UNIT 5 PREVENTION OF OUTBREAKS AND TRIGGER ALERTS*

Structure

5.0 OBJECTIVES

After studying this Unit, you should be able to:

- Explore the aspects of detecting and responding to outbreaks;
- Discuss the sources of information used in detecting outbreaks;
- Highlight the integration of data from channels to improve the accuracy and efficiency of outbreak detection;
- Explain the early warning signals for outbreaks focusing on patterns and indicators that play a significant role in identifying outbreaks;
- Highlight the significance of acting by exploring the consequences that delayed responses;
- Discuss the Rapid Response Teams (RRTs) including their composition, responsibilities, and tasks in containing and mitigating outbreaks; and
- Describe the objectives of outbreak investigations, and highlight the goals guiding these investigations as the step-by-step processes used to identify sources and transmission dynamics.

5.1 INTRODUCTION

The prevention of outbreaks and trigger alerts scrutinises proactive measures and early warning systems in public health. A detailed examination of

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historical trends and risk factors contributing to outbreaks provides a nuanced understanding of the factors that can precipitate public health crises. The implementation of targeted preventive measures, emphasises the need for tailored approaches that consider the specific context and characteristics of potential threats. By dissecting various prevention strategies, from vaccination campaigns to community-based interventions, learners will gain practical insights into the diverse toolkit available for safeguarding community health. A focal point is the exploration of trigger alerts—early warning systems designed to detect potential outbreaks at their nascent stages. It delves into the mechanisms through which trigger alerts operate, explaining their role in facilitating early detection and response. Public health professionals must understand trigger alerts to take early action, implement control measures, and prevent health crises from getting worse.

In this Unit, we will focus our discussion on the prevention of outbreaks and trigger alerts in outbreak investigation. In this context, discuss the outbreak management components. In a specific section, we will deal with evolving health threats through proactive prevention methods. The learners will be in a position to analyse the trends and identify variables to comprehend public health emergencies. In this Unit, we will bring out the outbreak detection sources and emphasise the need for vigilance in identifying early warning signs. The discourse will highlight the need for immediate action to minimise the impact of outbreaks on public health. Even the Rapid Response Team, its composition, and emergency deployment will be explained. We will understand the various phases and management of epidemic response. In this Unit, we will aid infectious disease professionals in understanding the role of health workers and medical officers in outbreaks. Hence, outbreak prevention, detection, and response techniques and protocols will be discussed extensively.

5.2 SOURCES OF INFORMATION TO DETECT OUTBREAKS

The process of detecting outbreaks relies heavily on a nuanced understanding and utilisation of a diverse array of information sources within the realm of public health surveillance. Traditional sources, such as data from healthcare facilities, form a foundational pillar in outbreak detection. This includes leveraging patient information, laboratory results, and clinical observations gathered from hospitals and clinics. The aggregation of data from these sources enables health authorities to discern patterns and anomalies that may signify the emergence of an outbreak.

Equally significant are community reports and notifiable disease registries, which provide insights into the health status of the general population. Community engagement and reporting mechanisms allow for the collection of real-time information from various locales, contributing to a more comprehensive understanding of local health trends.

In the contemporary landscape, integrating non-traditional sources has become increasingly crucial. Social media platforms, web searches, and syndromic surveillance offer additional layers of information. Analysing

digital data provides a rapid and dynamic means of identifying potential outbreaks by detecting signals or trends in health-related conversations and activities online.

The strength of outbreak detection lies in the synergy of these diverse sources. The amalgamation of traditional and modern data collection methods creates a more robust and sensitive surveillance system. By carefully examining this mosaic of information, public health professionals can identify unusual patterns or clusters of cases, triggering early warnings that enable timely and targeted interventions.

A comprehensive understanding of the myriad sources of information — ranging from conventional healthcare data to the wealth of information available in the digital realm — is essential for those involved in public health. This knowledge forms not only the basis for constructing effective surveillance systems but also empowers professionals to proactively identify and respond to potential outbreaks, safeguarding community health.

5.3 EARLY WARNING SIGNALS FOR AN OUTBREAK

The identification of warning signs that may herald an impending outbreak is pivotal in public health surveillance. A clustering of cases or deaths, whether in a specific geographic location or over a concentrated period, serves as a prominent indicator. An unusual increase in the number of cases or deaths beyond expected levels can also signify the potential emergence of an outbreak, prompting heightened vigilance.

i) **Clustering of Cases or Deaths in Time and/or Space**

Identifying a clustering of cases or deaths in a specific time frame or geographic area serves as a crucial warning sign of a potential outbreak. This clustering can highlight the spatial or temporal patterns of disease transmission, enabling public health officials to recognize and respond to localized or widespread health threats promptly. Monitoring and analysing these clusters facilitates the implementation of targeted interventions to contain the outbreak.

