Alert management

Checklist

1. Create alert log
2. Define alert management workflow
3. Define verification procedures
4. Standardise risk assessment
5. Standardise risk characterisation
6. Standardise outcome
7. Form rapid response teams

Alert Key Points

- All alerts must be registered in an alert log, and all must be managed according to the same, standardised workflow.
- Early detection of an alert should be rapidly followed by verification and, where needed, risk assessment.
- Verification is required to assess whether a alert generated by IBS or EBS is a genuine event or if it should be discarded.
- Risk assessment of events is conducted to understand the potential threat of the event to public health.
- These steps should be carried out rapidly, and ideally by trained public health staff at subnational level who are geographically as close to the alert as possible.

1. Create alert log

What are alerts?

Definition

Alerts are the first hints of a larger public health problem. They represent the first pieces of sparse data or information that hint at a potential risk to health.

- Alerts come from either IBS and EBS sources.
- All alerts detected by an EWAR system, regardless of the source, should be systematically documented in a central **alert log** and managed in the same, predictable manner.
- This helps to ensure that all alerts are recorded and acted upon consistently, and that the process can be monitored.
- Guidance on how to define alert thresholds for IBS and EBS are given in their corresponding chapters.

Disease	Alert criteria
IBS/EBS	(if one suspected case needs to be reported immediately)
Acute watery diarrhea	One suspected case
Suspected measles	One case
Suspected meningitis	One case
Acute flaccid paralysis	One suspected case
Acute hemorrhagic fever syndrome	One case
IBS only	
Bloody diarrhea	Three or more cases in one location
Acute respiratory infection	Twice the average number of cases seen in the previous 3 weeks for a given location
Suspected malaria	Twice the mean number of cases seen in the previous 3 weeks for a given location
Acute jaundice syndrome	Three of more cases in one location
EBS only	
Unexplained fever	One death or two times the mean number of cases of the previous 3 weeks for a given location
Unknown disease occurring in cluster	An aggregation of cases with related symptoms and signs of unknown cause that are closely grouped in time and/or place

What should the alert log record?

- The alert log should record:
  - the nature of the alerts (e.g. date, type, location) and

    - the actions taken (investigation, verification, response).
- The logs should be assessed daily to review outstanding actions.
- Alert logs should be kept at both national and subnational level. In electronic systems - such as EWARS-in-a-box - the alert log is maintanined automatically and users access alerts under their responsibility based on the location where they are working.
- Summary information on the numbers of alerts triggered, and the actions taken, should be sent weekly to the next level in the system and reported in the Epidemiological Bulletin.
- The steps to manage each alert are described below. All alerts should be verified, but only a small proportion will go on to require risk assessment. And even fewer events will be considered high or very high risk, and require large-scale response. This is illustrated below in Figure 1.

Figure Proportion of alerts requiring follow-up

2. Standardise alert management workflow

- All alerts must be managed according to a standard workflow that consists of the following steps:
  a. Verification
  b. Risk Assessment
  c. Risk Characterisation
  d. Risk Outcome
- Ideally, all steps in the workflow should be conducted at field-level. Staff at higher levels in the system should be able to access information on the alerts and monitor performance, but should only become directly involved if additional expertise or support is required.

Why manage alerts at field level?

- Decentralizing verification and risk assessment helps to ensure the rapid follow-up and processing of all alerts. Field-level staff are able to more quickly find source of the alert, and can better understand the epidemiological and socio-cultural context in which it occured. This is essential to be able to ask the right questions and to obtain accurate information.
- In emergencies, this means that frontline healthcare staff in health facilities may need to be trained to conduct the initial verification of alerts. If verified, this can then be escalated to the next level in the system to determine if additional support is needed to conduct a risk assessment.

Fig 1 Alert management workflow

Stage	Responsibility	Performance
Verification	Health Facility	Within 48 hours of an alert being triggered
Risk assessment	Health Facility and/or higher level*	Within 48 hours of an alert being verified
Risk characterisation	By the risk assessment team	At the time of the risk assessment
Outcome	By the risk assessment team	At the time of the risk assessment

* Higher levels should support risk assessment of high threat alerts. These should be clearer indicated in Alert SOPs.

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3. Define verification procedures

How are alerts verified to be events?

