

Model answer:

- *Online media sources (make a list of key domestic and international media sources),*
- *Online contributor-based sources such as ProMED or participatory networks,*
- *Online information services or data aggregators,*
- *National or international surveillance networks,*
- *Twitter or other social media, and*
- *Personal communications.*

Q3: What information should be included in a password-protected database or spreadsheet?

Model answer:

- *Name of organization of source,*
- *Report name,*
- *URL or hyperlink of source,*
- *Log In information,*
- *Username,*

- *Password, and*
- *Update passwords as they expire or are updated.*

The process for identifying potential online sources is described in Module 3.

Step 2: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement, and asking if they have any questions regarding the lecture. Clarify and answer any questions before moving to the next activity.

ACTIVITY 7.5

UNIT TOOLS AND RESOURCES

Describe key tools and resources used by the EBS Unit

Lecture

10 minutes

Step 1: Review the content of this activity

Review the content for this activity prior to conducting the presentation. Ask participants to make notes in their *Participant Guides* as they listen to the lecture.

Step 2: Present lecture on other resources that can be used by an EBS Unit

EBS team group email

An EBS unit should establish a shared email address to serve as a secure point of communication with all EBS unit staff. All staff should receive copies of emails that are sent to a secure, shared inbox, and this mailbox should be carbon copied on all electronic communication between analysts and other Ministry programs. This allows for transparency and knowledge amongst the EBS team and ensures a prompt response to every email or query that the EBS unit receives in a timely, accurate and appropriate manner.

Working in your same small groups, consider when a shared email box should be used to communicate between analysts and colleagues. In the space provided on page 57 of your Participant Guides, brainstorm the types of issues that should be communicated through a shared email address.

Model answer: *A shared email address should be used to communicate about:*

- *verification of outbreaks,*
- *updates to outbreak information,*
- *context surrounding outbreaks,*
- *subject matter expertise (pathogen, epidemiology, laboratory),*
- *epidemiologically-related outbreaks (temporal, geographic, population), and*
- *any coordinated response activities including logistics, travel, and funding.*

Using the shared email account for surveillance

The shared EBS email mailbox should be copied on all EBS unit-related communications, including communications on outbreaks, deployments of response teams, context on disease epidemiology, and background information on a particular pathogen or illness.

The analysts can then use email containing information related to outbreaks to conduct surveillance. Emails include information on public health events which are being followed ("active" events) or had been actively followed in the past (now "inactive" events). If the shared email box is copied on all communications, it can be used as a tool to assist in surveillance by searching through archived and stored data contained within email.

Respond to queries from partners

Email serves as the easiest and fastest way to respond to other public health agencies and partners, and email monitoring should be conducted constantly. Analysts responding to email should take note of the sensitivity of the information and when in doubt, clarify with the EBS Unit Director. Responses to queries sent by email should always include a copy to the group mailbox for the EBS Unit's situational awareness. Finally, responses should be accurate and rapid.

Shared resource portal for research and reference

An EBS Unit should establish an electronic portal, such as a network drive or cloud storage, for research and reference purposes, which is populated by analysts for shared use. For example, EBS analysts in countries with access to Microsoft SharePoint can search within the portal by country, disease and global epidemiological concerns.

Items can be tagged by disease, country, WHO region, laboratory, etc. Additional tags could include pathogen information, epidemiologic results, laboratory findings, email communications saved as documents, publications, documents concerning funding, and other supporting documents. EBS analysts should update the site on an ad hoc basis and consider whether to make the portal available to other Ministry programs.

An alternative to a shared resource portal is a shared network drive for analysts to share, edit, store, and archive documents such as schedules, active outbreaks, SME lists, presentations, key management updates, maps, spreadsheets, archived reports, disease-specific reports and summaries, and any other documents related to EBS. Permission should be granted to gain access to such a drive to ensure the information stored there is secure.

List of priority public health events

A list of priority public health events to be put under surveillance should be established. The process for developing this list is described in detail in a previous module. The list may contain:

- *Diseases (e.g. measles),*
- *Syndromes (e.g. hemorrhagic fevers),*
- *Hazards (e.g. contamination of drinking water source), and*
- *Unexpected/unusual events (e.g. unexplained mortality).*

Reporting templates

EBS analysts should develop and use templates for drafting reports for leadership and key stakeholders. When developing daily reports, an analyst should consider the audience, purpose, timeline, and template defined for daily, summary (weekly/monthly), ad hoc, and urgent reports.

Reporting templates should include the following essential information:

- *Event description,*
- *Timelines,*
- *Public health impact,*
- *Geographic scope and risk of spread,*
- *Ongoing or planned activities, and*
- *Additional context.*

EBS ensures the early detection of health events only if data are reported in a timely way. However, EBS is not restricted to immediate or real-time notification systems. The frequency of transmission should take into consideration the nature of the disease and the urgency of the implementation of the control measures. According to the diseases or syndrome, immediate, daily and weekly reporting can be appropriate and equally contribute to early warning.

A previous module describes the process of writing reports in detail.

Media aggregators for automating online searching

EBS Units should utilize leading media aggregators for automating internet-based searching for EBS. EBS units should customize such systems to best fit the geo-scope of the EBS unit's "reach" as well as the priority disease categories as determined by the country

Infectious disease databases

Baseline disease epidemiologic data should be checked to assess compatibility with known scientific information. Doing so can help determine whether the event meets EBS Unit reporting criteria, and requires alert and response actions, including EBS Unit coordination and reporting.

One infectious disease and microbiology database that can be used by clinicians and epidemiologists is The Global Infectious Diseases and Epidemiology Network (GIDEON). GIDEON is accessible via the web with a subscription; an EBS unit's username and password should be saved in the Source List.

An EBS Unit should use GIDEON to understand the epidemiology of diseases and can conduct searches on the website by country, place, time, etc. This is especially useful when context is needed about past outbreaks or to determine baseline disease burden, which is helpful for understanding whether a public health threat is unusual or unexpected.

Event Management Systems

A database should be designed and implemented for logging, managing and reporting events that meet the criteria to be entered into the system. This includes IHR Annex 2 and other significant events to the country. Ideally, this is a web-based application, called an Event Management System (EMS), that is only accessible to EBS analysts and has an application through which quantitative and qualitative data can be analyzed for publication. Ideally, this includes a reporting function such that reports are able to be generating directly from the database.

The outbreak database should contain all public health events that are currently actively being followed by the EBS unit, an "Active List". Analysts should review the Active List on a weekly basis to keep list updated and current.

Commercial products are available; however, Microsoft (MS) Office products can be utilized to create an EMS for a new EBS unit in a low-resource environment. For example, MS Excel can be used for logging and managing data, while MS Office can be used for reporting. An EMS' utility can also be expanded to use one or more business intelligence and data visualization products such as Power BI or Tableau.

Develop and use Line Lists

A Line List is an organized, detailed table that summarizes key information about each case in an outbreak. Line Lists could be helpful when tracking an outbreak to determine trends in the outbreak over time. Line Lists can be built and added to over time in an MS Excel spreadsheet. An EBS unit should use Line Lists to:

- *Maintain all the relevant verified information regarding key outbreaks,*
- *Undertake epidemiologic analyses to contribute to discussions in the relevant forum and contribute to broader epidemiologic investigations,*
- *Share key information during ad hoc presentations (e.g., constructing epidemic curves for use in slide presentations),*
- *Assist in communications with SMEs, and*
- *Track information found in media-reported or otherwise unverified cases.*

In a Line List database, variables recorded for each case could include:

- *Sex,*
- *Age,*
- *Jurisdiction,*
- *Date of symptom onset,*
- *Chronology of events from exposure to onset to list of symptoms,*
- *Date of hospitalization, and date of discharge (if applicable),*
- *Date of laboratory confirmation,*

- *Outcome (alive, fatal - with date of death, and unknown),*
- *Date of discharge,*
- *Lab confirmation (yes/no), and*
- *Other important qualitative information, e.g. laboratory name/source of confirmation; cluster information; web links or source of information; exposure information (e.g., bird exposure in human avian influenza infections).*

Make sure to save the spreadsheet in the Line List folder in the cloud or other shared drive. You can view a sample Line List in Appendix 5 of your Participant Guide.

Step 3: Thank participants and ask for questions

Wrap up the activity by thanking participants for their active involvement, and asking if they have any questions regarding the lecture. Clarify and answer any questions before moving to the next activity.

SESSION 8

TRAINING REVIEW AND POST-TEST

This session focuses on wrapping up the training and presenting the Rwanda Case Study which tests how well concepts have been understood and are able to be applied.

Materials

Facilitator

- Training agenda
- Case study presented in Appendix 4

Participants

- *Participant Guide* pages 60-74
- Case study presented in Appendix 6 of *Participant Guide*

Total time: 30 minutes

ACTIVITY 8.1

POST-TRAINING KNOWLEDGE CHECK

Review training

Administer the case study

Training review and case study

30 minutes

Step 1: Review the agenda and what has been learned

Ask participants to refer to their agendas to review what was discussed during the training. For every session, ask participants to share key takeaway points discussed and learned. Write their answers on the flipchart paper (if available) and encourage participants to take notes in their journals.

Step 2: Facilitate the Rwanda case study

The case study (Appendix 4) is used to test how well participants have understood key concepts and are able to apply them in a real-world context. Appendix 6 in their Participant Guides and give them time to work through the case study on their own. You can use the following script:

> *Turn to Appendix 6 in your Participant Guide and work through the case study presented there. This case study brings together the key concepts from the training and asks you to apply them to a real-world context. You will have 15 minutes to complete the case study. You are encouraged to ask us, the facilitators, if you have any questions or need clarification on questions asked in the case study.*

Remind participants to respect everyone's time by not engaging in side conversations once they have completed their case study.

Step 3: Review the case study as a group

After all participants have completed the ase study go over the answers and ask them to make corrections as needed. Ask for any clarification questions or final feedback that participants would like to provide. Thank participants for attending the training and actively participating.

APPENDICES

APPENDIX 1

SMALL GROUP EXERCISE - KEY TERMS IN PUBLIC HEALTH SURVEILLANCE

Q1: What is public health surveillance?

Q2: What is EWAR?

Q3: What do you see as the goal of EWAR?

Q4: What is epidemic intelligence?

APPENDIX 2

SMALL GROUP EXERCISE - HOW EBS AND IBS CONTRIBUTE TO EPIDEMIC INTELLIGENCE

	IBS	EBS
Process		
Characteristics of data		
Example of sources		

APPENDIX 3

SMALL GROUP EXERCISE – EBS AND IBS IN YOUR COMMUNITY

Q1: What is the purpose and importance of EBS?	**Q2:** How could EBS be used in your community?
Q3: What is the purpose and importance of IBS?	**Q4:** How could IBS be used in your community?

APPENDIX 4

RWANDA CASE STUDY

It's 10:30 am on 17 July in the Command Center. You are an EBS analyst performing a media scan on EIOS and you find the following article:

EIOS EPIDEMIC INTELLIGENCE FROM OPEN SOURCES

Monitoring | Communities and Teams | Documents | Dashboards

Uganda reports Rift Valley fever outbreak

Filed Under: **Rift Valley Fever**; **VHF**

Lisa Schnirring | News Editor | CIDRAP News | Jul 17, 2018

Share Tweet LinkedIn Email Print & PDF

Uganda's health ministry has reported a Rift Valley fever outbreak involving two of its districts, and Rwanda is reporting the disease in animals along with suspected human cases, events that are occurring alongside an ongoing outbreak in Kenya, the World Health Organization (WHO) African regional office said yesterday in its latest weekly outbreak report.

The outbreaks pose a threat to other countries in the region, especially East Africa, which is experiencing heavy rains, according to the WHO.

Livestock contract the virus from mosquitoes, and though humans can be infected by mosquitoes, the virus is more commonly passed by contact with blood or organs of infected animals or drinking milk from sick ones.

Rod Waddington / Flickr cc

Uganda cases in 'cattle corridor'

In Uganda, two unrelated cases were confirmed on Jun 28 in two separate districts in the western part of the country. Both involve men who had exposure to animals. One patient is a 47-year-old butcher who got sick on Jun 20 and died at home the following evening. Health officials collected a postmortem sample and sent it to the Uganda Virus Research Institute (UVRI).

The second patient is a laborer and herder whose symptoms began on Jun 25. He was hospitalized and isolated the following day because of suspected viral hemorrhagic fever. Samples were collected during hospitalization and sent to the UVRI. The man died on Jun 30, and a safe burial was performed, the WHO said.

Another confirmed case has been reported from a third district, but the WHO said it is awaiting more information about the illness. Two other suspected cases are under investigation, and animal samples have been collected from the farm where one of the patients worked and from the slaughterhouse where the other worked.

Uganda's government has deployed a rapid response team to the affected districts, established an isolation unit at Mbarara Regional Hospital as the main treatment center, and prepared district hospitals to handle cases.

The WHO said the affected districts are in the "cattle corridor" that stretches from the southwest to the northeast regions of the country.

The article describes the following:

- Two cases in humans (one death), in separate districts in the Western part of the country,
- The cases were reported by WHO AFRO,
- Another confirmed case from a third district, but more information is needed,
- Two other suspected cases are under investigation,
- Animal samples have been collected, and
- Information on a concurrent outbreak of Rift Valley fever in Kenya.

Considering what you have learnt so far, answer the following questions.

Q1: Is the source reporting the outbreak of RVF in Uganda an official source or an unofficial source?

Q2: Based on the source type, is verification required to confirm the RVF outbreak in Uganda?

Q3: Would you consider Rift Valley fever to be a priority disease for Rwanda? If so, why?

You continue to scan media of this event and you come across the following twitter feed:

You start seeing rumors on Twitter describing abortions and deaths in animals in northern Rwanda near the border with Uganda.

Considering what you have learnt so far, answer the following questions.

Q5: What verification activities would you perform at this time?

Q6: Would you contact someone for cross-checking the information known? If so, who?

It's 8:30 am on 6 August in the Command Center and you receive notice that the MOA and Animal Resources issued a situation update noting:

- 154 cows have died from RVF
- 257,900 cattle have been vaccinated against RVF
- An estimated 316,445 cows have been treated with ParmaPy Plus – a drug to kill ticks, flies, and mosquitoes that transmit RVF

Now that the outbreak has been confirmed you and your colleagues draft a notification about the RVF outbreak in cattle in Rwanda.

Q7: With whom do you share an RVF notification?

Q8: What is some of the information you would include in the notification?

Q9: How do you support outbreak response activities?

Public notification of RVF outbreak

Rwanda's EBS teams has contacted AFRO to report the available information according to the MOA and Animal Resources' investigation: "Rwanda is experiencing an epizootic, with suspected human cases."

AFRO has published in its weekly bulletin information on this multi-country RVF outbreak, based on information received by Uganda's PHEOC, Rwanda's RBC and Kenya's MOH.

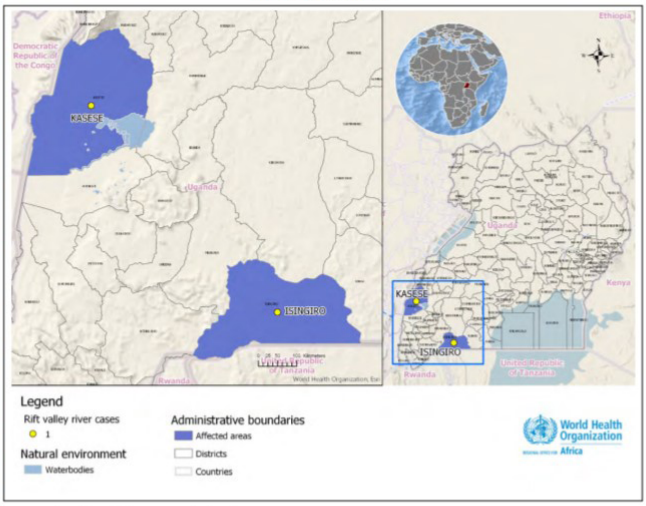
Rift Valley fever | **Uganda** | 2 **Cases** | 2 **Deaths** | 100% **CFR**

EVENT DESCRIPTION

On 29 June 2018, the Uganda Ministry of Health notified WHO of an outbreak of Rift Valley fever (RVF) in Isingiro and Kasese districts, all located in the western region of the country. Two unrelated simultaneous cases were confirmed on 28 June 2018, one in each district. The first case-patient was a 47-year-old male from Kanyatsi village in Munkunyu sub-county, Kasese District, whose main occupation was as a butcher. He fell ill on 20 June 2018 with symptoms of fever and headache, and self-administered antimalarial treatment. The case-patient died at home on the evening of 21 June 2018, with the body oozing blood from multiple orifices. The district health authority collected a nasal swab (posthumous) on notification of the death and the specimen was sent to the Uganda Virus Research Institute (UVRI) on 25 June 2018. The test result released on 28 June 2018 was positive for RVF by reverse transcriptase-polymerase chain reaction (RT-PCR).