ii) **Unusual Increase in Number of Cases or Deaths**

An abrupt and unusual surge in the number of cases or deaths, beyond the expected baseline, is a clear indicator of a potential outbreak. This statistical deviation from the norm prompts heightened surveillance and investigation. The recognition of such spikes in disease incidence allows for rapid response measures, such as resource mobilisation, healthcare preparedness, and communication strategies to inform the public and healthcare professionals.

iii) **Single Cases of Measles, AFP, Cholera, Plague, Dengue, or JE**

The occurrence of even a single case of highly contagious or severe diseases such as measles, Acute Flaccid Paralysis (AFP), cholera, plague, dengue, or Japanese Encephalitis (JE) raises significant concern.

These diseases are often associated with rapid transmission and severe consequences. Prompt identification and response to a solitary case are crucial to prevent further spread, particularly in areas where the population may be susceptible or where these diseases have historically caused outbreaks.

iv) **Acute Febrile Illness of Unknown Aetiology**

The presence of acute febrile illness with an unknown cause signifies a potential threat, as it may show the introduction or circulation of a novel pathogen. Investigating febrile illnesses with unidentified origins is essential for early detection and containment of emerging infectious diseases. Enhanced surveillance and diagnostic capabilities are crucial in determining the aetiology of these febrile cases, allowing for targeted public health actions, and mitigating the risk of a broader outbreak.

v) **Occurrence of Two or More Epidemiologically Linked Cases of Meningitis, Measles**

The identification of two or more epidemiologically linked cases of diseases like meningitis or measles is a critical warning sign. This suggests a potential pattern of transmission and shows that the disease may spread within a specific community or population. Epidemiological linkage provides valuable insights into the potential source and mode of transmission, guiding public health authorities in implementing targeted interventions, such as vaccination campaigns or quarantine measures.

vi) **Unusual Isolate**

The detection of an unusual isolate, characterized by changes in the genetic or antigenic characteristics of a pathogen, raises concerns about potential shifts in the disease's virulence or transmissibility. Monitoring the genetic makeup of pathogens is essential for anticipating the evolution of infectious agents. This warning sign prompts further investigation to understand the implications of these changes and adapt public health strategies accordingly.

vii) **Shifting in the Age Distribution of Cases**

A noticeable shift in the age distribution of cases can show changes in susceptibility, exposure patterns, or the emergence of a new strain. Understanding such demographic shifts is crucial for tailoring public health interventions, especially if a disease affects age groups that were previously less vulnerable. This information helps refine vaccination strategies and other preventive measures to effectively address the evolving epidemiological profile.

viii) **Sudden Increase / High Vector Density**

A sudden increase in vector density, such as mosquitoes for vector-borne diseases like dengue or malaria, serves as a potent warning sign. Changes in vector abundance can lead to a rapid escalation of disease transmission. Monitoring vector density allows for the timely implementation of vector control measures, such as insecticide spraying

or habitat management, to curb the spread of vector-borne diseases and prevent larger outbreaks.

ix) **Natural Disasters**

Natural disasters, including floods, earthquakes, or hurricanes, can create conditions conducive to the outbreak of infectious diseases. Displacement, compromised sanitation, and disrupted healthcare infrastructure amplify the risk of disease transmission. Monitoring and responding to potential outbreaks in the aftermath of natural disasters is crucial for preventing secondary health emergencies. Public health efforts may include vaccination campaigns, provision of clean water and sanitation, and heightened disease surveillance in affected regions.

5.4 IMPORTANCE OF TIMELY ACTION

Trigger events, which can serve as early indicators of an impending outbreak, are diverse and may encompass anomalies such as an abrupt surge in reported cases, distinctive shifts in disease patterns, or the identification of a novel pathogen. To effectively address such scenarios, a structured approach involves establishing preset trigger levels for diseases. These trigger levels, carefully determined based on rigorous epidemiological analysis, hinge on key factors, including the epidemic potential of the disease, its case fatality rate, and the prevalence of the issue within the community or communities at risk. The concept is to define specific thresholds or trigger points, each associated with predetermined responses tailored to the severity and characteristics of the situation. The trigger levels act as a graduated scale of preparedness, allowing public health authorities to escalate their response measures proportionally to the perceived threat. The adaptability of this framework is paramount, enabling adjustments to be made based on emerging scientific insights, the evolving nature of the outbreak, and the effectiveness of implemented interventions. In the end, this approach helps us effectively manage and respond to disease outbreaks by being proactive and organised, considering the specific characteristics of each health crisis.