> Verification is used to determine whether or not an initial alert is valid and requires escalation to the next level of risk assessment. It should remain as quick and straightforward a process as possible.

- As there is no standard means of verifying events, and as different persons may approach the task in different ways, it is important to develop a structured process and set of questions to verify alerts.
- Depending on the setting, verification can include seeking more information from the reporter by telephone or through field visit. A sample set of questions that can be used to verify information contained in an alert is provided below (Box X).
- All alerts must be verified as quickly as possible and at least within 48 hours of detection. This requires staff at subnational levels to be trained and involved in process. However, this decentralization also requires stronger implementation and use of electronic tools that can provide access to a common alert log to key staff at sub-national levels.

Key information to collect during verification

- The information submitted with an alert will depend on the information collected in the IBS and EBS forms in a given emergency. However, as a guiding principle it should include the following core fields:

Key information to support verification of an alert

Source:

- Name of reporter
- Contact information of the reporter (e.g. mobile number)
- Original source of information (if second-hand)

Location:

- Location of alert (e.g. village, district, province, state)
- Use landmarks if unsure

Description:

- Date of onset of symptoms
- Symptoms and signs of cases (to consider differential diagnoses)
- Age distribution of cases (< 5 years / > 5 years)
- Outcomes of cases (cases / deaths)
- Actions taken

Key questions to determine validity of an alert

- Based on the information submitted, some key questions can help to detemine the validity of an alert.

Questions to help determine the validity of an alert

Source

- Has the event been reported by an official source (e.g. local health-care centre or clinic, public health authorities, animal health workers)

Frequency

- Has the event been reported by multiple independent sources (e.g. residents, news media, health-care workers, animal health status)?

Epidemiology

- Does the event description include details about time, place and people involved (e.g. six people are sick and two died three days after a ending a local celebration on in community X)?

Clinical details

- Is the clinical presentation of the cases described (e.g. a cluster of seven people admitted to hospital with atypical pneumonia, of whom two have died)?

Consistency

- Has a similar event been reported previously (e.g. with a similar presentation, affecting a similar population and geographical area, over the same me period)?

Case example

- 2 deaths and 16 suspected cases of acute watery diarrhoea in an internally displaced persons camp
- 52 pigs died in two neighbouring farms over one to two days
- 7.3 magnitude earthquake in Nepal with epicentre 18km from Kathmandu
- 22 cases of acute fever and rash, with 7 deaths, were reported from one district in the past week.

Outcomes of verification

At the end of the verification stage, the alert can be:

1. **Discarded**, on the basis that the alert is:
    - Verified to be false rumor
    - Verified to refer to a disease or hazard that is not amenable to immediate public health action (e.g., alert of several diabetes cases, varicella cases, etc.)

2. **Risk asssessed**, on the basis that the alert is verified as genuine, in which case it is classified as a real public health event. This means that is must be risk-assessed to understand the potential impact it may have on public health.
3. **Monitored**, on the basis that there is still not enough information for an alert to be verified (e.g. the reporter cannot be found). This means that the alert remains at the verification stage, pending a definitive outcome to either discard it or escalate it to risk assessment.

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4. Conduct a risk assessment

When is it done?

> An event is "a manifestation of disease or an occurrence that creates a potential for disease;" (IHR , 2005) (which can include events that are infectious, zoonotic, food safety, chemical, radiological or nuclear or unknown in origin. Events are verified alerts that warrant risk assessment.

- Risk assessment should be carried out within 48 hours of an alert being verified as an event.
- The level of risk will change over time, meaning that risk assessment is a systematic and continuous process. It should be done immediately after the alert is verified in the field, and then may need to be repeated at a later stage as soon as new information becomes available (e.g. new cases, new areas affected, changes in outbreak indicators).

How is it done?

Risk assessment is a dynamic process that may change in complexity based on the needs of any given event. For EWAR, the purpose is to rapidly characterize the probability that a verified alert will have a serious public health impact, and to help determine the actions needed to reduce this risk.

The level of risk is based the following factors (see Figure X):

1. Type of hazard (agent)
2. Exposure to the hazard (host)
3. Context (environment)

4. The key information collected under each factor is show in Table X below.
5. This information will assist in determining whether the event meets the criteria for response, and potential notification through IHR to WHO.