The second case-patient was a 35-year-old male casual labourer and herdsman from Kabare village in Isingiro town council, Isingiro District. The village is located near Lake Nakivale and borders Lake Mburo National park. On 25 June 2018, he developed fever, headache, and anorexia, which was followed by epistaxis. He presented to the local health facility the same day, but was immediately referred to the regional referral hospital because of the severity of his illness and suspicion of a viral haemorrhagic disease. The case-patient was admitted in the isolation unit. A blood specimen was obtained and shipped to UVRI on 26 June 2018. The test result released by UVRI on 28 June 2018 was positive for RVF on RT-PCR. The case-patient died on 30 June 2018 and a supervised burial was carried out.

Geographical distribution of Rift Valley fever cases in Uganda, 20 - 30 June 2018



There is a report of another confirmed RVF case in Ibanda District, on which more information is being sought. Two other suspected cases are reportedly being investigated in Mbarara (1) and Kasese (1) districts. Additionally, 55 animal specimens were collected from the farm where one of the confirmed cases worked and in Isingiro town council abattoir. A further update will be provided on the evolution of this event.

Report writing activity

We're going to practice logging the RVF outbreak into a mock EMS as an EBS analyst would.

Review the GDDOC examples below, then log the RVF outbreak in the template that follows. Remember to consider criteria for EBS reporting, outbreak timeliness metrics, and EBS report components.

GDDOC example of an first report in Uganda

Country: Uganda
Agent/Disease: Rift Valley Fever
Event ID: 2235-B92.4-2018
First reported to GDDOC: 6/29/2018
Location: Kanese, Insingiro
Source: CDC Programs
Geographic scope: medium
Public health risk impact: high

Event description

The GDD Operation Center (GDDOC) has learned of two human cases of Rift Valley fever (RVF) reported in Uganda. The first case, which was fatal, was in a 49-year-old man from Kasese district who worked as a meat trader, and who had possibly also consumed meat, in Kiruhura district. He was initially suspected of being infected with anthrax, however, preliminary laboratory results at Uganda Virus Research Institute (UVRI) on 27 June indicate infection with RVF.

The second case, also fatal, was in a 35-year-old man from Insingiro district who worked as a herdsman; he also has a history of slaughtering and consuming meat from an ill cow. The patient was hospitalized on 26 June with fulminant viral haemorrhagic fever (VHF), and later died. Preliminary laboratory tests at UVRI on 27 June also indicate infection with RVF.

The UVRI VHF team is in the field conducting animal and human investigations in both locations, serving as the Ministry of Health's Rapid Response Team.

The GDDOC last reported RVF in Uganda in February 2018, at which time nine human cases with five deaths were reported from the districts of Kiboga, Mityana, Kyankwanzi, Kiruhura, Buikwe, and Arua.

The GDDOC will report additional information as it becomes available.

GDDOC example of information on RVF in Rwanda

Country: Rwanda
Agent/Disease: Rift Valley Fever
Event ID: 2248-B92.4-2018
First reported to GDDOC: 6/7/2018
Location: Eastern Province
Source: CDC Programs
Geographic scope: medium
Public health risk impact: high

Event description

The OIE has reported outbreaks of Rift Valley fever (RVF) among cattle in Eastern Province, Rwanda. Eight outbreaks were reported in Kirehe district (three outbreaks) and Ngoma district (five outbreaks). Of 33 susceptible cattle, there were 26 cases with two deaths. The cases were all in dairy cows and calves.

Laboratory testing was conducted at the National Veterinary Laboratory, samples tested positive by serology on 6 and 29 June. In response to the outbreak, the Ministry of Agriculture and Animal Resources (MINAGRI) implemented quarantine measures including banning the movement of livestock and livestock products in the districts of Kirehe, Ngoma, and Kayonza. Further, a vaccination campaign among livestock was conducted in 18 districts, which included 237,386 cattle, 22,727 goats, and 17,872 sheep, representing a coverage of 84.6%, according to OIE.

To prevent cases among humans, a community sensitization campaign using the media is underway, educating the public with regard to mosquito control and avoiding meat from livestock that appear ill. MINAGRI has also advised reporting of suspected cases among livestock to veterinarians.

The GDD Operations Center will provide updates as they become available.

GDDOC example of an update to a report in Uganda

Country: Uganda
Agent/Disease: Rift Valley Fever
Event ID: 2235-B92.4-2018
First reported to GDDOC: 6/29/2018
Location: Western Uganda
Source: CDC Programs
Geographic scope: medium
Public health risk impact: high

Event description

This is an update to the cases of Rift Valley Fever (RVF) in Uganda, last reported by the GDD Operations Center (GDDOC) on 3 August 2018.

To date, there have been a total of 25 cases in humans with 13 deaths (case-fatality proportion=52.0%) attributable to RVF reported from Uganda during 2018. Cases have been reported from the districts of Insingiro (11 cases, 4 deaths), Mbarara (2 fatal cases), Kasese (1 fatal case), Sheema (1 fatal case), Ibanda (1 case), Lwengo (1 case), exported from Mubende (1 case), Sembabule (1 case), Iganga (1 fatal case), Kiruhura (2 cases, 1 death), Rakai (1 fatal case), Buikwe (1 fatal case), and Yumbe (1 fatal case).

All cases have been confirmed positive from RVF by polymerase chain reactions (PCR) at the Uganda Virus Research Institute (UVRI). The index case, which was fatal, was in a 35-year-old herdsman from Isingiro district who had illness onset on 22 June. Most cases have been reported in people who work as herdsman, butchers, or farmers.

Ongoing outbreaks of RVF affecting both humans and animals have been reported in the neighbouring countries of Kenya, Rwanda, and South Sudan. Reoccurrences of RVF have become common in Uganda in recent years. The last documented outbreak ended in January 2018 and affected several districts including Arua, Buikwe, Kiboga, Kiruhura, Kiynkwanzi, and Mityana. The rainy season, flooding, and confirmed outbreaks in neighboring Kenya, Rwanda and South Sudan all increase the risk of RVF transmission in Uganda. The affected districts are located in the cattle corridor, and uncontrolled movement of livestock can propagate the risk of spread of RVF to new areas. The RVF epizootic causes agricultural impact and economic losses to communities because of high mortality and abortion rates among infected livestock. WHO recommends strengthening the multisectoral One Health approach to mitigate this RVF outbreak in Uganda and neighboring countries.

The GDDOC will report additional information as it becomes available.

Now it's your turn. Fill in the logging template with details of the RVF outbreak described throughout this case study.

Country:
Agent/Disease:
Event ID:
First reported to GDDOC:
Location:
Source:
Geographic scope:
Public health risk impact:

Event description

APPENDIX 5

SMALL GROUP EXERCISE

Q1: Differentiating information: EBS or public health?

Complete the matching activity on different types of information. Circle **A** for items that meet the criteria for early warning information. Circle **B** for items that meet the criteria for public health/risk communication information.

- A / B - Growing public health sentiment or discord
- A / B - Clusters of an unknown disease
- A / B - Unusual or excess deaths occurring in a community
- A / B - Circulating public health misinformation
- A / B - New public health laws or regulations passed
- A / B - Unusual die-off of animals
- A / B - Annual/routine reports of morbidity and mortality
- A / B - Drug/vaccine developments
- A / B - Unexpected occurrence of a disease not previously reported from an area
- A / B - New public health/ ministry of health leadership
- A / B - Chronic or noninfectious disease reports
- A / B - Accidental or deliberate pathogen release
- A / B - Toxic chemical releases
- A / B - Reports on occupational health
- A / B - Radio-nuclear releases
- A / B - New motor vehicle or other travel related safety measures

Q2: Differentiating media headlines for EBS from information for public health/risk communication)

Consider the following examples of media headlines to complete the matching activity. Circle **A** for headlines that meet the criteria for early warning information, and circle **B** for headlines that meet the criteria for public health/ risk communication information.

- A / B - “50 unexplained deaths”
- A / B - “A major AIDS awareness campaign launched”
- A / B - “New bleeding syndrome reported”
- A / B - “A new Minister of Health elected”
- A / B - “Crime rates up by 40%”
- A / B - “High absenteeism at local school”
- A / B - “Farmer reports entire flock die off in Northern province”
- A / B - “New airbag safety measures mandated”
- A / B - “Flooding in Southern province”
- A / B - “Cholera reported for the first time”
- A / B - “Miner killed on the job”

APPENDIX 6

INDIVIDUAL EXERCISE: FREQUENCY OF REPORTING

Q1: List a few examples of health events that require immediate reporting.

Q2: List a few examples of health events for which accuracy should be prioritized.

APPENDIX 7

INDIVIDUAL EXERCISE: EBS REPORTS

Part A) What information should be included in an EBS report?

Part B) Identifying the key elements in a sample CDC EBS report

- The Global Disease Detection Operations Center (GDDOC) has learned of an outbreak of measles in Romania.
- On 21 September 2016 the Romanian Ministry of Health (MOH) reported that in the first eight months of this year, they have recorded 675 confirmed cases of measles in 23 counties, with two deaths. A third suspected measles death was reported but is undergoing final confirmation. The two confirmed and one suspected deaths all occurred in children younger than one year, which is under the age of routine measles vaccination. The MOH attributes the resurgence of measles to failure of some parents to adhere to the routine vaccination schedule.
- The National Institute of Public Health recommends vaccinating children in the affected areas of the country at the age of seven months with resumption of the normal vaccination schedule at one year of age.
- In 2015 Romania reported only seven confirmed cases of measles and no deaths. Measles vaccination coverage has gradually declined from a high of 98% in 2000 - 2002, to 86% in 2016. Officials report that there is no shortage of MMR vaccine in the country.
- GDDOC will continue to follow this outbreak and report updates as they become available.

MODULE 6.2

INTERNET EVENT-BASED SURVEILLANCE TRAINING MODULE

PARTICIPANT GUIDE

U.S. Centers for Disease Control and Prevention

TABLE OF CONTENTS

ACRONYMS

US CDC	U.S. Centers for Disease Control and Prevention
CBS	Community-Based Surveillance
CHV	Community Health Volunteers
EBS	Event-Based Surveillance
EI	Epidemic Intelligence
EWAR	Early Warning and Response
HEBS	Health Facility Event-Based Surveillance
IBS	Indicator-Based Surveillance
IDSR	Integrated Disease Surveillance and Response
IEBS	Internet Event-Based Surveillance
IHR	International Health Regulations (2005)
MOH	Ministry of Health
MS	Member States
NGO	Non-Governmental Organization
WHO	World Health Organization

GLOSSARY OF TERMS

Community-based surveillance (CBS):

CBS is the systematic detection and reporting of events of public health significance within a community, by community members. Community Health Volunteers (CHV), the public, religious leaders, civil society members, teachers, and similar groups are engaged and trained to detect and immediately report events or health risks occurring in their communities. CBS may also be known as community health surveillance, or community event-based surveillance.

Community health volunteers (CHV):

According to a WHO study group, CHVs 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. They may also be known as community health workers, among other terms.

Event:

The International Health Regulations (IHR) define an event as "[…] a manifestation of disease or an occurrence that creates a potential for disease; […]". This includes 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 the World Health Organization (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.

Geographic Scope:

The observed geographic distribution and rapidity of spread for public health event and is categorized as follows:

High: Events affecting several multi-national regions or continuing spread beyond national borders;

Moderate: Events affecting a multi-national region or continuing spread within national borders;

Low: Events limited to sub-national areas.

Health Event of International Importance:

A verified outbreak or a health threat that meets one of the following criteria, modeled after Annex 2 of the International Health Regulations: Is one of the following: SARS, polio (wild-type), smallpox, or a new subtype of influenza; Presents a serious threat to public health; is unusual or unexpected; poses a significant risk for international spread that potentially requires international intervention; or potentially causes restrictions of trade or travel.

Health Event Under Investigation:	An outbreak or a health threat that potentially meets one of the above criteria, but is not yet verified.
Health Event for Information:	A description of a verified health event that does not meet one of the above criteria but is of interest to the public health community because it poses a potential public health risk.
Health facility:	Defined by WHO as any establishment that is engaged in direct on-site patient care.
Health facility event-based surveillance (HEBS):	EBS that is conducted in health facilities. Healthcare workers are involved as either the primary reporting sources, such as during patient consultations, or as secondary sources, reporting unusual health events or health risks picked up through patient consultations.
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.
Information Credibility Scale:	Combines 1) the credibility of the source with 2) the validity of the information and is categorized as: **High:** evidence from public health agencies, in-country laboratories; not confirmed, but logical and consistent with event information; **Moderate:** Public health agency staff with in-country information without approved laboratory support, but not without some doubt of authenticity, trustworthiness. *Note: that this scale only applies to events categorized as Health Event Under Investigation*
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 other terms.
Internet event-based surveillance (IEBS):	Internet event-based public health surveillance looks at reports, stories, rumors, and other information about health events that could be a serious risk to public health; such information may be described as unstructured information because the information obtained is non-standardized or subjective. WHO: Implementation of Early Warning and Response with a focus on Event-Based Surveillance, Interim Version

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.
One Health:	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.
Public Health Impact:	Refers to actual or potential severity of illness, ease of transmission, public fear, or economic effects and is categorized as follows: **High:** highly pathogenic, highly transmittable, new or emerging, or has significant potential to disrupt travel or trade; **Moderate:** the potential to cause morbidity /mortality, transmit efficiently, or to disrupt travel or trade.
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.
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.
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 need to be triaged and verified before a 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.
Surveillance:	Is the ongoing systematic collection, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know.
Triage:	The process of screening out the data and information that are relevant for early detection purposes (i.e., the screening out of 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". Under the IHR, all State 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 cross-checking of the validity (veracity) of the signals collected by Early Warning and Response, by contacting the original source, additional sources, or by performing field investigation. Verification requires that hoaxes, false rumors, and artefacts are eliminated from further consideration.

INTRODUCTION

Many countries lack the essential resources required to meet the revised International Health Regulations (IHR 2005) requirements to effectively monitor, report, and respond to any disease or other public health threat with the potential to harm the public's health.

The revised IHR is the international agreement designed to help contain or prevent serious risks to public health and discourage unnecessary or excessive restrictions on travel or trade entered into force in 2007. The revised Regulations acknowledge that public health events can pose threats beyond national borders and that Member States have a responsibility to the global community to identify, report, and when possible, contain public health threats before they become "public health emergencies of international concern". While public health burden is assessed by analyses of quantitative data collected via traditional surveillance methods, an estimate of public health can be gleaned via event-based surveillance (EBS) data.

Countries that lack resources could have inadequate health service infrastructures, poorly trained staff, inadequate diagnostic lab capacities, or weak reporting mechanisms. Furthermore, many governments could be reluctant to report public health events to the international community. Both situations - if countries cannot or will not report - are ideal for EBS. EBS is a system of organized and rapid capture of information about potential public health threats that pose a risk to public health.

These are defined at:
WHO: Implementation of Early Warning and Response with a focus on Event-Based Surveillance, Interim Version

An EBS unit includes a director and staff ("Analysts") with expertise in infectious and non-infectious disease, human and veterinary medicine, medical microbiology, epidemiology, and information technology who are responsible for:

- Detection and verification of public health threats,
- Tracking and identifying "mysterious illnesses" for the which etiology is unknown,
- Establishing a subject matter network to assist with threat verification, and
- Partnering with local, regional, and international public health organizations to disseminate information.

This module describes the daily responsibilities of an EBS unit positioned at the central, or federal, level and addresses resources that should be used and applied to successfully conduct EBS.

Background

The mission of an EBS unit should be to provide a single source of reliable, comprehensive, and confirmed information on international disease outbreaks and other public health threats by systematically collecting and analyzing international health event data, conducting risk assessments, classifying the health risks associated with these events, and disseminating health threat information.

This system of risk assessment is particularly effective in detecting public health threats in countries that have weak surveillance and reporting. Sources of data include existing channels of established formal and routine reporting systems, and informal open channels, using internet-based media, social media, and non-governmental organizations.

Analysts in an EBS unit provide prompt, expert analysis and projected impact of public health threats. Data collected from disparate sources are reviewed and verified through refined methodologies and protocols, including the use of sophisticated text-mining and multilingual translating systems.

Events should be triaged and entered into a software application, creating a database of analyzed public health threats. Such a database should ideally be used to create reports to disseminate to shareholders and partner organizations, with reporting frequency determined by the EBS unit and shareholders.

Analysts in an EBS unit should be knowledgeable with regard to the International Health Regulations (IHR). The IHR is an international legal instrument that is binding in 194 countries, including all the Member States of the World Health Organization (WHO). The IHR initially came into being in 1969 and remained relatively unchanged until a revision was completed in 2005.

The aim of the IHR (2005) is to:

- Ensure the international community can prevent and respond to acute public health risks that have the potential to cross borders and threaten people worldwide,
- Provide a legal framework for the prevention, detection and containment of public health risks at source, before they spread across borders, through the collaborative actions of States Parties and WHO, and
- Be inclusive in respect of the public health events under consideration.

All Member States are required to notify WHO for all "events that may constitute a public health emergency of international concern" under the IHR. In this regard, the broad new definitions of "event", "disease" and "public health risk" in the IHR are the building blocks of the surveillance obligations for States Parties and WHO. Within the IHR they define a Public Health Emergency of International Concern (PHEIC) as "an extraordinary event which is determined to constitute a public health risk to other States through the international spread of disease and to potentially require a coordinated international response." Events of potential international concern require States Parties to notify WHO and may extend beyond communicable diseases and arise from any origin or source.