Table 5.1: Trigger Level, Response Level, and Responsible Official

Trigger Level-1	Suspected /limited Outbreak	Local Response by a Health Worker and Medical Officer (MO)
Trigger Level-2	Outbreak	Local & District Response by District Surveillance Officer (DSO) & District Epidemic Investigating Team (DEIT)
Trigger Level -3	Confirmed Outbreak	Local, District and State level response
Trigger Level -4	Widespread Epidemic	State Level response to an epidemic
Trigger Level -5	Disaster Response	Local, District, State, Center & Partners

In regions where a particular disease is not endemic, a singular case of a suspected epidemic-prone illness holds significant weight and should act as a

catalyst for a prompt and comprehensive trigger response. For instance, the report of a single case of Acute Flaccid Paralysis (AFP) in an area that has remained free of polio cases for an entire year causes immediate attention. The rationale behind this approach lies in the recognition that even isolated instances of certain diseases with epidemic potential demand swift intervention to prevent potential outbreaks. Conversely, in areas where a disease is already endemic, a change in the disease pattern or the emergence of clustered cases should serve as a trigger event. For instance, the identification of over 10 cases of jaundice within a week in a specific urban ward makes up a notable change in the disease landscape and requires an immediate response. This approach acknowledges the importance of vigilance in regions with established disease prevalence, where alterations in the usual disease patterns can signify an increased risk and warrant heightened surveillance and response efforts. In both situations, these trigger responses are important parts of proactive public health management. Their goal is to identify and reduce the impact of potential outbreaks as soon as possible.

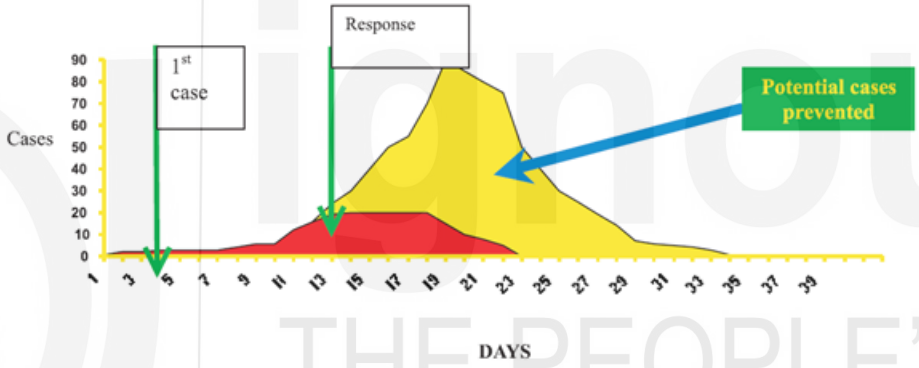

Figure 5.1: Response to an Outbreak and Control Measures

Timely action in controlling an outbreak through effective surveillance is of utmost importance and cannot be overstated. Swift and accurate surveillance serves as the linchpin in identifying and containing emerging health threats before they escalate into full-scale epidemics. Timely detection enables public health authorities to implement targeted interventions, including isolation measures, contact tracing, and the dissemination of critical information to healthcare providers and the public. Acting promptly can curtail the spread of infectious agents, reduce the overall impact on communities, and mitigate potential strain on healthcare systems. Timely surveillance also provides valuable data for understanding the epidemiology of the outbreak, informing evidence-based decision-making and resource allocation. Early response efforts contribute to maintaining public trust and confidence in the healthcare system. The proactive nature of timely surveillance action is indispensable in protecting public health, preventing the loss of lives, and minimising the economic and social disruptions associated with unchecked disease outbreaks.

The prompt and accurate reporting of suspected epidemics is crucial for effective public health response, and the First Information Report (FIR), as outlined in Form C (Table 5.2), plays a pivotal role in this process. Once the

reporting unit has verified a suspected epidemic, it is imperative to swiftly submit the FIR to the District Surveillance Officer. The emphasis here is on responding rapidly to ensure that necessary interventions can be deployed promptly to contain the outbreak. To facilitate this expeditious reporting, the guidelines recommend using the fastest route of information available. This could involve various communication methods, such as telephone, fax, email, or through the Integrated Disease Surveillance Programme (IDSP) computer format entry. By leveraging multiple communication channels, health authorities can ensure that critical information reaches the District Surveillance Officer without delay, enabling a quick and coordinated response to the emerging health threat.