Figure X

Table X Key information collected in risk assessment

Components	Key information
Hazard assessment Identification of the hazard (i.e. cholera), the characteristics of a public health hazard and health effects.	- Laboratory confirmation if available (or clinical and epidemiological features) - Otherwise, listing of possible causes
Exposure assessment Evaluation of the exposure of individuals and populations to likely hazards.	- # of people likely exposed - # exposed likely susceptible - Mode of transmission (possibly vectors and animal hosts) - Incubation period - Potential for transmission (R0) - Immune status
Context assessment Evaluation of the context which may affect either the transmission potential or overall impact of the event	- Environment (e.g. climate, vegetation, land use) - Health and nutritional status - Cultural practices and beliefs - Infrastructure (access, services) - Social context (e.g. ongoing civil war, refugee camp)

Who is responsible?

Standard operating procedures should define which types of alerts will require which level of support for risk assessment. Depending on the context, health facility staff may have the capacity to risk assess certain types of alerts at their level. For other alerts, additional technical resources or expertise may be required from higher levels in the system.

More detailed risk assessments are needed when events appear particularly dangerous for public health (e.g. a cluster of suspected diphtheria cases among new arrivals in a refugee camp; reports of suspected EVD close to the borders of two countries).

A team with appropriate level of specialization should be assembled to carry out a risk assessment (see Rapid Response Teams (RRTs) below)

Role of laboratory surveillance

Laboratories play an essential role in the EWAR functions of a surveillance system:

- Rapid diagnostic tests sometimes play a role in generating alerts (e.g. positive cholera rapid diagnostic test among one or more suspect cases)
- Laboratory confirmation of an outbreak often also plays a role in the characterisation of a hazard during a risk assessment and during an intial public health investigation. This should be achieved as rapidly as possible, ideally at peripheral levels of the health system, to support characterisation of the level of risk and identification of the control measures required.
- Ongoing monitoring of trends in laboratory positivity, and antibiotic resistance patterns, are also sometimes indicated depending on the type of outbreak. See Box 1 for guidance.

Laboratory confirmation and laboratory data

- Laboratory confirmation is a key step in establishing the existence and the nature of transmission in the outbreak.
- There are resources available to WHO Member States to enable confirmation of pathogens, including access to reference laboratories for specific pathogens. However, the challenges in obtaining laboratory confirmation frequently start in the field, with the difficulties in the collection and transport of specimens.

Checklist

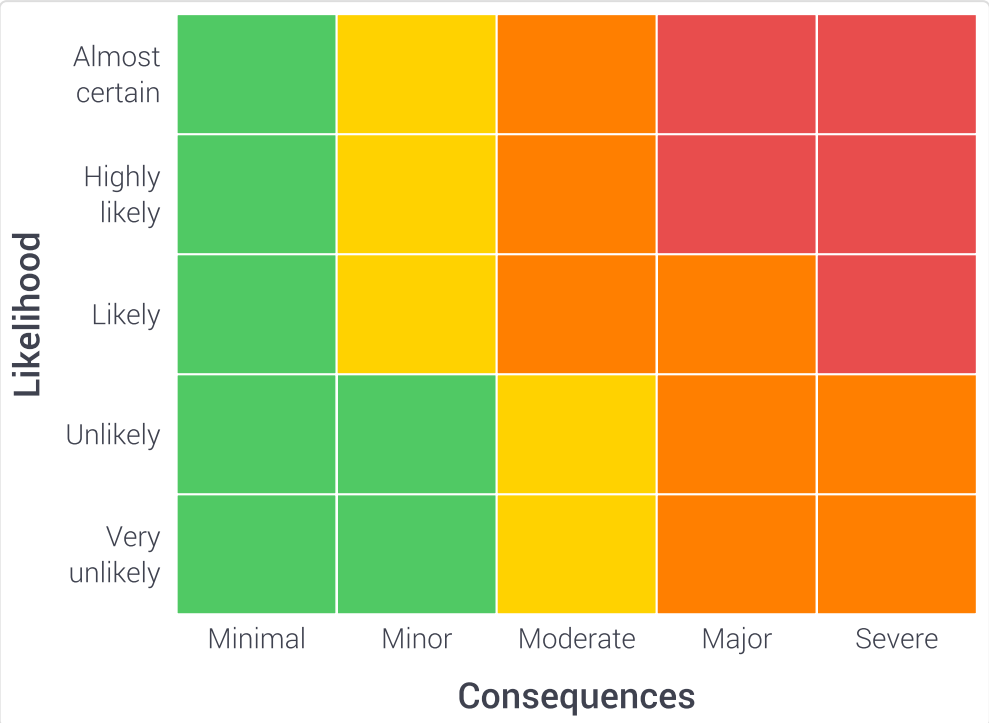
To support early warning of an outbreak, are your laboratory systems ready?