The IHR document itself and information on it can be found here: http://www.who.int/ihr/en/.

Internet event-based surveillance (IEBS)

An EBS unit conducts event-based surveillance, as opposed to indicator or case-based surveillance.

EBS is the organized and rapid capture of information about events that are a potential risk to public health:

- It is designed for early warning and rapid response,
- There is a systematic monitoring of events, event assessment and verification, and data dissemination,
- The collection and collation of information is processed in real time, and
- There is no designated timeline or predefined structure for reporting.

EBS has several advantages over case-based surveillance, because case-based surveillance:

- Produces credible information, but reporting is often delayed,
- Is designed for known diseases; diseases are often not reported until the etiology is known,

- Is not well-established in all countries, and
- Is limited to the health sector, whereas media and other types of open-source reports often originate from highly-motivated entities, such as journalists, which can promptly provide information to open sources

EBS is primarily conducted using the internet: information, or "epidemic intelligence" is collected from formal and informal sources, including media reports, to detect potential public health events to verify and take action on, if necessary. Public health events that include notable human or animal illnesses or deaths, for example, will likely be covered by local media sources which will undoubtedly be posted on the internet, before they are detected, confirmed, and reported by a local public health agency.

Staffing of an EBS unit

A highly trained staff with diverse backgrounds is imperative to the function of an EBS unit.

Director, reports to public health agency leadership

- Leads in a proactive, customer-responsive manner consistent with stakeholders: ascertains needs/ requirements, solicits feedback, and makes appropriate adjustments,
- Ensures a high level of standard and quality of the services and products provided by the EBS unit,
- Identifies the priority and strategy for the EBS unit and plans, organizes, and assigns work,
- Responsible for prudent management of financial resources provided to the EBS unit, and for reporting expenditures,
- Recruits and selects staff,
- Establishes employee performance plans, and completes required reviews and ratings, and
- Leads a daily epidemic intelligence meeting and contributes technical and global health expertise and knowledge.

Analysts, report to EBS Unit Director

- Conducts EBS, including detection, verification and risk assessment of public health events,
- Identifies, collects, and consolidates public health event data,
- Liaises with other units within the agency, and with external public health agencies,
- Prepares and submits reports and other products related to the EBS unit, as well as manuscripts, presentations, journal articles and publications based on scientific findings,
- Supervises interns, students, and guest researchers, and
- Develops new concepts, methods and strategies for conducting EBS.

Analysts should possess specialized training, including medical officers, veterinary medical officers, and doctoral epidemiologists.

Medical officers

- Provides technical expertise on scientific planning, implementation and analysis of medical aspects of scientific research studies,
- Provides agency wide leadership for medical, epidemiologic, and scientific activities, and
- Serves as an expert on clinical human medicine.

Veterinary medical officers

- Provides expert veterinary medical consultation services,
- Provides international zoonotic disease surveillance and epidemiology,
- Provides knowledge of prevention and control of zoonotic disease,
- Integrates veterinary and public health research and practice,
- Coordinates veterinary medical technical assistance on scientific features of zoonotic disease,
- Monitors global human and animal health systems,
- Establishes and maintains channels of information gathering and sharing on animal populations, existing animal surveillance systems, databases and veterinary government contact points, and
- Develops plans for using epidemiologic methods to reduce public health risks associated with the handling, exhibition, production and consumption of animals and their products/by-products.

Medical officers

- Develops policy and objectives, appraising programs and initiating requirements for epidemiologic studies,
- Evaluates data collection, quality control and data utilization methods to study epidemiologic problems,
- Coordinates analytical and data visualization projects, and
- Develops training curricula on core concepts in EBS and leads EBS workshops/mentorships.

OVERVIEW

Purpose

The *Internet Event-Based Surveillance Training Module* will provide public health professionals with the knowledge, skills, and tools necessary to effectively implement EBS using the internet as a primary source of information. The module will additionally help public health professionals to plan, organize and establish an EBS unit in their jurisdiction.

This module is divided into eight sessions, including a case study and post-test to check participant progress after the training.

General Objectives

By the end of this training module, participants will have the skills, knowledge, and resources to complete the following tasks:

- Supervise and conduct effective EBS activities in health facilities and communities that are in line with routine surveillance strategies,
- Contribute to the flow of surveillance-related information between the community level and the existing public health surveillance system, and
- Establish an EBS unit positioned at the central or federal level.

INTERNET EVENT-BASED SURVEILLANCE TRAINING AGENDA

DAY 1

SESSION	ACTIVITIES	TIME
1. Welcome and Introductions	Icebreaker	15 minutes
2. Training Objectives and Agenda	Agenda	10 minutes
3. Introduction to Key Concepts in Epidemic Intelligence	Lecture Small group exercise	45 minutes
4. Identifying Signals for Priority Diseases	Lecture Group discussion	1 hour
5. Signal Verification and Rapid Event Assessment	Lecture	60 minutes
Internet Event-Based Surveillance Training Day 1		**Total: 3 hours 10 minutes**

DAY 2

SESSION	ACTIVITIES	TIME
6. Registration and Reporting of Events	Lecture Small group exercise Group discussion	1 hour 15 minutes
7. Establishing an EBS Unit	Lecture	45 minutes
8. Training Review, Case Study and Close	Post-test	30 minutes
Internet Event-Based Surveillance Training Day 2		**Total: 2 hours 30 minutes**

SESSION 1

WELCOME AND INTRODUCTIONS

Purpose

- Getting to know each other
- Group formation

Total time: 15 minutes

Introductions questions

Q1: What is your name and which organization or agency do you work for?	**Q2:** What is one thing you enjoy about working in public health?
Q3: What two words best describe the people your work with in your organization?	**Q4:** Have you taken any previous trainings or workshops related to event-based surveillance?
Q5: What is one expectation you have for this training?	

SESSION 2

TRAINING OBJECTIVES AND AGENDA

Purpose

- Training overview and purpose
- Agenda for the day

Total time: 10 minutes

Purpose of internet event-based surveillance training

The purpose of this training is to provide you—public health professionals—with the knowledge, skills, and tools necessary to conduct event-based surveillance (EBS) in your countries. This training aims to develop your ability to:

- Supervise and conduct effective EBS activities in health facilities and communities that are in line with routine surveillance strategies,
- Contribute to the flow of surveillance-related information between the community level and the existing public health surveillance system, and
- Establish an EBS unit positioned at the central or federal level.

This two-day EBS training is divided into two parts. The first day will focus on:

- Key concepts in epidemic intelligence,
- How to identify signals for priority diseases, and
- Signal verification and rapid event assessment.

The second day will focus on:

- Registration and reporting of events,
- Establishing an EBS unit, and
- Training review and post-test.

SESSION 3

INTRODUCTION TO KEY CONCEPTS IN EPIDEMIC INTELLIGENCE

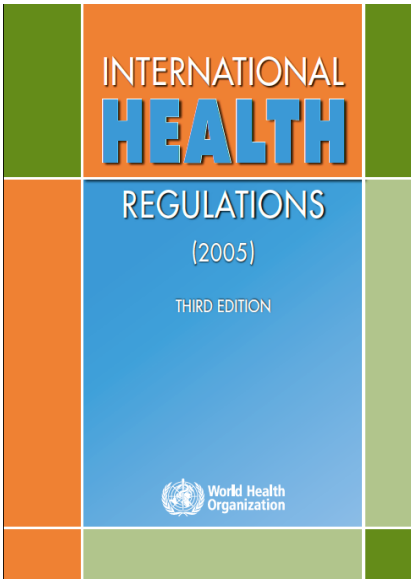
Purpose

- Define key terms connected with epidemic intelligence
- Identify guiding documents for public health surveillance
- Describe the roles of IBS and EBS in epidemic intelligence
- Identify key differences in IBS and EBS in epidemic intelligence
- Describe the signal detection process

Total time: 45 minutes

Q1: What is public health surveillance?

International Health Regulations (IHR)



The revised IHR is an international framework for strengthening and maintaining capacities for early detection and response. The IHR:

- Is a binding legal agreement,
- Defines the obligations of Member States and the WHO,
- Meets the minimum requirements to detect, assess, report, and respond to public health events, and
- Can be accessed via: http://www.who.int/topics/international_health_regulations/en/

What is a public health emergency of international concern?

The IHR define a public health emergency of international concern as an extraordinary event which is determined to constitute a public health risk to other states through the international spread of disease that potentially requires a coordinated international response.

Q2: What is early warning and response (EWAR)?

Q3: What do you see as the goal of EWAR?

Flattening the curve

Flattening the curve means taking action quickly to change an epidemic curve from the red line to the dotted gray line, reducing the number of cases and the overall impact of the health event.

"flatten the curve..."

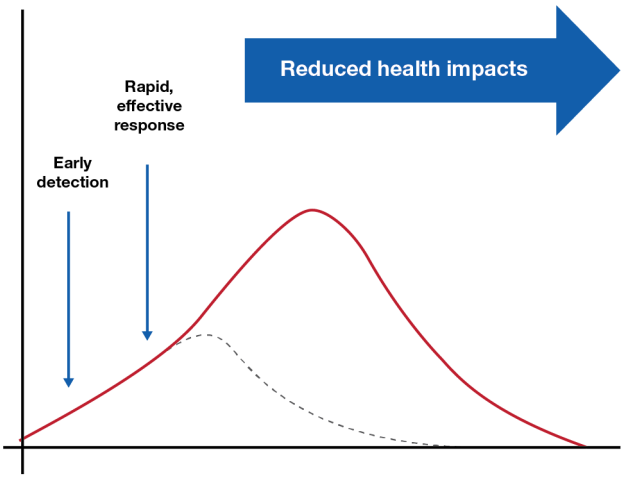


Figure 1. The Objective of EWAR: Flatten the Curve

Q4: What is epidemic intelligence?

At each phase, the material/information is moved through different classifications starting with the **raw information** that needs to be reviewed and triaged. Once that data has been screened and triaged, or organized by its importance to public health, those pieces of information that are relevant are classified as **signals**, which require further verification.

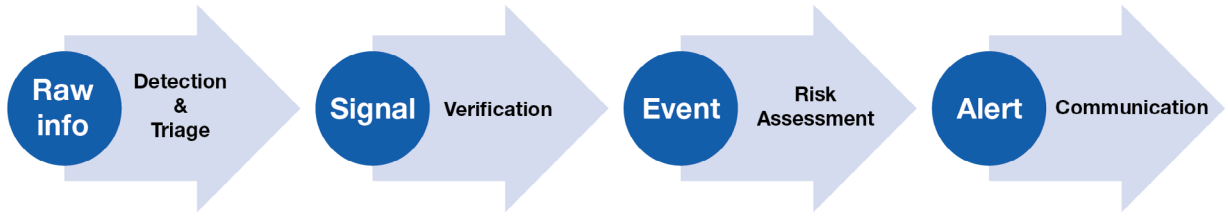


Figure 2. Epidemic Intelligence Overview

Indicator-based surveillance and EBS in epidemic intelligence

Indicator-based surveillance (IBS) and EBS are complementary sources.
IHR and related guidance suggest that countries build capacities for early warning functions through the integration of systems for IBS and EBS.

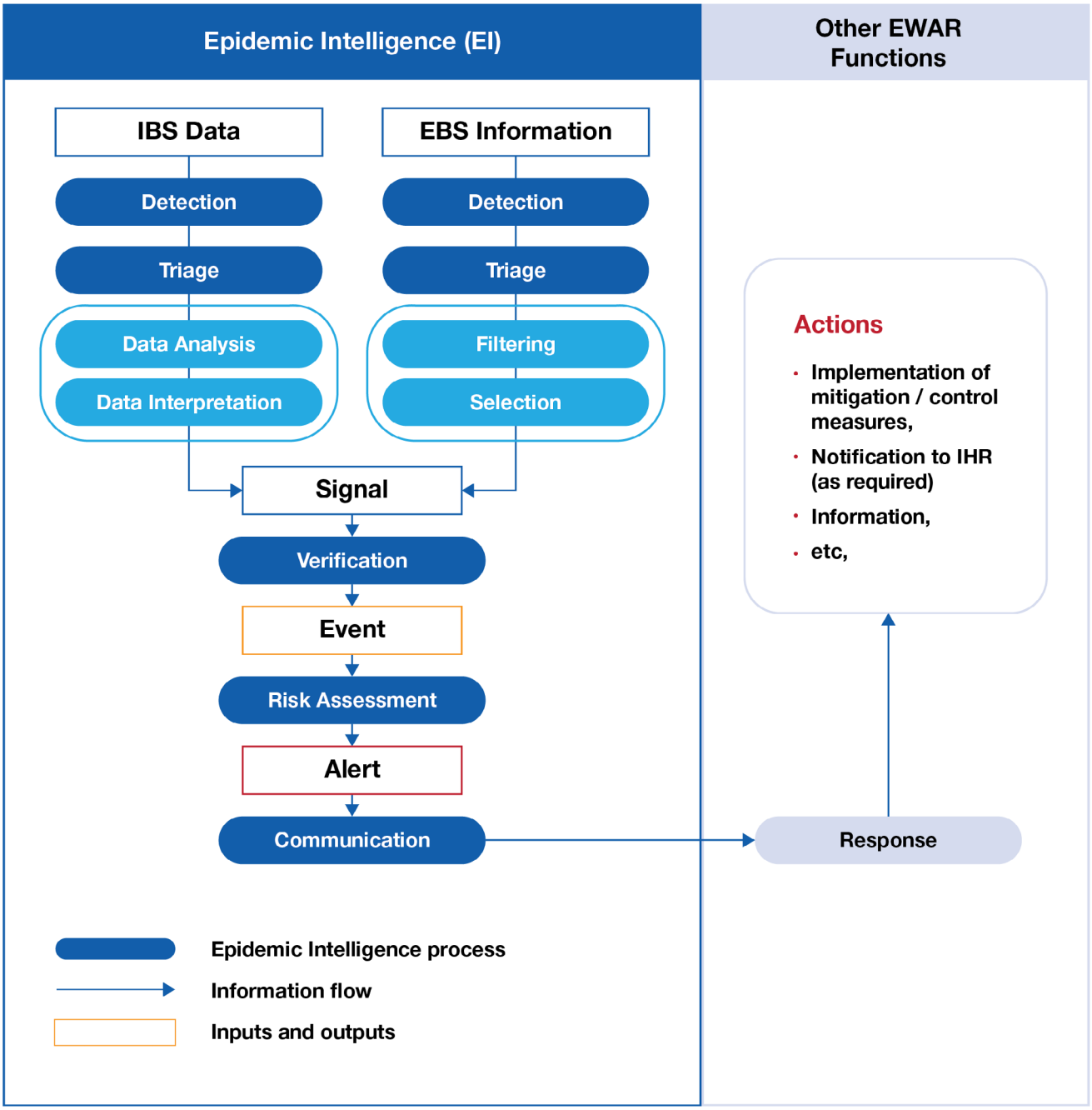
How EBS and IBS contribute to epidemic intelligence

Thinking about the differences between IBS and EBS, write down a few key points for each of the following topics:

	IBS	EBS
Process		
Characteristics of data		
Example of sources		

This diagram below depicts the collection of data (IBS and EBS) with the aim of detecting emerging health threats through a process called epidemic intelligence.

Figure 3. Early Warning and Response Diagram



Signal detection within epidemic intelligence

Signals are composed of data and/or information considered by the EWAR system as representing a potential acute risk to human health.

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.

Signal detection process

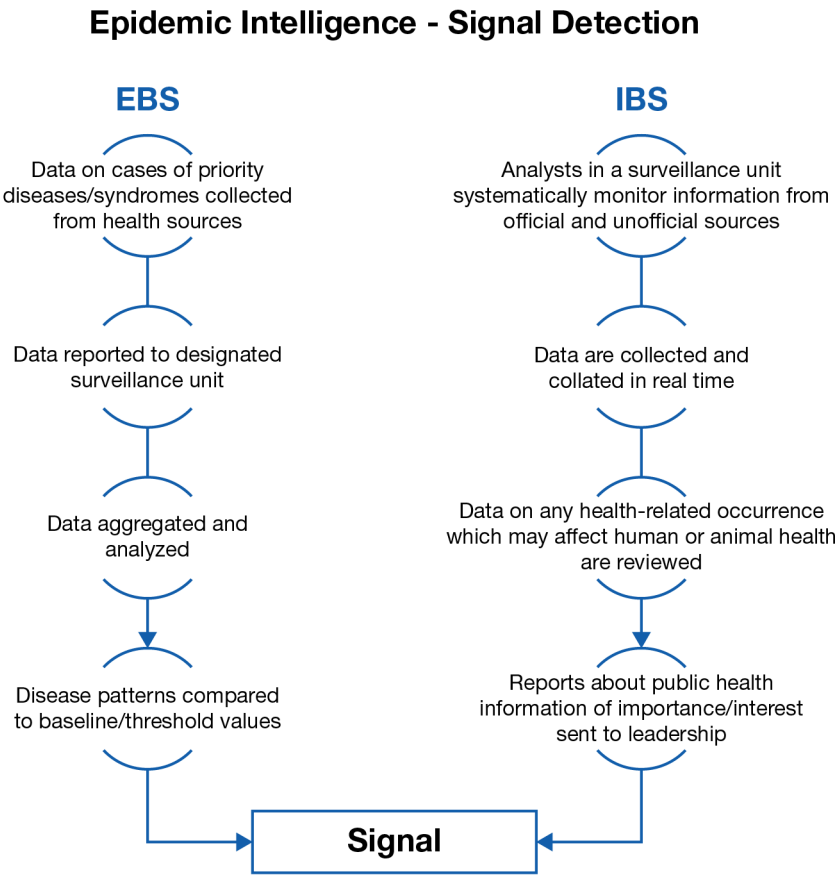


Figure 4. Signal Detection Process

EBS and IBS work hand-in-hand for epidemic intelligence

EBS and IBS are components of EWAR and epidemic intelligence, incorporated into the IDSR strategy. EBS and IBS complement each other, although with separate roles and purposes.