Table 5.2: First Information Report Form–FORM C

Officer In Charge CHC/PHC–Trigger-1 Response
General Information State: _____ District: _____ Town/PHC: _____ Ward / Village: _____ Population: _____ District code No: _____ Unique identifier Reporting unit: _____
Background Information Person reporting the outbreak: _____ Date of report: _____ Date investigations started: _____ Person(s) investigating the outbreak: _____
Details of Investigation **Describe how the cases were found (may include: (a) house-to-house searches in the affected area; (b)visiting blocks adjacent to the affected households; (c) conducting record reviews at local hospitals; (d) requesting health workers to report similar cases in their areas, etc.):** _____ _____ _____ _____ _____

Descriptive Epidemiology 1. Cases by time, place and person (attach case-based reporting forms and relevant graphs and maps). 2. Age-specific attack rates and mortality rates 3. High-risk age groups and geographical areas.
Description of Control Measures taken _____ _____
Brief Description of Problems Encountered _____ _____
Factors which, in your opinion, contributed to the Outbreak _____ _____
Conclusions and Recommendations _____ _____

5.5 CONCEPT OF RAPID RESPONSE TEAMS

A Rapid Response Team (RRT) is described as a proficient and well-equipped multidisciplinary unit capable of swiftly deploying to address a public health emergency in collaboration with other response initiatives. The composition of RRT members, outlined in this document, is designed to be adaptable and adaptable to the changing requirements of outbreak responses. This encompasses both individual member deployments and collective team deployments. Ideally, RRTs employ an interdisciplinary approach, and their members are expected to embody the characteristics represented in the figure below (figure5.2):

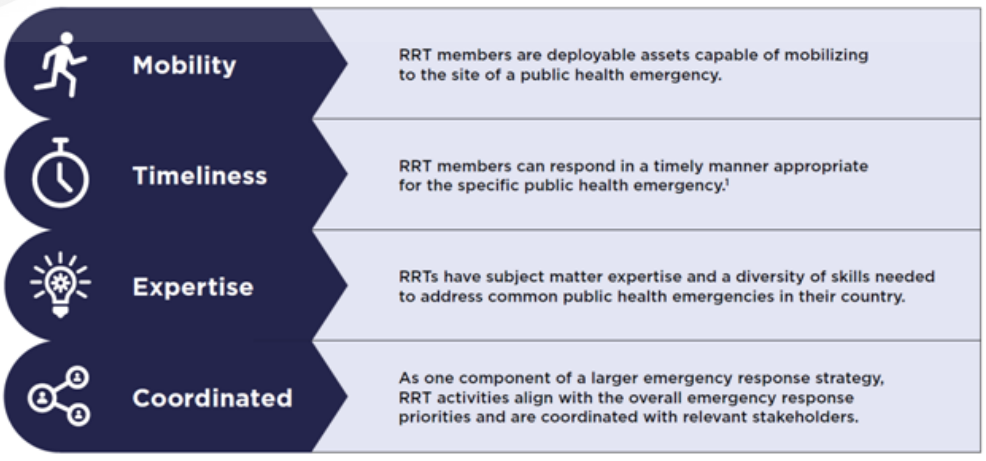

Figure 5.2: Characteristics of a RRT

Source: CDC

The operations of Rapid Response Teams (RRTs) are strategically organised into two distinct phases: the non-emergency phase and the emergency phase, as illustrated in Figure 5.3. This division underscores the cyclic nature of

RRT processes, emphasising the continual support required for the team to remain functional, even during non-emergency periods. The non-emergency phase primarily focuses on essential aspects such as the development of standard operating procedures (SOPs) for both phases, staffing, rostering, readiness, and training, ensuring that the RRT is well-prepared for any potential emergencies. Conversely, the emergency phase encompasses critical activities such as RRT activation, pre-deployment, deployment, and post-deployment processes when responding to an active emergency. It is important to note that in countries where a functional RRT may not exist before the onset of an emergency, the processes of these two phases may intersect during the crisis, underscoring the urgency and adaptability required for effective emergency response in such situations.