- Do health facilities have rapid diagnostic tests accessible to provide more evidence (though not confirmation) of an alert? (e.g., cholera)
- Do district health authorities have access to specimen collection kits for epidemic-prone diseases?
- Do district health authorities have funds and skilled staff to collect adequate-quality specimens form health facilities, and then transport these specimens by road or air to the central laboratory?
- Are there protocols for specimen collection and transport of biosafety level 2 to 4 pathogens?
- Does the Ministry of Health have a rapid clearance process to permit specimens to exit the country by air?
- Does the surveillance system integrate basic variables for laboratory confirmation into the line-list (e.g., RDT +/-, confirmed - yes/no, strain, resistance profile, etc.)?

5. Standardise risk characterisation

- Risk characterisation is the assignment of a level of risk to the event according to its likelihood of occuring and the resulting public health consequences.
- For some events, the information is limited and/or the overall level of risk is obvious and can be characterized automatically. However, a useful tool is a risk matrix where estimates of the likelihood are combined with estimates of the consequences (Figure 2).
- Two key questions to ask:
  - What is the likelihood of further spread?
  - What would be the consequences (type and magnitude) to public health if this were to occur?

Figure 2 Risk assessment matrix



Levels of risk

- **Low risk.** Managed in accordance with standard intervention protocols, routine control programs and regulations (eg, surveillance using routine surveillance systems)

- **Moderate risk.** The roles and responsibility of the response must be specified. Specific surveillance or control measures required (eg enhanced surveillance, supplementary vaccination campaigns)
- **High risk.** Special attention from management is needed: it may be necessary to put in place command and control structures; a series of additional control measures will be needed, some of which may have significant consequences
- **Very high risk.** An immediate response is required even if the event is reported outside normal business hours. Immediate attention from the required senior management (for example, the command and control structure should be put in place within a few hours); the implementation of control measures with serious consequences is very likely

How long does it take?

- The process does not have to be overly complicated or lengthy. It is guided by expert opinion of the risk assessment team, quantitative grading and if expertise is available.
- During discussions, team members should consider all types of consequences in addition to the expected morbidity, mortality, and direct long-term health consequences of the event (e.g. disability).
- The risk matrix also helps to assess and document changes in risk before and after control measures are implemented.

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6. Standardise risk outcome

- The final step is a decision to assign a final risk outcome to the event, based on the results of the risk assessment and risk characterisation.
- The risk matrix helps to define standard sets of actions, based on the level of risk.
- During risk assessment, it may become clear through laboratory confirmation and/or a strong index of suspicion that this is likely an outbreak or a public health emergency.
- Without delay, enhanced surveillance should be implemented to find as many suspect cases as possible and more detailed data. A public health investigation should also undertaken. The primary purpose is to identify the source, mode of transmission and to indicate potential control measures.

- In some circumstances, the risk assessment may lead to a discarding of the event based on the information available.

7. Form rapid response teams

- To ensure a predictable early response, a rapid response team (RRT) should be formed at each level of the system to support the risk assessment of alerts.
- The role of the rapid response teams are to conduct risk assessments of verified alerts, and support additional public health investigations.
- The composition of a team will depend on the nature of the threat being risk assessed. This can commonly include:

Function	Role
Epidemiology	Provide understanding on infectious disease threats, sources and modes of transmission
Laboratories and health services	Support specimen collection and transport
Clinicians	Support case management, IPC, immunization
Veterinarians	For zoonotic threats where indicated
Information and communication	To support communication of results

References

1. Rapid risk assessment of acute public health events. Geneva, World Health Organization, 2012.
2. Early detection, assessment and response to acute public health events: implementation of early warning and response with a focus on event-based surveillance. Geneva, World Health Organization, 2014.