Unlike IBS, EBS is not based on the routine monitoring of indicators and automated thresholds for action, but rather on the screening of all available information to detect any event happening in the community.

Traditional disease reporting mechanisms:

- Produce credible information but reporting is often delayed (while media monitoring systems are gathering information 24/7),
- Are designed for known diseases and often do not report cases until the etiology is known,
- Are not well established in all countries, and
- Are limited to the health sector, whereas media reports come from reporters who are highly motivated to report disease events or health threats and have a way to promptly provide the information to the public.

Q1: What is the purpose and importance of EBS?	**Q2:** How could EBS be used in your community?
Q3: What is the purpose and importance of IBS?	**Q4:** How could IBS be used in your community?

Now that we have some ideas on what EBS and IBS are, why they are important, and how they can be applied to your community, we will start Session Four focused on how to identify signals for priority diseases.

SESSION 4

IDENTIFYING SIGNALS FOR PRIORITY DISEASES

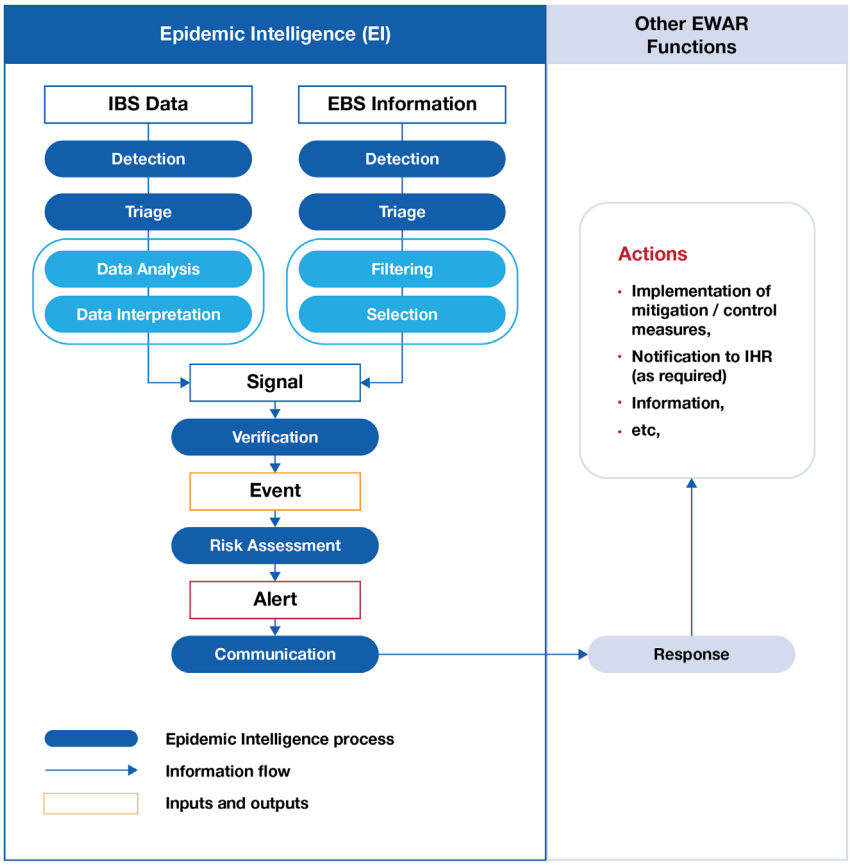
Purpose

- Describe different types of information sources that can be used for signal detection
- Explain the data collection and verification process
- Distinguish formal from informal sources of EBS information
- Describe methods for filtering and selecting information

Total time: 60 minutes

The context for signal detection

The EWAR diagram depicts the collection of IBS and EBS data with the aim of detecting emerging health threats through a process called epidemic intelligence.



Defining signals and signal detection

Q1: What do signals consist of?	**Q2:** How are signals detected?

Where does EBS information come from?

EBS information may come from numerous sources across sectors and levels. Thinking of your own work, can you think of any examples of EBS sources?

Q1: At the national level?	**Q2:** What about at the international level?

This graphic depicts examples of these sources, from those closest to the community level (at the base of the arrow) to examples of international sources at the top of the figure.

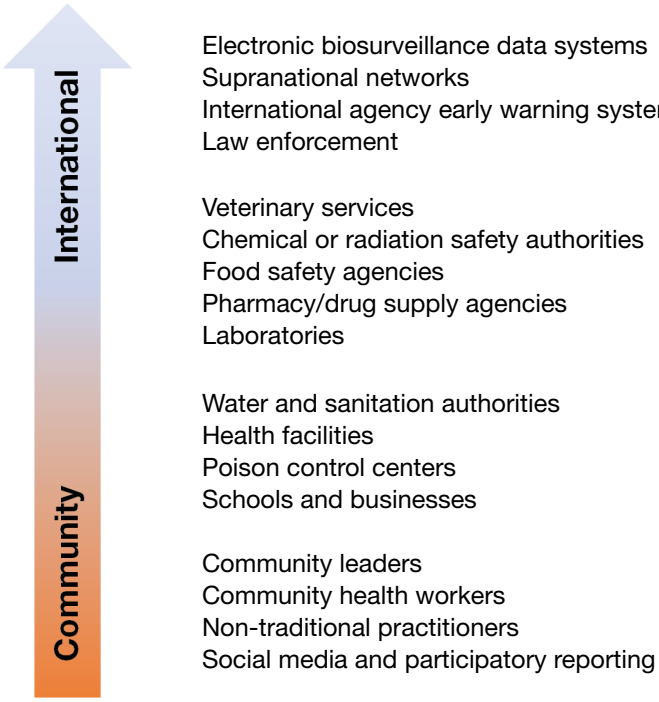


Figure 5. Sources of EBS Information

Online sources of information for EBS

Various types of electronic or online sources can provide information for EBS:

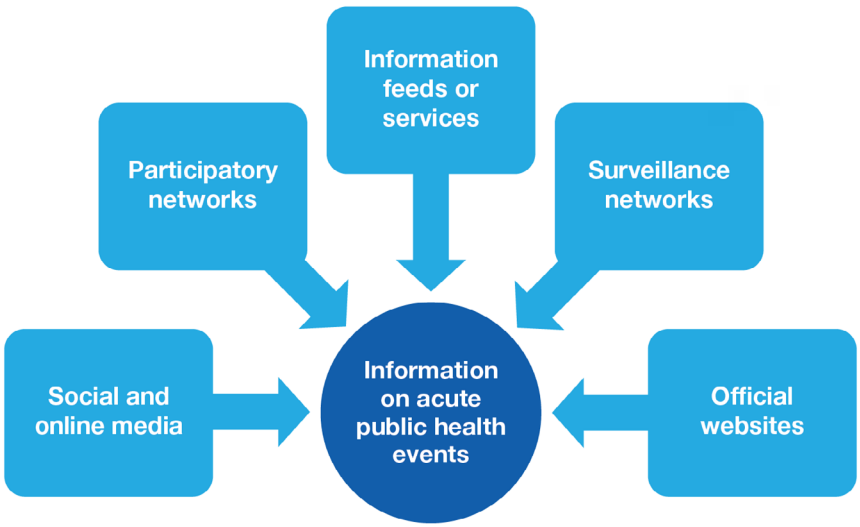


Figure 6. Online sources of information for EBS

Types of electronic or online information that may serve as sources of EBS signals include:

- Official websites
- Surveillance networks
- Information feeds or services
- Participatory networks
- Social and online media

Sources of EBS signals

Potential sources of EBS signals include both official and unofficial sources:

- **Official** (or formal) sources are any governmental, subnational, national or international institution accredited to provide information, and
- **Unofficial** (or informal) sources are those that are directly involved in an event as either service providers or members of the affected population making inquiries or sharing information via unstructured channels.

Sources of EBS information

Answer these questions before turning the page to view the model answers.

Q1: What are some examples of formal sources of EBS information?	**Q2:** What are some examples of informal sources of EBS information?
Q3: Can informal sources be useful? Why?	

Example of a formal source of EBS information – WHO Disease Outbreak News

Figure 7. WHO Disease Outbreak News

Examples of informal sources of EBS information

Figure 8. Informal sources of EBS information

Triage of raw EBS inputs

Q1: What is the goal of information triage?

Q2: In the context of triage for EBS, how would you define filtering?

Q3: In the context of triage for EBS, how would you define selection?

Filtering

Filtering refers to the screening out of duplicates and irrelevant information.

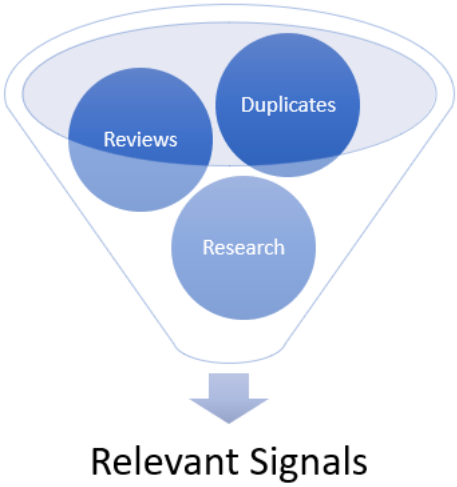


Figure 9. Filtering for Relevant Signals

The general process of automated analysis using scrapers and aggregators is depicted in the figure below.

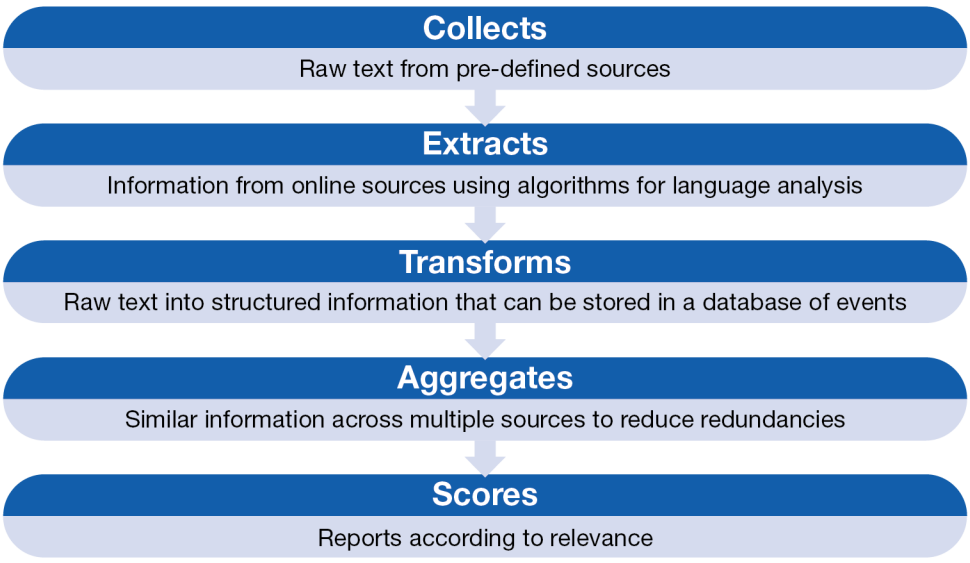


Figure 10. Automated Analysis Using Scrapers and Aggregators

The figure below shows some examples of IEBS systems:

System Name		Country	No. Languages	Moderated
EIOS		Global	>50	No
GPHIN		Canada	9	Yes
HealthMap		US	7	No
MedISys		EU	26	No
ProMED		US	4	Yes

Figure 11. Examples of Media Aggregators for IEBS

The selection process

The national EWAR surveillance objectives will depend on the characteristics of the disease or hazard, such as:

- Diseases (e.g. measles),
- Syndromes (e.g. hemorrhagic fevers),
- Hazards (e.g. contamination of drinking water source), and
- Unexpected/unusual events (e.g. unexplained mortality).

The objectives depend on the characteristics of the disease or hazard, such as:

- Attack rate,
- Morbidity and mortality,
- Environment,
- Mode of transmission, including but not limited to:
  - Person-to-person,
  - Point source,
  - Toxin exposure, and
  - Public health interventions required to mitigate spread.

Considerations for developing a list of priority diseases for EBS

- Ensure sensitivity and adequate disease coverage of an EBS program; don't forget to look for what you don't yet know about!
- Ensure sustainability of the EBS program (human resource bandwidth).
- Consider how easily the defined surveillance program can be maintained over time without undermining other public health programs.

No country, regardless of resources, can monitor every potential source of information for signals of public health events. Therefore, a country-specific list of priority diseases for EBS should be established.

SESSION 5

SIGNAL VERIFICATION AND RAPID EVENT ASSESSMENT

Purpose

- Describe under what conditions verification is required
- Describe the key steps associated with the verification process
- Explain the role of SMEs and social media in EBS
- Explain the IHR Annex 2 and international reporting requirements
- Describe how EBS analysts can conduct high-level rapid event assessments

Total time: 60 minutes

The EWAR diagram

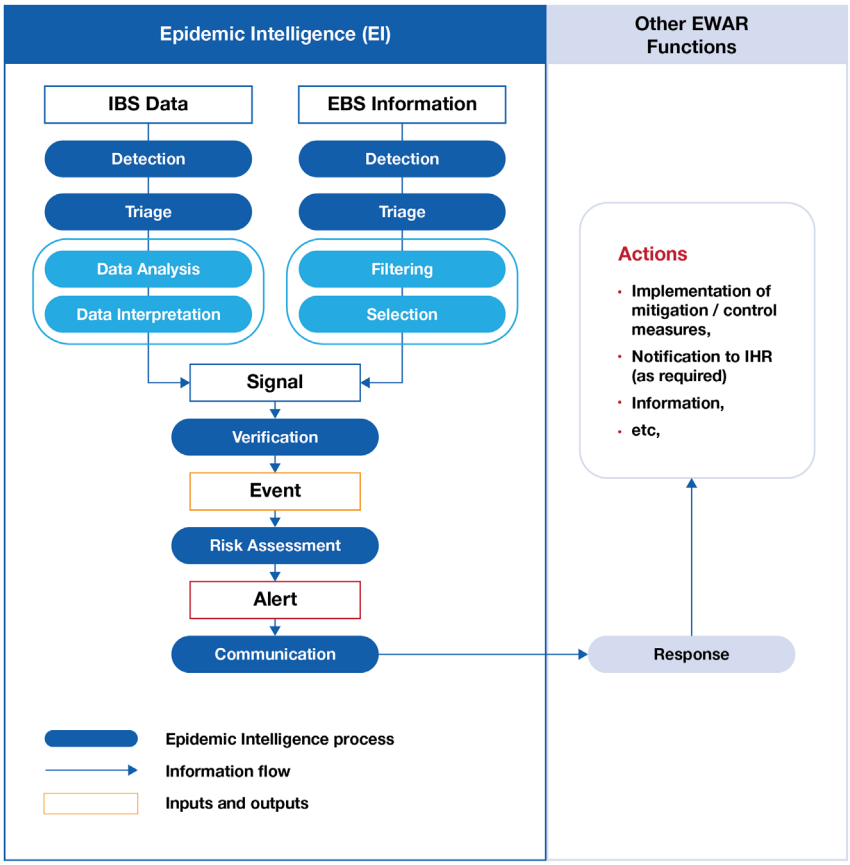


Figure 12. Early Warning and Response Diagram

The verification process

Q1: What are the four steps that should actively be taken in the verification process?