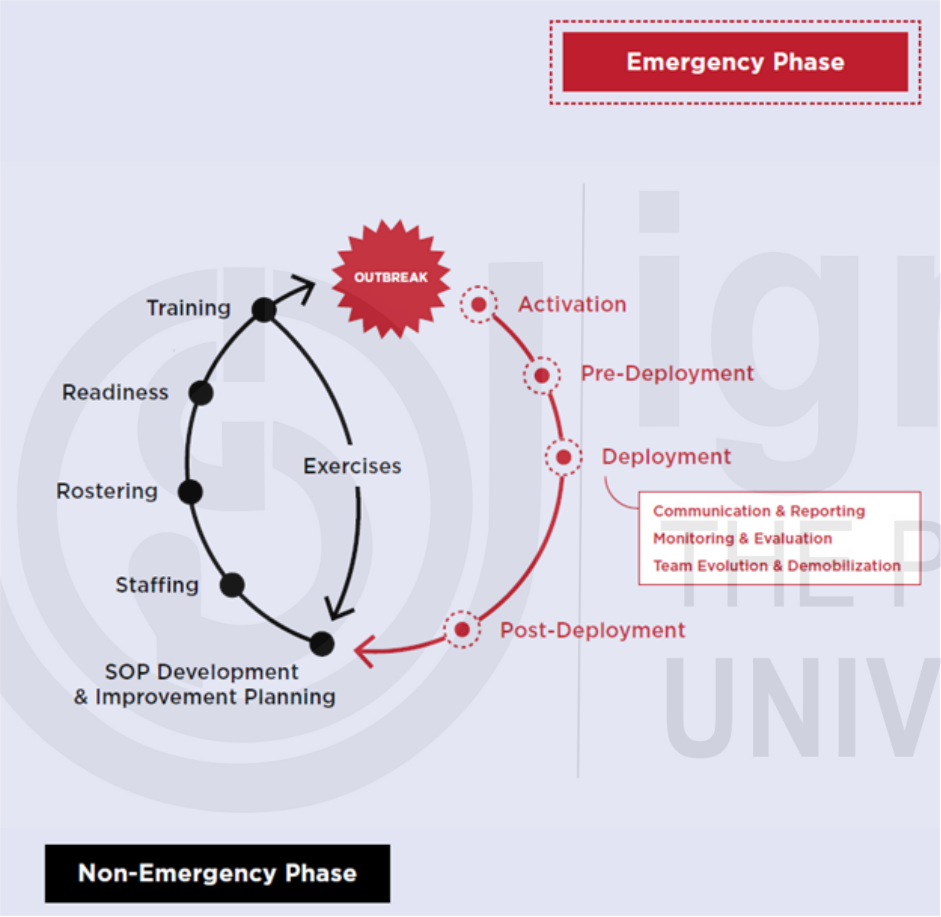

Figure 5.3: RRT Emergency and Non-emergency Phase Operations

During a response, RRT management alone or with input from key decision-makers may be responsible for:

- Identifying and selecting the RRT members for deployment,
- Providing and/or procuring support for the RRT, including logistics support, technical guidance and expertise, equipment, and human resources,
- Ensuring execution of established pre-deployment, deployment and post-deployment RRT processes,
- Facilitating communication between the RRT and the emergency coordination unit, and

- Monitoring RRT response activities, ensuring a coordinated approach and alignment with response priorities.

Check Your Progress 1

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the unit.

1) Write a note on early warning signals for an outbreak.

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2) What do you mean by Rapid Response Team?

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5.6 STEPS IN OUTBREAK RESPONSE

Step 1 - Verification of the Outbreak

The process for responding to a potential outbreak involves several crucial steps to ensure a timely and accurate assessment of the situation. First, it is imperative to identify the validity of the source of information, aiming to prevent false alarms or errors in data entry that could lead to unnecessary panic or misguided responses. Subsequently, the District Surveillance Officer (DSO) should collaborate with the relevant Medical Officer (MO) to investigate. This involves checking for indicators such as abnormal increases in the number of cases, case clusters, epidemiological links among cases, occurrence of trigger events, or a notable increase in mortality rates. If any of these factors are identified, it signals the need for heightened vigilance and further action.

In the event of a confirmed outbreak, the DSO plays a pivotal role in alerting neighbouring districts, Community Health Centers (CHCs), and Primary Health Centers (PHCs) about the situation. This proactive measure aims to facilitate the prompt institution of preventive measures in surrounding areas, minimising the potential spread of the outbreak. Simultaneously, the DSO notifies the concerned Programme Officer and the Chief Medical Officer (CMO) about the outbreak. This communication sets in motion a coordinated response, with the relevant Programme Division taking the lead in implementing and overseeing additional control measures. By following this structured protocol, public health authorities can swiftly and effectively

respond to emerging outbreaks, mitigating their impact and safeguarding the health of the community.

Step 2 – Sending the DEIT

The efficient management of a suspected outbreak involves a systematic and rapid response, with the establishment of a District Epidemic Investigating Team (DEIT) as a key component. Upon identification of a potential outbreak, the DEIT should be promptly made upof a pool of specialists tailored to the suspected type of outbreak. The team's orientation to the current scenario is crucial, ensuring that its members are well-informed and prepared for the specific challenges posed by the outbreak.

To facilitate the DEIT's on-site investigation, necessary resources, such as vehicles, drugs, reagents, and required forms, should be expeditiously made available. This ensures that the team can swiftly move to the affected area and begin investigative efforts without delay. Coordination and feedback mechanisms between the DEIT and relevant authorities, such as the District Surveillance Officer (DSO), concerned Programme Officer, and Chief Medical Officer (CMO), are integral in maintaining a synchronised response.

The DEIT is tasked with a comprehensive investigation into the outbreak, with regular reporting to the DSO, concerned Programme Officer, and CMO. The team starts the process by filing an interim report, using a specified format provided in the Annex. If the epidemic persists despite initial control measures, the DEIT may recommend and undertake special studies as outlined in the established procedures.

Follow-up visits are imperative to ensure the effective implementation of control measures. These visits serve as a critical mechanism for ongoing assessment, allowing the DEIT to verify the adequacy of implemented measures and make any necessary adjustments. This systematic approach, from the immediate constitution of the DEIT to thorough investigations, interim reporting, and follow-up visits, forms a robust framework for responding to outbreaks, enhancing the likelihood of successful containment and mitigation efforts.

To Investigate or control?

ETIOLOGY		SOURCE / TRANSMISSION	
		Known	**Unknown**
	Known	**Control +++** **Investigate +**	**Control +** **Investigate +++**
	Unknown	**Control +++** **Investigate +++**	**Control +** **Investigate +++**

Figure 5.4: Etiology and Source/Transmission of Outbreaks

Step 3: Monitoring the Situation

The District Epidemic Investigating Team (DEIT) plays a pivotal role in providing ongoing updates to the District Surveillance Officer (DSO) regarding the progress of control measures and the current state of the outbreak. This communication is carried out in close collaboration with the Chief Medical Officer (CMO) and the concerned Programme Officer. The information relayed to the DSO encompasses several critical elements that help to gauge the effectiveness of the response strategy.

First, the DEIT monitors the trends in the reported cases and deaths associated with the outbreak. This continuous assessment aids in understanding the trajectory of the outbreak, allowing for timely adjustments to control measures as needed. The team closely evaluates the implementation of containment measures to ensure their effectiveness and appropriateness in curbing the spread of the outbreak. Another essential aspect of the update involves the status of drug and vaccine stock. Monitoring the availability of medical resources is crucial to guarantee that affected individuals receive timely and appropriate treatment. To promptly address any operational challenges, we closely scrutinize logistic issues, including communication channels, the availability of vehicles for transportation, and the overall coordination of resources. Community involvement is a key consideration, and the DEIT assesses the level of engagement and cooperation from the community in adhering to control measures. This involvement is vital for the success of public health interventions. The team evaluates the media's response to ensure accurate and timely information dissemination, fostering transparency and minimising misinformation.

Health authorities sustain this reporting and monitoring process until the outbreak is officially declared to be over. The continual updates allow for adaptive decision-making, enabling health authorities to respond dynamically to the evolving nature of the outbreak and ensuring that control measures remain effective until resolving the public health crisis.

Step 4: Declaring the Outbreak to be Over

The criteria for declaring the end of an outbreak involves a comprehensive assessment, particularly when there have been no fresh cases reported for a specified duration. In this context, the criterion specifies a period of 2 incubation periods since the onset of the last reported case. An incubation period refers to the time elapsed between exposure to a pathogen and the manifestation of symptoms in an infected individual. By waiting for two full incubation periods, health authorities adopt a conservative approach to ensure that the likelihood of fresh cases emerging is minimal.

The process involves rigorous active case search efforts, showing an intensive and proactive approach to identifying any potential cases that might not have been initially reported. This thorough investigation is crucial for confirming that no fresh cases have occurred during the specified period.The choice of a 2-incubation period timeframe is strategic, as it allows for a sufficiently extended observation period, considering the variability in

incubation periods for different diseases. Once this criterion is met, and no fresh cases are identified after the active case search, health authorities can reasonably conclude that the outbreak has subsided, and the risk of ongoing transmission is significantly reduced.

Step 5: Review of the Final Report

Following the declaration that an outbreak has officially concluded, there is a crucial and systematic process that involves the submission of a report. The Primary Health Center (PHC) Medical Officer (MO) is responsible for providing this report and must submit it within a specified timeframe of 10 days from the official declaration of the end of the outbreak.The report serves as a comprehensive documentation of the outbreak, covering various aspects such as the timeline of the outbreak, the number of cases reported, control measures implemented, and any challenges faced during the response. The goal is to provide a detailed account of the outbreak response efforts undertaken at the PHC level.

Upon submission of the report, a Technical Committee, likely consisting of public health experts, epidemiologists, and other relevant specialists, reviews the document. This committee conducts a thorough analysis of the outbreak, aiming to identify key insights and lessons learned during the response. The emphasis is on generating suitable recommendations for both immediate and medium-term actions to prevent similar outbreaks in the future.Immediate recommendations may involve refining specific aspects of the response strategy, addressing any shortcomings, or suggesting modifications to existing protocols. Medium-term recommendations focus on implementing sustainable measures and improvements that contribute to the overall enhancement of the public health system's resilience against potential outbreaks.