Step 1: Consider the information source

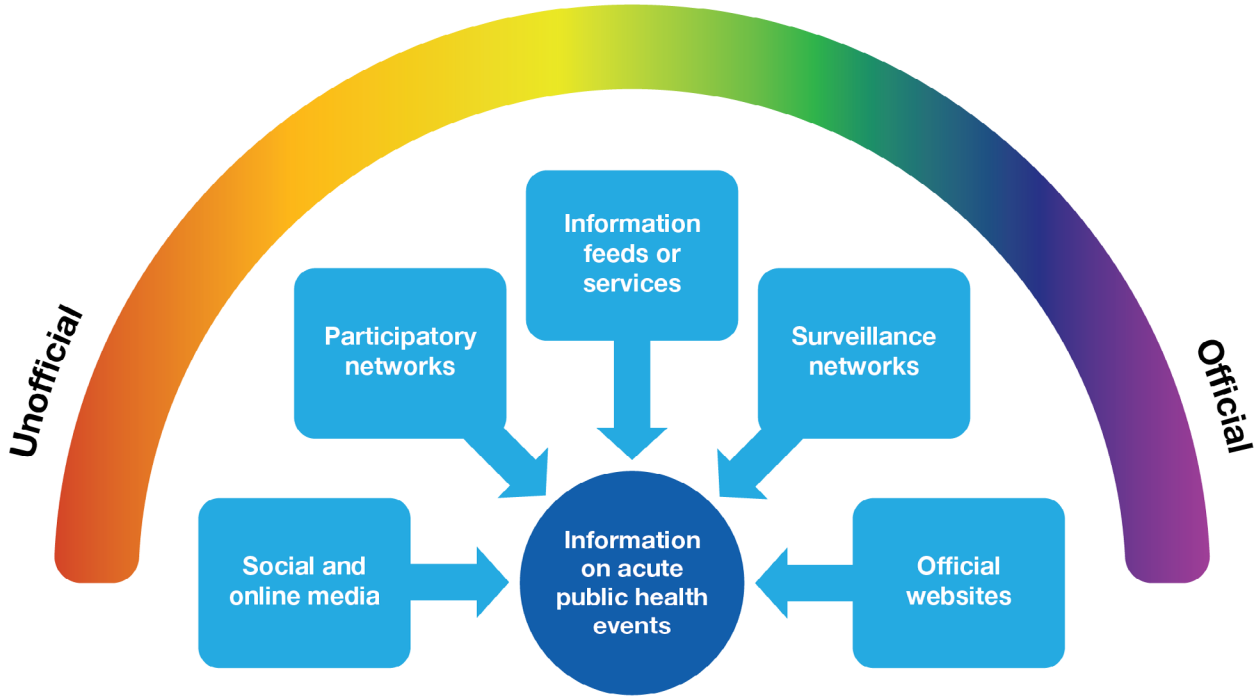


Figure 13. Information Sources

Challenges with social media

Q1: What are some challenges or issues with using social media to identify disease signals?

Step 2: Collecting corroborating information

Q2: The second step of the verification process involves searching for and collecting corroborating information. What are some ways that this can be done?

Step 3: Cross-checking information with other official sources/experts

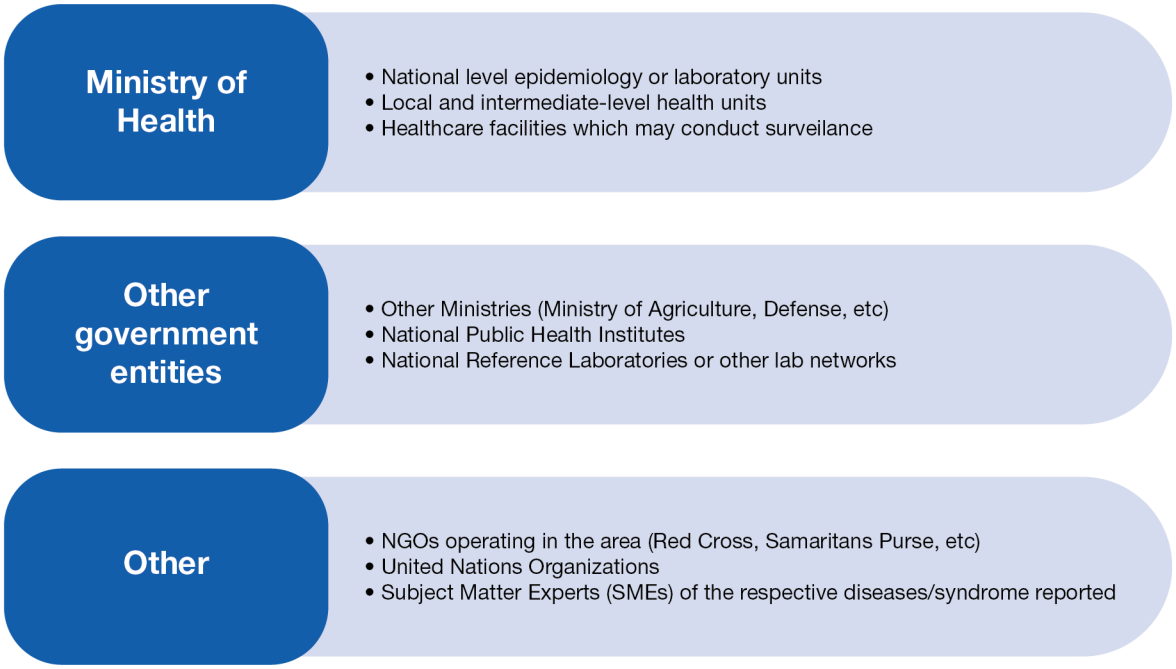


Figure 14. Cross-Checking Sources for Verification

The EBS Unit should ask partners across sectors and levels to identify technical resource persons or subject matter experts (SMEs) who will serve as main points of contact for EWAR on a 24/7 basis.

The following details should be recorded:

Name of designated office	Name of responsible individual	Email address Phone numbers Fax numbers

Subject matter experts

SMEs have an important role in EBS and are necessary for a number of reasons.

Q1: In the space below, write a list of areas that SMEs can assist with EBS.

Step 4: Begin to characterize the potential event with known information

Oftentimes, media reports may describe “mystery diseases” or “unknown illnesses” at the onset of the outbreak. As more information is learned, it is important to continuously assess the situation to determine if the event is improving or worsening.

The risk assessment process

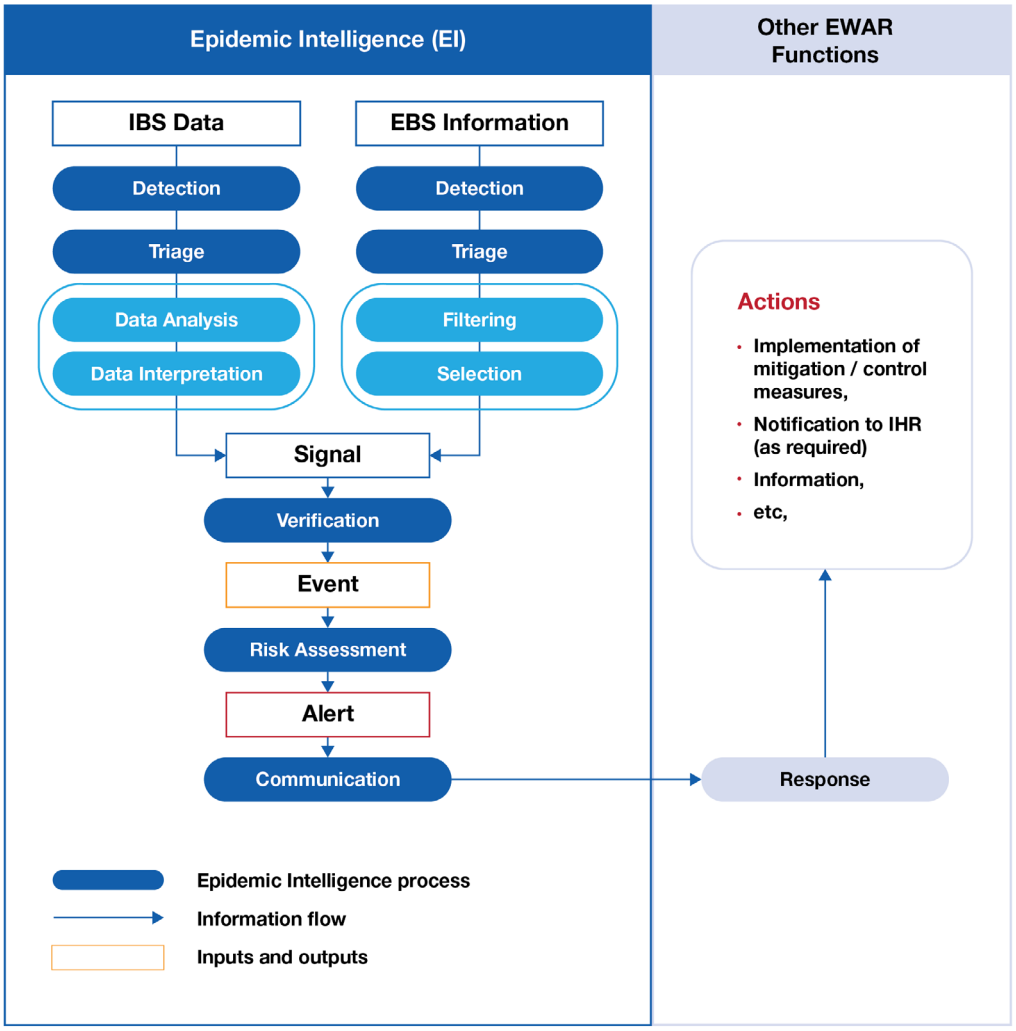


Figure 15. Early Warning and Response Diagram

Defining risk assessment

Risk assessment is the systematic and continuous process of assessing and documenting information to provide the basis for taking action to manage and reduce the negative consequences of an acute public health event.

The IHR timeline for verification

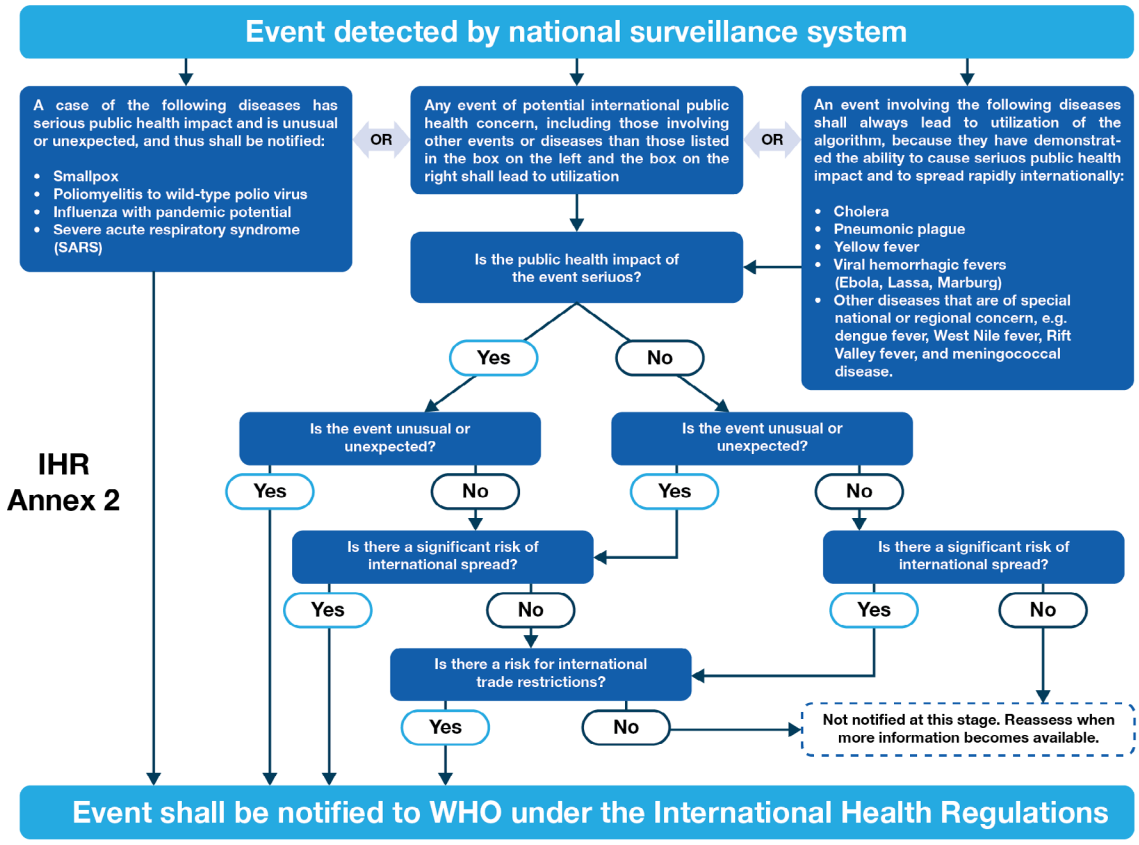


Figure 16. IHR Annex 2

Characterizing the type of event

Health events can be organized into three categories:

1) A **Health Event of International Importance** is a verified disease outbreak or a health threat that meets one of the following criteria (IHR Annex 2):
   - Is one of the following: SARS, polio (wild-type), smallpox or a new subtype of influenza,
   - Presents a serious threat to the public health,
   - Is an unusual or unexpected event,
   - Poses a significant risk for international spread that potentially requires international intervention, or
   - Potentially causes restrictions of trade or travel.

2) A **Health Event Under Investigation** is a disease outbreak or a health threat that potentially meets one of the above criteria, but currently is not yet verified.

3) A **Health Event for Information** is a description of a verified health event that does not meet one of the above criteria but is of interest to the public health community.

Assessing risk level of the event: Geoscope and public health impact

There are two ways to assess the risk level of an event.

1) **Geographic scope** refers to the observed geographic distribution and rapidity of spread for an outbreak and is categorized as follows:
   - High events affecting several multi-national regions with evidence of continuing spread,
   - Moderate events affecting a national, or bordering multi-national region, with evidence of continuing spread, and
   - Low events limited to sub-national, local areas.

2) **Public health impact** refers to actual or potential severity of illness, ease of transmission, public fear, or economic affects and is categorized as follows:
   - High agent that is or potentially: highly pathogenic, highly transmittable, new or emerging, or has significant potential to disrupt travel/trade, and
   - Moderate agent that has low to moderate potential to cause morbidity /mortality, transmit efficiently, or to disrupt travel or trade.

Risk assessment: a team effort

Risk assessment is performed by the EBS unit with input from SMEs. The process of risk assessment on behalf of EBS analysts is:

- Routine, oftentimes daily,
- Well-coordinated with internal and external input, and
- Consistent in its methodology.

The EBS/EWAR analyst team should organize daily briefings to examine new signals and new information on ongoing events.

SESSION 6

REGISTRATION AND REPORTING OF EVENTS

Purpose

- Define the objectives and process of event registration
- Identify health events that require immediate reporting
- Differentiate between information for early warning vs information for health communications purposes
- Describe key reporting products
- Define key data elements and outbreak metrics to be captured by EBS event management systems

Total time: 75 minutes

The role of communication in EBS

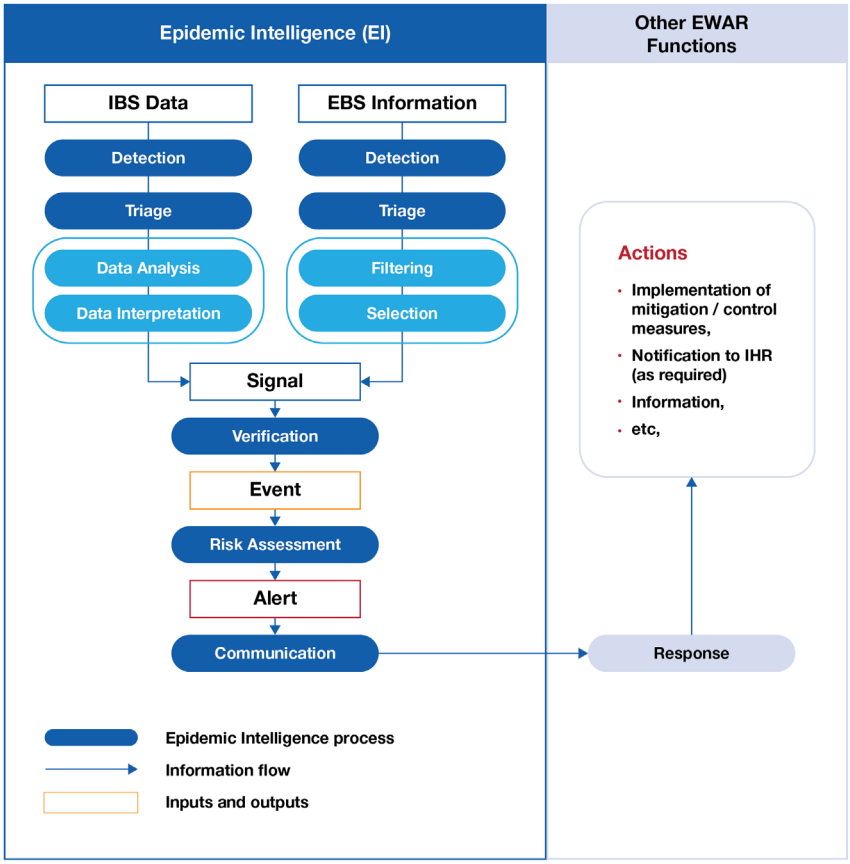


Figure 17. Early Warning and Response Diagram

Defining an EBS event

What criteria will define an “EBS event” to be targeted and captured?

Differentiating information for EBS from information for public health/ risk communication

Complete the matching activity on different types of information. Circle **A** for items that meet the criteria for early warning information. Circle **B** for items that meet the criteria for public health/ risk communication information.