5.7 SUMMARY OF OUTBREAK INVESTIGATION – BY THE HEALTH WORKER

Table 5.3: Responses by Health workers to the Outbreak

S.No	Syndrome	Trigger event	Action taken
1.	Acute watery stools	A single case of severe dehydration /death in a patient > 5 years of age with diarrhoea More than 10 houses having at least one case of loose stools irrespective of age per village or an urban ward	a) Treat with appropriate antibiotics b) Treat with ORS c) Refer to PHC, if dehydration is severe. d) Inform MO PHC e) Collect water samples and send them to PHC for analysis f) OT testing g) Check TCL stock (bleaching Powder) h) Train the local person/s about the chlorination of

S.No	Syndrome	Trigger event	Action taken
			water i) IEC for community awareness about safe water and personal hygiene
2.	Fever < 7 days duration Only fever	5 cases in 1000 population.	a) Slides for MP with presumptive/RT for malaria b) Inform MOPHC. c) IEC for community awareness.
3.	With rash (Measles/ Dengue)	Two similar cases in a village (1000 population)	a) Collect slide for MP. b) Refer the case to PHC c) Inform MOPHC d) Give vitamin A e) Give paracetamol f) Check immunization g) Surveillance for Aedes Egypti Larvae in the house: • Containers • Coolers, etc.
4.	Altered conscious-ness	Two cases of fever with altered consciousness in the village/1000 population	a) Collect slide for M.P. b) Refer the case to CHC/DH c) Antipyretics (Avoid Aspirin) d) Inform to PHC e) IEC
5.	Fever with bleeding	Two cases of fever with bleeding in a village or 1000 population	a) Refer the case to CHC/DH b) Inform to PHC c) IEC
6.	Fever with convulsions	Two cases of fever with convulsions in a village or 1000 population	a) Refer the case to CHC/DH b) Inform to PHC c) IEC
7.	Fever more than 7 days	More than 2 cases in a village or 1000 population	a) Give paracetamol b) Collect slide for MP c) Give antimalarial treatment d) Inform and refer to PHC for treatment e) OT testing of drinking water f) Collect water samples and send them to PHC for onward transmission g) Check TCL stock h) Train local people about water Chlorination i) Community awareness about waste water and Personal hygiene
8.	Jaundice	More than 2 cases in a village or 1000	a) Refer to PHC b) Inform MOPHC

S.No	Syndrome	Trigger event	Action taken
		population	c) Search and refer antenatal cases with jaundice in the 2nd/3rd trimester d) Collect water samples for analysis and e) Sendit to PHC f) OT testing of drinking water g) Collect water samples and send them to PHC for onward transmission. h) Check TCL stock i) Train local persons about water Chlorination j) Community awareness about wastewater and personal hygiene.
9.	Unusual events	More than 2 deaths or hospitalisation	a) Inform MOPHC b) Community awareness

5.8 SUMMARY OF OUTBREAK INVESTIGATION – BY THE MEDICAL OFFICER

Table 5.4: Responses by Medical Officer Level (PHC/CHC) to the outbreak

Sl No.	Probable Diagnose	Trigger event	Action taken
1	Acute watery diarrhoea/ Cholera	A single case of cholera or epidemiologically linked cases of diarrhoea, / a case of severe dehydration or death due to diarrhoea ina patient > 5 years old Clustering of cases particularly in a village or ward where more than 10 houses having at least 1 case of loose stools irrespective of age	a) Verify the information from ANM b) Confirmation of the outbreak. c) Standard case definition d) Standard case management e) Stool sample collection for cholera f) Ensure safe water supply g) Inform district authority and ask for help SOS h) IEC i) Documentation. j) Ensure buffer stock
2	Typhoid	More than 30 cases of prolonged fever in a week from the entire PHC or 5 or more cases per week from the sub-centre OR More than 2 cases from	a) Verify the information from ANM b) Confirmation of the outbreak c) Active search of cases with a standard case definition d) Stool sample collection

Sl No.	Probable Diagnose	Trigger event	Action taken
		a single village/ urban ward with 1000 population	e) Standard case management f) Ensure safe water supply g) Inform district authority and ask for help SOS h) IEC i) Documentation j) Ensure buffer stock k) Blood culture for Styphi
3	Viral hepatitis	Clustering of cases from a particular village / urban ward where more than 2 cases of jaundice have been found in different households OR More than 10 cases per PHC per week.	a) Clinical verification b) Standard case management c) Active search of cases d) Ensure Safe Water supply e) Serological investigation f) Active search for 2nd/3rd-trimester cases with jaundice g) Keep them under observation with referral to district hospital SOS. h) Investigation of water treatment plant/ pipeline leakages
4	Measles	A single case of probable measles from a tribal or remote area two or more cases with fever with rash	a) Verify the case through clinical manifestation b) Send samples for laboratory testing c) Standard case management d) Active search of cases e) Ring vaccination f) Vitamin A g) IEC
5	Japanese Encephalitis	Even a single case of probable JE or 2 cases with fever with altered consciousness/seizures.	a) Verify the information b) Clinical confirmation c) Standard case management d) Active search of cases with the standard case definition e) Vector surveillance and control f) IEC g) Subsequently, inform to higher authority h) Isolation of virus i) Sero-diagnosis j) Referral of serious cases to the district hospital.