- A / B - Growing public health sentiment or discord
- A / B -Clusters of an unknown disease
- A / B -Unusual or excess deaths occurring in a community
- A / B -Circulating public health misinformation
- A / B -New public health laws or regulations passed
- A / B -Unusual die-off of animals
- A / B -Annual/routine reports of morbidity and mortality
- A / B -Drug/vaccine developments
- A / B -Unexpected occurrence of a disease not previously reported from an area
- A / B - New public health/ministry of health leadership
- A / B -Chronic or noninfectious disease reports
- A / B -Accidental or deliberate pathogen release
- A / B -Toxic chemical releases
- A / B -Reports on occupational health
- A / B -Radio-nuclear releases
- A / B -New motor vehicle or other travel related safety measures

Differentiating media headlines for early warning (EBS) from information for public health/risk communication

Consider the following examples of media headlines to complete the matching activity. Circle A for headlines that meet the criteria for early warning information, and circle B for headlines that meet the criteria for public health/risk communication information.

- A / B - “50 unexplained deaths”
- A / B - “A major AIDS awareness campaign launched”
- A / B - “New bleeding syndrome reported”
- A / B - “A new Minister of Health elected”
- A / B - “Crime rates up by 40%”
- A / B - “High absenteeism at local school”
- A / B - “Farmer reports entire flock die off in Northern province”
- A / B - “New airbag safety measures mandated”
- A / B - “Flooding in Southern province”
- A / B - “Cholera reported for the first time”
- A / B - “Miner killed on the job”

Information of interest is not the same as information for action

Registration of events

Registration of events is the process by which health events are recorded in a standardized way with regular entries of items or details.

Epidemic intelligence products

Type of report	*Frequency*
EBS daily report ▸ *Time-sensitive bullet points to leadership* ▸ *Critical Information requirement type, or "flash" report*	*Daily*
EBS map *(if applicable)*	*Daily*
Weekly summaries for immediate leadership *(if applicable)*	*Weekly (on Thursdays)*
Monthly bulletin for organizational leadership *(if applicable)*	*Monthly*

Figure 18. Examples of EBS Reporting Products

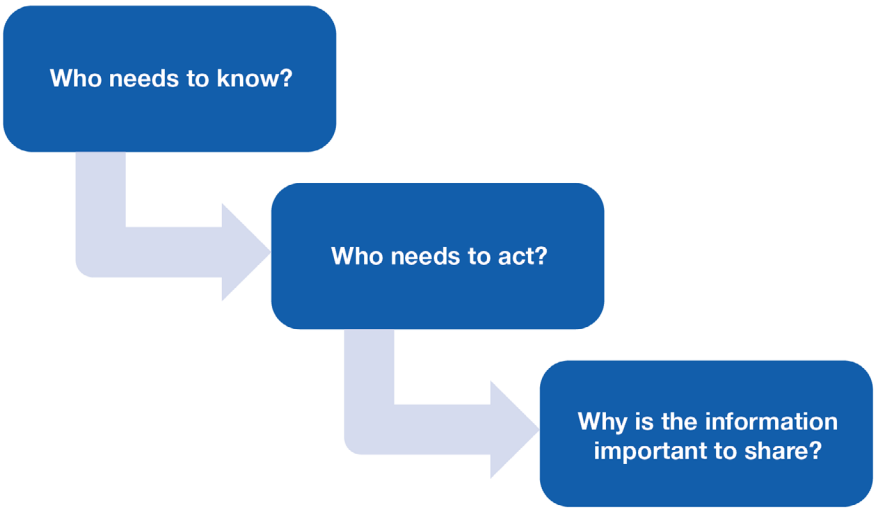
Reporting frequencies

Reporting frequencies should strike a balance between timeliness and accuracy of information, and will depend on the nature of the disease/syndromes to be detected.

Take a moment now to consider the types of health events requiring an immediate response compared to health events that should prioritize accuracy over timeliness. Write a few bullet points for each question below.

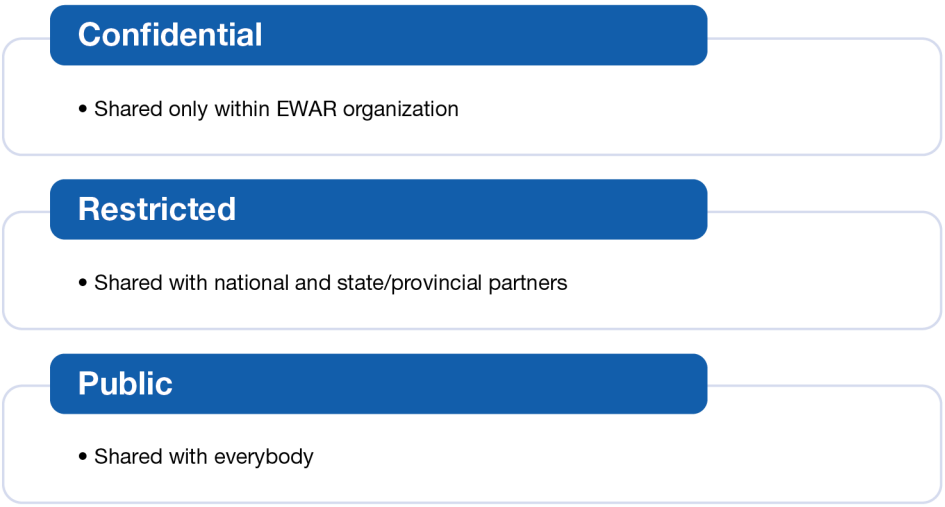
Q1: List a few examples of health events that require immediate reporting.	**Q2:** List a few examples of health events for which accuracy should be prioritized.

Epidemic intelligence products



Information should be classified by type of access

Information collected by EWAR should be systematically classified by type of access.



Any information collected by EWAR should be systematically classified as confidential, restricted or public:

- **Confidential** or operational information is only shared among staff of the EBS unit (e.g. not yet verified information);
- **Restricted** information may only be shared among specific groups such as the national and provincial partners, and recipients are requested to avoid further dissemination of the information provided; and
- **Public** information is, by definition, shared with everybody and may be disseminated on the website, or in the form of press releases, scientific publications, etc.

Using established channels

Established channels should be used for bidirectional communications with partners.

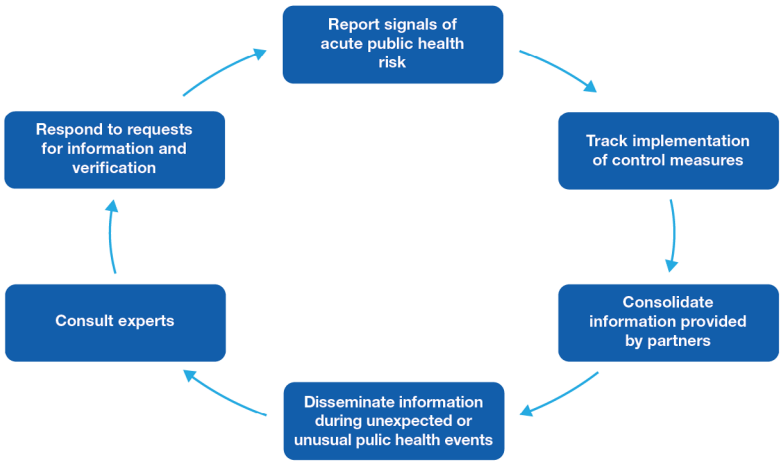


Figure 19. Communicating with Partners

Preparing a daily EBS report

EBS reports should:

- Adhere to a standardized template for content,
- Follow consistent approaches to epidemiological writing,
- Be published at the same time each day, and
- Be distributed to a consistent (but ever evolving) recipient list and using a consistent dissemination mechanism.

The figure below shows an example of a prepared EBS report.

**** Global Disease Detection Operations Center (GDDOC) Daily Report for 07-16-2019 ****

****** **FOR INTERNAL CDC USE ONLY** ******

At A Glance:

Of International Importance[1]

- Measles (Rubeola) in Jordan (NEW): **23 cases reported in 7 clusters**
- Cholera in Cameroon (NEW): **OCV campaign planned**
- Ebola in The Democratic Republic of the Congo (Update): **Outbreak surpasses 2,500 cases and 700 recoveries**
- Leishmaniasis (Visceral) in Kenya (Update): **New county affected**

FOR INTERNAL CDC USE ONLY

Global Disease Detection Operations Center
U.S. Centers for Disease Control and Prevention
Daily Report for 7/16/2019
Contact: Ray Arthur, PhD
Mobile: (404) 431-6630
gddoutbreak@cdc.gov
EOC: (770) 488-7100 (24 hours / 7 days a week) Contents At A Glance
INTERNATIONAL IMPORTANCE

- Measles (Rubeola) in Jordan (NEW): **23 cases reported in 7 clusters**
- Cholera in Cameroon (NEW): **OCV campaign planned**
- Ebola in The Democratic Republic of the Congo (Update): **Outbreak surpasses 2,500 cases and 700 recoveries**
- Leishmaniasis (Visceral) in Kenya (Update): **New county affected**

PUBLIC HEALTH EVENT OF INTERNATIONAL IMPORTANCE	
Geographic Scope	Public Health Impact Risk
Medium	Medium

The importance of event management systems

The purpose of an event management system (EMS) is to provide a secure focal point for tracking public health data on international health threats detected. This data is analyzed by the CDC's Global Disease Detection Operations Center (GDDOC) and has an 'all-hazard,' One Health-based approach which includes radiological, nuclear, chemical, and environmental threats.

An EMS allows you to input the findings of EBS to prepare CDC to respond to acute, public health emergencies with information captured in a Daily Report.

See Appendix 2 of your Participant Guide for a sample daily report.

Outbreak milestones

Outbreak Milestones	Definition
Outbreak Start	Date of symptom onset in the primary case or earliest epidemiologically linked case
Outbreak Detection	Date that the outbreak or disease-related event is first recorded by any source or in any system
Outbreak Notification	Date the outbreak is first reported to a public health authority
Outbreak Verification	Earliest date of outbreak verification through a reliable verification mechanism
Laboratory Confirmation	Earliest date of laboratory confirmation in an epidemiologically-linked case
Outbreak Intervention	Earliest date of any public health intervention to control the outbreak
Public Communication	Date of first official release of information to the public from the responsible authority
Outbreak End	Date that outbreak is declared over by responsible authorities

Defining and capturing timeliness metrics

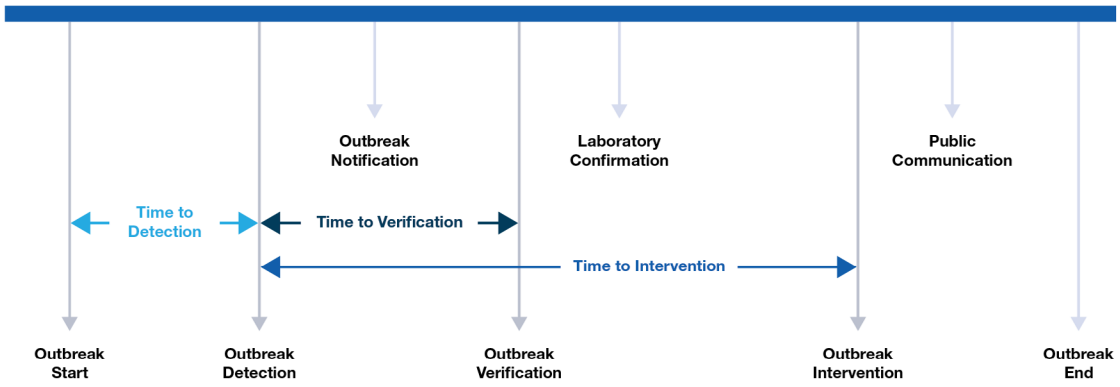


Figure 20. The eight outbreak milestones shown in the above figure are for illustrative purposes only as the actual sequencing may vary. For example, laboratory confirmation may occur simultaneous to outbreak verification. In another case, public communication may be the first outbreak intervention. As an example, Ending Pandemics' timeliness metrics are shown as the intervals between the relevant outbreak milestones.

Q1: What information should be included in an EBS report?

Q2: What are the key elements in this sample CDC EBS report of a measles outbreak in Romania? Underline what you think are the key elements that should be included in every EBS report.

- The Global Disease Detection Operations Center (GDDOC) has learned of an outbreak of measles in Romania.
- On 21 September 2016 the Romanian Ministry of Health (MOH) reported that in the first eight months of this year, they have recorded 675 confirmed cases of measles in 23 counties, with two deaths. A third suspected measles death was reported but is undergoing final confirmation. The two confirmed and one suspected death all occurred in children younger than one year, which is under the age of routine measles vaccination. The MOH attributes the resurgence of measles to failure of some parents to adhere to the routine vaccination schedule.
- The National Institute of Public Health recommends vaccinating children in the affected areas of the country at the age of seven months with resumption of the normal vaccination schedule at one year of age.
- In 2015 Romania reported only seven confirmed cases of measles and no deaths. Measles vaccination coverage has gradually declined from a high of 98% in 2000 - 2002, to 86% in 2016. Officials report that there is no shortage of MMR vaccine in the country.
- GDDOC will continue to follow this outbreak and report updates as they become available.

Weekly review of active events

Inquire	Monitor	Respond	Close
Outbreak is ongoing, response may be underway. Information reported is up to date. Continue to watch for new information.	No updated information available. Reach out to SMEs, field teams, or local staff to gather more information.	Support field investigations or control measures to interrupt transmission.	Outbreak is concluded or at least dropped to baseline. No further monitoring needed.

Business Intelligence (BI) tools to assess EBS performance

Business intelligence (BI) loosely refers to tools that retrieve, analyze, and transform data into meaningful information that helps businesses make more intelligent decisions. BI tools cover a range of technologies, including Tableau and Microsoft Power BI.

Example of a CDC EBS product – The Daily Map

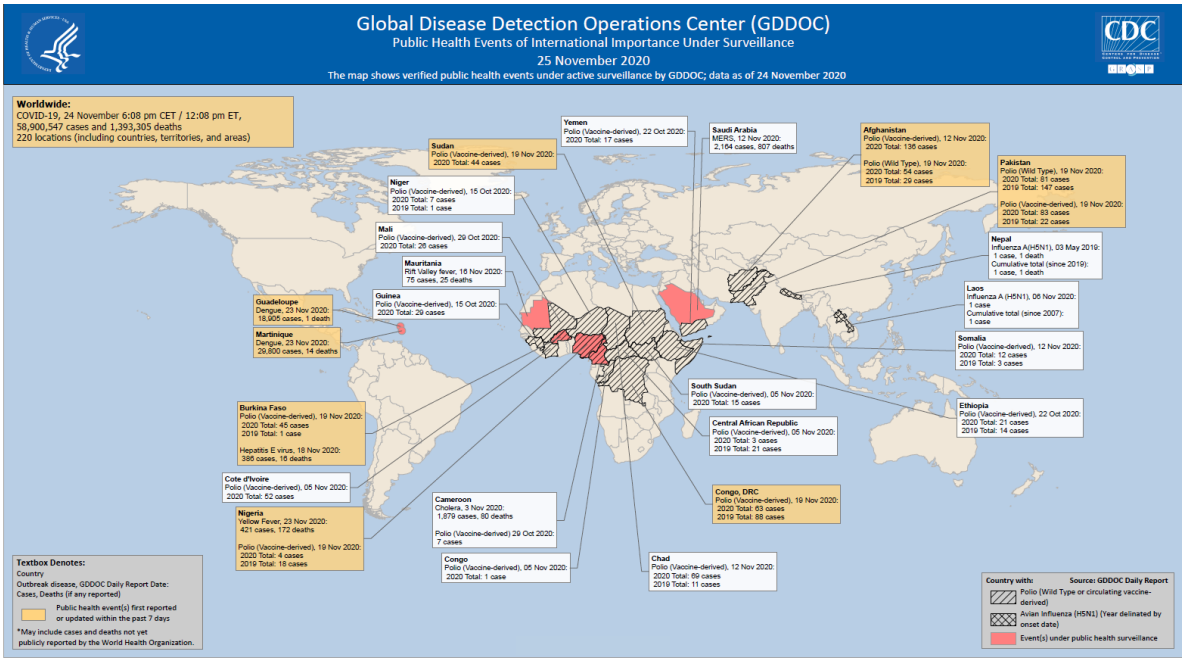


Figure 21. The Daily Map

Q1: How do you see this map being used?

This figure shows you that from January 1, 2008 to November 25, 2019, the GDDOC monitored **1,209 outbreaks** of **168 diseases** in **239 countries.**

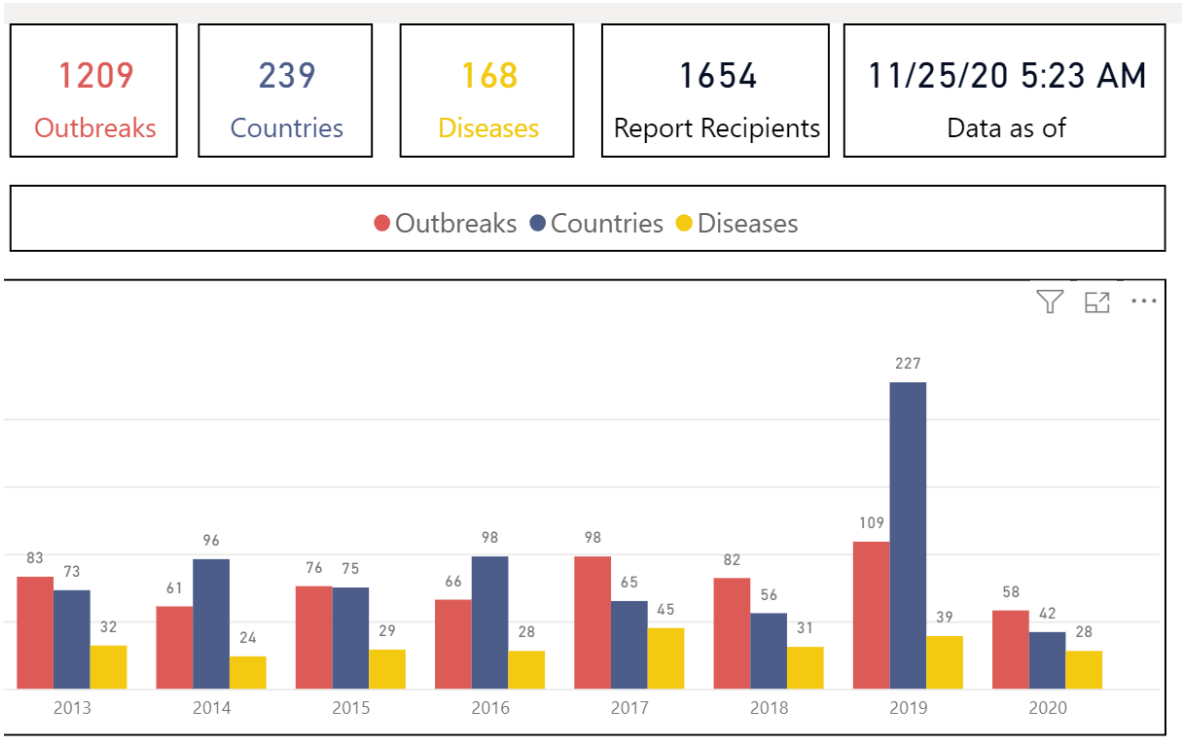


Figure 22. GDDOC Outbreak Monitoring

This figure shows you the outbreaks monitored by the US CDC GDD Operations Center over several years.

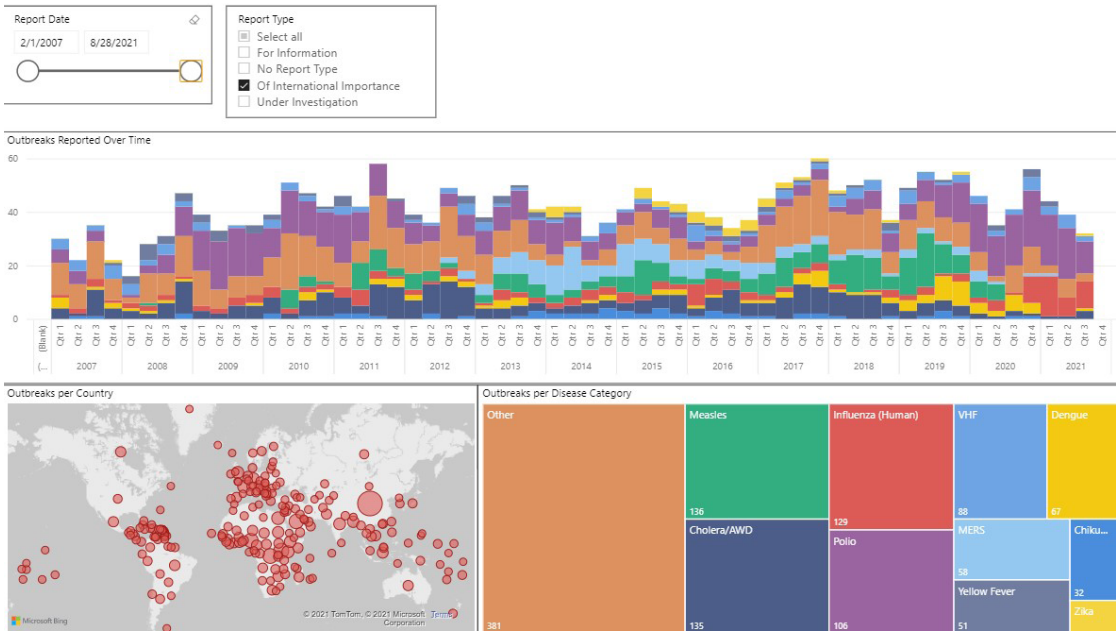


Figure 23. US CDC GDD Operations Center EBS Reporting 2007-2021

This journal article is another helpful resource you can refer to that looks back at EBS detection from 2012-2016.

Health Security
Volume 15, Number 5, 2017 Mary Ann Liebert, Inc.
DOI: 10.1089/hs.2017.0004

What We Are Watching—Top Global Infectious Disease Threats, 2013-2016: An Update from CDC's Global Disease Detection Operations Center

Kira A. Christian, A. Danielle Iuliano, Timothy M. Uyeki, Eric D. Mintz, Stuart T. Nichol, Pierre Rollin, J. Erin Staples, and Ray R. Arthur

Figure 24. Reference

EBS is defined as the organized collection, monitoring, assessment, and interpretation of unstructured information regarding public health events that may represent an acute risk to human health. Conducting EBS includes establishing an EBS unit to better track public health events of concern.

SESSION 7

ESTABLISHING AN EVENT-BASED SURVEILLANCE UNIT

Purpose

- Describe the daily workflow of an EBS unit
- Identify the core competencies and specialized skillsets required to conduct EBS
- Define the key resources and tools necessary for an EBS unit
- Describe “mystery” diseases and how to assess their risk
- Describe the role of SMEs and SME lists in EBS

Total time: 45 minutes

The **mission of an EBS** unit is to provide a single source of reliable, comprehensive, and high-quality information on international disease outbreaks and other health threats. How do they accomplish this? List a few ways that EBS units fulfil their objective.

Staff are the most important resource

Staff of an EBS unit are the most important resources, who efficiently and effectively use the rest of the resources to fulfill mission objectives. Well-coordinated teamwork, work sharing, transparency, and flexibility within a structured work plan allow for an environment of efficiency to make effective use of all resources.

Other resources

In addition to staff, an EBS Unit should also include:

- Information sources, such as subject matter experts, public health agencies, WHO and WHO Regional Offices, partner country Ministries of Health, Agriculture, or other relevant Ministries, and non-governmental organizations,
- Communication tools, and
- Information technology tools.

Q1: What are the required skills of an ideal EBS Unit analyst?	**Q2:** What are the desired skills and attributes of an ideal EBS Unit analyst?

Create, review, and revise EBS Unit Standard Operating Procedures

Standard Operating Procedures (SOPs) should be written, reviewed, and followed by the EBS unit, and updated at a frequency determined by the Director (e.g., annually). One analyst should be the lead on the development and annual review of the SOPs.

Daily general workflow of an EBS Unit

This schematic outlines the sets of tasks that the EBS unit staff use routinely to identify, verify, and communicate with key stakeholders about acute public health events. We will now go over each of these in turn.

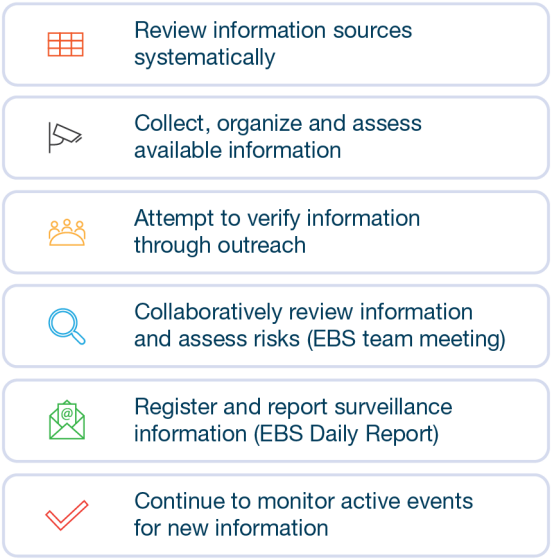
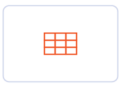


Figure 25. EBS Unit Tasks



Review information sources systematically

Analysts begin the workday by screening multiple sources to see if there is a new public health event of interest or an update to a previously identified event.

Collect, organize and assess available information

Once an EBS analyst has detected a signal, the analyst should follow the appropriate steps to contextualize this information:

- Check additional sources for corroborating reports,
- Check baseline disease epidemiologic data to determine if this information is unusual or unexpected (consider geographic locations, seasonality, etc.),
- Determine whether an event meets reporting criteria, and
- Determine whether an event requires alert and response actions (including EBS unit coordination).

Attempt to verify information through outreach

Verification is an essential step of the epidemic intelligence process that consists of confirming the reality (authenticity and conformity) of a possible public health threat. This is done by actively cross-checking the validity of the information using reliable sources, or verifying pertinence in order to confirm and, when possible, to characterize the nature of the event.

Collaboratively review information and assess risks in the EBS team meetings

During the mid-day EBS Unit Daily Meeting, analysts:

- Share and discuss signals (unverified) or events (verified) discovered over the past 24 hours to decide if reporting/updating is warranted,
- Identify the “lead analyst” for continued monitoring and reporting of each new signal or event,
- Discuss/characterize a high-level risk assessment (i.e. geo-scope; public health impact) based on all available information and contextualized data,
- Identify information to be conveyed in the daily report, and
- Discuss policy, logistics, administrative, or other issues.

Register and report surveillance information

Following the EBS Unit Daily Meeting, analysts:

- Continue surveillance of information,
- Enter key information into outbreak database (i.e. an event management system),
- After discussion in the team meeting, develop an event report/update to be included in the EBS Daily Report,
- Seek comments and feedback from SMEs on the EBS Daily Report if needed, and
- Finalize and distribute the EBS Daily Report.

Continuous monitoring of events for new information

Analysts continuously monitor events for new information, including:

- Following up on information sources and feedback until the event is no longer actively being followed or is “closed”,
- Regularly checking for updates on websites,
- Continuously checking email (EBS group mailbox) or other communications from reliable sources to verify event information,
- Continuing to share updated information in daily EBS team meetings, and
- Providing updates on the EBS Daily Report.

Conduct risk assessments for undiagnosed “mystery” diseases

Some reports describing outbreaks will not have an etiology. These reports may refer to the outbreak as “mystery”, “unknown”, or “unidentified” outbreaks. Analysts should take steps to assess these reports in order to verify and determine a diagnosis.

If the source is verified (e.g., WHO, UN Organizations, MOH/MOA):

- Confirm case and death numbers,
- Confirm whether laboratory testing was conducted and results obtained or pending, and
- Inquire whether there has been a public health response.

If the source is unverified (e.g., media, blog, or social media), search other sources to seek corroborating media reports (“triangulating” multiple media reports).

If additional media reports confirm information contained in the original media report, you should verify that the additional media reports are original publications and not just redistributions of the first report through media recycling.

Q1: What should you do if the “mystery” disease etiology remains unconfirmed?

Subject Matter Experts

A Subject Matter Expert (SME) is a person who is considered to be highly trained in a particular subject or disease or has obtained significant experience in a particular country or region of the world.

Q2: What areas of EBS can SMEs contribute to?

SME list

All EBS analysts should develop and maintain SME lists that can be used to quickly identify and find contact information for SMEs that can be consulted for assistance during an event. SME lists can be maintained in a straightforward manner using programs such as Microsoft Excel, or on a shared network drive. The list should be updated at regularly defined intervals.

Key information that should be gathered on an SME includes:

- Disease/area of expertise
- Contact name
- Organization/unit
- Contact information (office phone, mobile phone, email)

An SME list template can be found in Appendix 3 of your Participant Guide.

Anthropologic expertise

When analysts are investigating a public health threat such as a disease outbreak in specific ethnic groups, an EBS unit would benefit from the advice of a medical anthropologist or social behaviorist on the cultural practices of that specific group. Why do you think this is important?

Q1: Why is it important to include medical anthropologists or social behaviorists in this context?

Source lists

Analysts should use a “Source List” to save a source list of website names including URLs and corresponding passwords. These can be stored in a password-protected database such as an MS Excel spreadsheet if required.

Q1: What are some formal, or official verified sources that provide verified information?

Q2: What are some informal sources that provide information?

Q3: What information should be included in a password-protected database or spreadsheet?

The EBS team functions as one unit

EBS team group email

Q1: What type of issues should be communicated through a shared email address?

Respond to queries from partners

Email is the easiest and fastest way to respond to other public health agencies and partners.

- Email monitoring should be conducted constantly.
- Analysts responding to email should take note of the sensitivity of the information and when in doubt, clarify with the EBS Unit Director.
- Responses to queries sent by email should always include a copy to the group mailbox the for EBS Unit's situational awareness.
- Responses should be accurate and rapid.

Shared resource portal for research and reference

Analysts can share research and reference information through:

- Electronic portals (such as Microsoft SharePoint) for saving tagged documents by disease, country, region, etc., or
- A shared network drive (secured by permissions) can serve as a repository for relevant documents.

List of priority public health events

A list of priority public health events for surveillance should be established in the context of EBS selection criteria and national planning for EWAR. The list may contain:

- Diseases (e.g. measles),
- Syndromes (e.g. hemorrhagic fevers),
- Hazards (e.g. contamination of drinking water source), and
- Unexpected/unusual events (e.g. unexplained mortality).

Reporting templates

EBS analysts should develop and use templates for drafting reports for leadership and key stakeholders. When developing daily reports, an analyst should consider the audience, purpose, timeline, and template defined for daily, summary (weekly/monthly), ad hoc, and urgent reports.

Reporting templates should include the following essential information:

- Event description,
- Timelines,
- Public health impact,
- Geographic scope and risk of spread,
- Ongoing or planned activities, and
- Additional context.

Media aggregators for automating online searching

EBS Units should utilize leading media aggregators for automating internet-based searching for EBS. EBS units should customize such systems to best fit the geo-scope of the EBS unit's "reach" as well as the priority disease categories as determined by the country.

A Source List template with selected examples of media aggregators can be found in Appendix 4 of your Participant Guide.

Infectious disease databases

Baseline disease epidemiologic data should be checked to assess compatibility with known scientific information. Doing so can help determine whether the event meets EBS unit reporting criteria, and requires alert and response actions, including EBS unit coordination and reporting.

Event Management Systems

Software is recommended to design a database, or Event Management System (EMS) for logging, managing, and reporting public health events that meet the EBS Unit's criteria. The EMS should:

- Only be accessible to EBS analysts,
- Allow analysis of quantitative and qualitative data,

- Includes a function for generating reports directly,
- Contain the “Active List” of all public health events that are currently actively followed by the EBS Unit, and
- Be reviewed and revised weekly by analysts.

Develop and use Line Lists

A Line List is an organized, detailed table that summarizes key information about each case in an outbreak. Line Lists could be helpful when tracking an outbreak to determine trends in the outbreak over time. Line Lists can be built and added to over time in an MS Excel spreadsheet.

An EBS unit should use Line Lists to:

- Maintain all the relevant verified information regarding key outbreaks,
- Undertake epidemiologic analyses to contribute to discussions in the relevant forum and contribute to broader epidemiologic investigations,
- Share key information during ad hoc presentations (e.g., constructing epidemic curves for use in slide presentations),
- Assist in communications with SMEs, and
- Track information found in media-reported or otherwise unverified cases.

You can view a sample Line List in Appendix 5 of your Participant Guide.

SESSION 8

TRAINING REVIEW AND CASE STUDY

Purpose

- Review training
- Complete the case study

Total time: 30 minutes

Post-training knowledge check

The purpose of the post-training case study is to assess your knowledge and ability to apply what you have learnt during this training. The case study is presented in Appendix 4 of this guide. Please follow the facilitator's instructions to complete this case study.

Many thanks for your participation!

Many thanks for your participation today! We are encouraged by your commitment to working and supporting your communities. We hope the expectations you expressed in the introductions exercise were met. We strongly encourage you to share what we have discussed and learned today with other health professionals who were not able to attend.

APPENDIX 1

SOURCE LIST TEMPLATE WITH SELECTED EXAMPLES: PRIMARY SOURCES

Source or System Name	Verified?	URL	User ID	Password
WHO Disease Outbreak News	yes	https://www.who.int/emergencies/disease-outbreak-news	userID	password
ECDC Weekly Threat Report	yes	https://www.ecdc.europa.eu/en/threats-and-outbreaks/reports-and-data/weekly-threats	userID	password
WHO AFRO Outbreaks and Emergencies Bulletin	yes	https://www.afro.who.int/health-topics/disease-outbreaks/outbreaks-and-other-emergencies-updates	userID	password
World Organization for Animal Health	yes	https://www.oie.int/	userID	password
Avian Flu Diary	yes	https://afludiary.blogspot.com/	userID	password
<add more continuing below>				

APPENDIX 2

EXAMPLE – DAILY REPORT

At A Glance:
INTERNATIONAL IMPORTANCE
Rubeola (Measles) in France (UPDATE)

Public Health Events:

Public Health Event: OF INTERNATIONAL IMPORTANCE
Agent/Disease: Rubeola (Measles)
Country: France Location: Southeast of France
Source: Ministry of Health
GeoScope: High Risk: Medium

Event Description: This is an update regarding the outbreak of measles in France last reported by on 26 May.

According to the National Institute for Health Surveillance (InVS), the number of measles cases reported between 1 January 2008 and 30 June 2011 has now exceeded 20,000. This is an increase of approximately 3,000 cases since InVS last updated case numbers inclusive of April 2011. The data for the month of June remains provisional at this time.

French authorities note that the third epidemic wave, described as “massive” in comparison with first and second waves in 2009 and 2010, has peaked in March 2011 (See attached Epi Curve by InVS). The highest incidence of cases reported between July 2010 and June 2011 continue to be seen in the southeastern part of France (See attached map by InVS).

During the first 6 months of 2011, more than 14,000 cases were reported. Of these cases, 15 suffered neurological complications, 615 had severe pneumonia, and 6 died. For comparison, in 2010, 5,071 cases were reported, of which 8 suffered neurological complications (encephalitis / myelitis), 287 had severe pneumonia and two died.

Epidemiologic investigations and genotyping by laboratories earlier in 2011 have confirmed the transmission of measles virus among several European countries and to the Region of the Americas. As of May 2011, 38 countries in the WHO European Reg

APPENDIX 3

SME LIST TEMPLATE, WITH EXAMPLES OF SUBJECT MATTER AREA AND COUNTRY

Pathogen or Subject Matter Area	Name and E-mail Address	Country or Region	Name and E-mail Address
Anthrax	Dr. XYZ; XYZ@CDCexample.com	WHO AFRO	Dr. XYZ; XYZ@whoexample.com
Brucellosis		Angola	
Cholera		Burundi	
Dengue		Djibouti	
Ebola		Egypt	
Floods		WHO EMRO	
Humanitarian disaster		Haiti	
Measles		Indonesia	
Polio		Nepal	
Rabies		Swaziland	
Typhoid fever		Zambia	

APPENDIX 4

SOURCE LIST TEMPLATE WITH SELECTED EXAMPLES: MEDIA AGGREGATORS

Source or System Name	URL	Number of Languages	User ID, Password	Moderated?	Subscription or permission required to access?
Epidemic Intelligence from Open Sources	https://portal.who.int/eios/#	< 50	Consult source list	No	Permission
GPHIN	https://gphin.canada.ca/	9	Consult source list	Yes	Permission +subscription fee (could be waived)
MediSys	https://medisys.newsbrief.eu/medisys/homeedition/en/home.html	26	N/A; open	No	N/A
ProMED		4	N/A; open	Yes	N/A
HealthMap		7	N/A; open	No	N/A
<add more continuing below>					

APPENDIX 5

LINE LIST TEMPLATE WITH EXAMPLE: INFLUENZA A (H5N1), HUMANS, EGYPT

Case No.	Gender	Age (yr)	Location (State/Province/ Governorate)	Onset Symptoms	Hosp Date	Outcome / Date	Date of Death	Comments / Contacts, e.g., exposures	Lab Confirmation
1	Male	28	Alexandria	May 1 2004	May 3 2004	Recovered	N/A	Exposure to sick/ dead poultry	yes
2	Male	30	Damietta	Mar 06 2004	Mar 16 2004	Recovered	N/A	Culled poultry on a farm where he worked	yes
3	Female	31	Giza	Mar 12 2004	Mar 16 2004	Died	Mar 27 2006	Slaughtered chickens at home	yes
4	Male	18	Luxor	Mar18 2004	Mar 19 2004	Recovered	N/A	No exposure	no

APPENDIX 6

RWANDA CASE STUDY

It's 10:30 am on 17 July in the Command Center. You are an EBS analyst performing a media scan on EIOS and you find the following article:

EIOS EPIDEMIC INTELLIGENCE FROM OPEN SOURCES

Monitoring | Communities and Teams | Documents | Dashboards

Uganda reports Rift Valley fever outbreak

Filed Under: **Rift Valley Fever**; **VHF**

Lisa Schnirring | News Editor | CIDRAP News | Jul 17, 2018

Share | Tweet | LinkedIn | Email | Print & PDF

Uganda's health ministry has reported a Rift Valley fever outbreak involving two of its districts, and Rwanda is reporting the disease in animals along with suspected human cases, events that are occurring alongside an ongoing outbreak in Kenya, the World Health Organization (WHO) African regional office said yesterday in its latest weekly outbreak report.

The outbreaks pose a threat to other countries in the region, especially East Africa, which is experiencing heavy rains, according to the WHO.

Livestock contract the virus from mosquitoes, and though humans can be infected by mosquitoes, the virus is more commonly passed by contact with blood or organs of infected animals or drinking milk from sick ones.

Rod Waddington / Flickr cc

Uganda cases in 'cattle corridor'

In Uganda, two unrelated cases were confirmed on Jun 28 in two separate districts in the western part of the country. Both involve men who had exposure to animals. One patient is a 47-year-old butcher who got sick on Jun 20 and died at home the following evening. Health officials collected a postmortem sample and sent it to the Uganda Virus Research Institute (UVRI).

The second patient is a laborer and herder whose symptoms began on Jun 25. He was hospitalized and isolated the following day because of suspected viral hemorrhagic fever. Samples were collected during hospitalization and sent to the UVRI. The man died on Jun 30, and a safe burial was performed, the WHO said.

Another confirmed case has been reported from a third district, but the WHO said it is awaiting more information about the illness. Two other suspected cases are under investigation, and animal samples have been collected from the farm where one of the patients worked and from the slaughterhouse where the other worked.

Uganda's government has deployed a rapid response team to the affected districts, established an isolation unit at Mbarara Regional Hospital as the main treatment center, and prepared district hospitals to handle cases.

The WHO said the affected districts are in the "cattle corridor" that stretches from the southwest to the northeast regions of the country.

The article describes the following:

- Two cases in humans (one death), in separate districts in the western part of the country
- The cases were reported by WHO AFRO
- Another confirmed case from a third district, but more information is needed
- Two other suspected cases are under investigation
- Animal samples have been collected
- Information on a concurrent outbreak of Rift Valley fever in Kenya

Considering what you have learnt so far, answer the following questions

Q1: Is the source reporting the outbreak of RVF in Uganda an official source or an unofficial source?

Q2: Based on the source type, is verification required to confirm the RVF outbreak in Uganda?

Q3: Would you consider Rift Valley fever to be a priority disease for Rwanda? If so, why?

Q4: Would you consider an outbreak of Rift Valley fever occurring in Uganda to be important for Rwanda to monitor? If so, why?

You continue to scan media of this event and you come across the following twitter feed:

You start seeing rumors on Twitter describing abortions and deaths in animals in northern Rwanda near the border with Uganda.

Considering what you have learnt so far, answer the following questions.

Q5: What verification activities would you perform at this time?

Q6: Would you contact someone for cross-checking the information known? If so, who?

It's 8:30am on 6 August in the Command Center and you receive notice that the Ministry of Agriculture and Animal Resources issued a situation update noting:

- 154 cows have died from RVF
- 257,900 cattle have been vaccinated against RVF
- An estimated 316,445 cows have been treated with ParmaPy Plus – a drug to kill ticks, flies, and mosquitoes that transmit RVF

Now that the outbreak has been confirmed you and your colleagues draft a notification about the RVF outbreak in cattle in Rwanda.

Q7: With whom do you share an RVF notification?

Q8: What is some of the information you would include in the notification?

Q9: How do you support outbreak response activities?

Public notification of RVF outbreak

Rwanda's EBS teams has contacted AFRO to report the available information according to the Ministry of Agriculture and Animal Resources' investigation: "Rwanda is experiencing an epizootic, with suspected human cases."

AFRO has published in its weekly bulletin information on this multi-country RVF outbreak, based on information received by Uganda's PHEOC, Rwanda's RBC and Kenya's MOH.

Public notification of RVF outbreak

Rwanda's EBS teams has contacted AFRO to report the available information according to the Ministry of Agriculture and Animal Resources' investigation: "Rwanda is experiencing an epizootic, with suspected human cases."

AFRO has published in its weekly bulletin information on this multi-country RVF outbreak, based on information received by Uganda's PHEOC, Rwanda's RBC and Kenya's MOH.

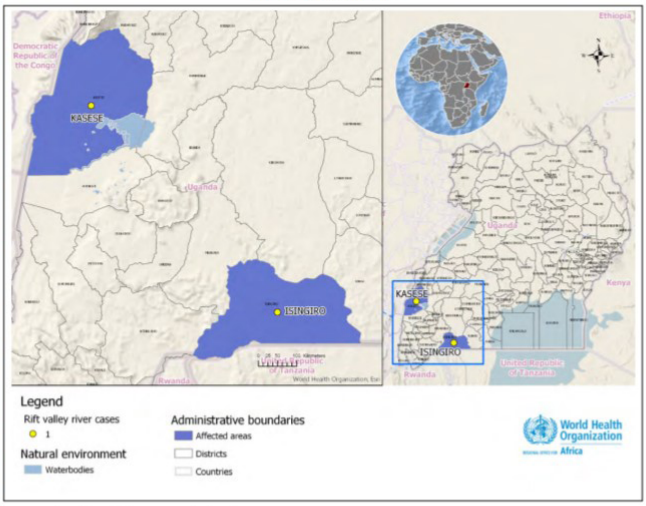
Rift Valley fever | **Uganda** | 2 **Cases** | 2 **Deaths** | 100% **CFR**

EVENT DESCRIPTION

On 29 June 2018, the Uganda Ministry of Health notified WHO of an outbreak of Rift Valley fever (RVF) in Isingiro and Kasese districts, all located in the western region of the country. Two unrelated simultaneous cases were confirmed on 28 June 2018, one in each district. The first case-patient was a 47-year-old male from Kanyatsi village in Munkunyu sub-county, Kasese District, whose main occupation was as a butcher. He fell ill on 20 June 2018 with symptoms of fever and headache, and self-administered antimalarial treatment. The case-patient died at home on the evening of 21 June 2018, with the body oozing blood from multiple orifices. The district health authority collected a nasal swab (posthumous) on notification of the death and the specimen was sent to the Uganda Virus Research Institute (UVRI) on 25 June 2018. The test result released on 28 June 2018 was positive for RVF by reverse transcriptase-polymerase chain reaction (RT-PCR).

The second case-patient was a 35-year-old male casual labourer and herdsman from Kabare village in Isingiro town council, Isingiro District. The village is located near Lake Nakivale and borders Lake Mburo National park. On 25 June 2018, he developed fever, headache, and anorexia, which was followed by epistaxis. He presented to the local health facility the same day, but was immediately referred to the regional referral hospital because of the severity of his illness and suspicion of a viral haemorrhagic disease. The case-patient was admitted in the isolation unit. A blood specimen was obtained and shipped to UVRI on 26 June 2018. The test result released by UVRI on 28 June 2018 was positive for RVF on RT-PCR. The case-patient died on 30 June 2018 and a supervised burial was carried out.

Geographical distribution of Rift Valley fever cases in Uganda, 20 - 30 June 2018



There is a report of another confirmed RVF case in Ibanda District, on which more information is being sought. Two other suspected cases are reportedly being investigated in Mbarara (1) and Kasese (1) districts. Additionally, 55 animal specimens were collected from the farm where one of the confirmed cases worked and in Isingiro town council abattoir. A further update will be provided on the evolution of this event.

Report writing activity

We're going to practice logging the RVF outbreak into a mock event management system as an EBS analyst would.

Review the GDDOC examples below, then log the RVF outbreak in the template that follows. Remember to consider criteria for EBS reporting, outbreak timeliness metrics, and EBS report components.

GDDOC example of a first report in Uganda

Country: Uganda
Agent/Disease: Rift Valley Fever
Event ID: 2235-B92.4-2018
First reported to GDDOC: 6/29/2018
Location: Kanese, Insingiro
Source: CDC Programs
Geographic scope: medium
Public health risk impact: high

Event description

The GDD Operation Center (GDDOC) has learned of two human cases of Rift Valley fever (RVF) reported in Uganda. The first case, which was fatal, was in a 49-year-old man from Kasese district who worked as a meat trader, and who had possibly also consumed meat, in Kiruhura district. He was initially suspected of being infected with anthrax, however, preliminary laboratory results at Uganda Virus Research Institute (UVRI) on 27 June indicate infection with RVF.

The second case, also fatal, was in a 35-year-old man from Insingiro district who worked as a herdsman; he also has a history of slaughtering and consuming meat from an ill cow. The patient was hospitalized on 26 June with fulminant viral haemorrhagic fever (VHF), and later died. Preliminary laboratory tests at UVRI on 27 June also indicate infection with RVF.

The UVRI VHF team is in the field conducting animal and human investigations in both locations, serving as the Ministry of Health's Rapid Response Team.

The GDDOC last reported RVF in Uganda in February 2018, at which time nine human cases with five deaths were reported from the districts of Kiboga, Mityana, Kyankwanzi, Kiruhura, Buikwe, and Arua.

The GDDOC will report additional information as it becomes available.

GDDOC example of information on RVF in Rwanda

Country: Rwanda
Agent/Disease: Rift Valley Fever
Event ID: 2248-B92.4-2018
First reported to GDDOC: 6/7/2018
Location: Eastern Province
Source: CDC Programs
Geographic scope: medium
Public health risk impact: high

Event description

The OIE has reported outbreaks of Rift Valley fever (RVF) among cattle in Eastern Province, Rwanda. Eight outbreaks were reported in Kirehe district (three outbreaks) and Ngoma district (five outbreaks). Of 33 susceptible cattle, there were 26 cases with two deaths. The cases were all in dairy cows and calves.

Laboratory testing was conducted at the National Veterinary Laboratory, samples tested positive by serology on 6 and 29 June. In response to the outbreak, the Ministry of Agriculture and Animal Resources (MINAGRI) implemented quarantine measures including banning the movement of livestock and livestock products in the districts of Kirehe, Ngoma, and Kayonza. Further, a vaccination campaign among livestock was conducted in 18 districts, which included 237,386 cattle, 22,727 goats, and 17,872 sheep, representing a coverage of 84.6%, according to OIE.

To prevent cases among humans, a community sensitization campaign using the media is underway, educating the public with regard to mosquito control and avoiding meat from livestock that appear ill. MINAGRI has also advised reporting of suspected cases among livestock to veterinarians.

The GDD Operations Center will provide updates as they become available.

GDDOC example of an update to a report in Uganda

Country: Uganda
Agent/Disease: Rift Valley Fever
Event ID: 2235-B92.4-2018
First reported to GDDOC: 6/29/2018
Location: Western Uganda
Source: CDC Programs
Geographic scope: medium
Public health risk impact: high

Event description

This is an update to the cases of Rift Valley Fever (RVF) in Uganda, last reported by the GDD Operations Center (GDDOC) on 3 August 2018.

To date, there have been a total of 25 cases in humans with 13 deaths (case-fatality proportion=52.0%) attributable to RVF reported from Uganda during 2018. Cases have been reported from the districts of Insingiro (11 cases, 4 deaths), Mbarara (2 fatal cases), Kasese (1 fatal case), Sheema (1 fatal case), Ibanda (1 case), Lwengo (1 case), exported from Mubende (1 case), Sembabule (1 case), Iganga (1 fatal case), Kiruhura (2 cases, 1 death), Rakai (1 fatal case), Buikwe (1 fatal case), and Yumbe (1 fatal case).

All cases have been confirmed positive from RVF by polymerase chain reactions (PCR) at the Uganda Virus Research Institute (UVRI). The index case, which was fatal, was in a 35-year-old herdsman from Isingiro district who had illness onset on 22 June. Most cases have been reported in people who work as herdsman, butchers, or farmers.

Ongoing outbreaks of RVF affecting both humans and animals have been reported in the neighbouring countries of Kenya, Rwanda, and South Sudan. Reoccurrences of RVF have become common in Uganda in recent years. The last documented outbreak ended in January 2018 and affected several districts including Arua, Buikwe, Kiboga, Kiruhura, Kiynkwanzi, and Mityana. The rainy season, flooding, and confirmed outbreaks in neighboring Kenya, Rwanda and South Sudan all increase the risk of RVF transmission in Uganda. The affected districts are located in the cattle corridor, and uncontrolled movement of livestock can propagate the risk of spread of RVF to new areas. The RVF epizootic causes agricultural impact and economic losses to communities because of high mortality and abortion rates among infected livestock. WHO recommends strengthening the multisectoral One Health approach to mitigate this RVF outbreak in Uganda and neighboring countries.

The GDDOC will report additional information as it becomes available.

Now it's your turn. Fill in the logging template with details of the RVF outbreak described throughout this case study.

Country:
Agent/Disease:
Event ID:
First reported to GDDOC:
Location:
Source:
Geographic scope:
Public health risk impact:

Event description