Sl No.	Probable Diagnose	Trigger event	Action taken
6	Dengue/DHF	Even a single case of suspected DHF from a community rising number of fever cases for the previous 3weeks	a) Verify the information b) Suspect, if clustering of fever cases with M.P. negative slides are found c) Confirmation of outbreak. d) Standard case management e) Standard case definition f) House-to-house Vector surveillance for *A. Egypti Larvae* g) Fogging/spraying if necessary h) Inform the DHO i) IEC j) Empty the coolers and vessels and keep them dry for 24 hours at least once a week k) Remove garbage (Containers) l) Laboratory confirmation
7	Malaria	Even a single case is found malaria+ ve in an area where malaria was not present for a minimum of three months OR SPR has risen more than double over the last three months OR States will have to set trigger values based on the endemicity of malaria	a) Mass survey for fever cases. b) Microscopic examination within 24 hours c) Start CRT to all fever cases/all contacts of + ve cases and all migratory populations. (in the case of a single PF case of indigenous origin is found) d) Focal spraying with synthetic pyrethyroid e) Fogging daily X3 days followed by biweekly for 3 weeks f) Larvicidal application g) Elimination of mosquito genic places by tempting water tables, landfilling, and channelizing the drains. h) Activate DDC/FTD k) Involve local bodies and communities by IPEC. l) Daily surveillance for 3 to 4 weeks

Sl No.	Probable Diagnose	Trigger event	Action taken
8	Unusual syndromes causing death or hospital admission	Hospitalisation or death of a minimum of two cases of similar illness from a geographical area.	a) Verification of the rumour b) Clinical verification of cases c) Basic Life Support and emergency medical care d) Refer to an appropriate hospital, if necessary e) Active search of cases f) Autopsy and preservation of body fluid and tissues of vital organs for laboratory diagnosis g) IEC to avoid panic h) Reporting to the higher authority

Check Your Progress 2

Note: i) Use the space given below for your answers.

ii) Check your answers with those given at the end of the unit.

1) Enumerate the major steps in outbreak response.

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2) Explain the key steps involved in the Outbreak Investigation response by Health Workers.

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5.9 CONCLUSION

A comprehensive exploration of key elements in outbreak management is important. In this Unit, we have focused our discussion on the prevention of outbreaks and trigger alerts in outbreak investigation. In this context, we have discussed the outbreak management components. In a specific section, we have dealt with evolving health threats through proactive prevention methods. Here, we have analysed the trends and identified variables to comprehend public health emergencies. In this Unit, we have brought out the

outbreak detection sources and emphasised the need for vigilance in identifying early warning signs. The discourse highlighted the need for immediate action to minimise the impact of outbreaks on public health. Even the Rapid Response Team, its composition, and emergency deployment have been explained. We have explained the various phases and management of epidemic response. In this Unit, we have provided information to infectious disease professionals to understand the role of health workers and medical officers in outbreaks. Hence, outbreak prevention, detection, and response techniques and protocols have been discussed extensively for effective prevention of outbreaks and trigger alerts.

5.10 GLOSSARY

Clustering of cases : Clustering of cases in a medical context refers to a situation where cases of a particular disease are grouped in time, geographic location, or by common exposures. This term is often used during an outbreak or epidemic to describe how cases are not randomly distributed but are concentrated in certain areas or among specific populations.

Meningitis : It is a medical condition characterised by the inflammation of the meninges, which are the protective membranes that cover both the brain and the spinal cord. The cause of this condition can vary and may be attributed to infectious agents, such as viruses, bacteria, fungi, and parasites. Symptoms typically include fever, headache, stiff neck, and in more severe instances, seizures, confusion, and sensitivity to light.

Outbreak Investigation : An outbreak investigation is a systematic process used to identify the cause of an outbreak, whether it's related to infectious diseases, foodborne illnesses, or other health threats. It involves detecting and confirming the outbreak, defining cases, analysing data, generating hypotheses, and implementing control measures. The goal is to swiftly understand the outbreak's source, prevent further spread, and protect public health.

Outbreak Response : Outbreak response involves a series of coordinated actions aimed at minimising the spread and impact of a disease outbreak. When faced with an outbreak, public health authorities swiftly detect and confirm the outbreak, identify its source, and implement control measures. These measures extend beyond traditional

healthcare settings and may include physical distancing, contact tracing, mapping disease clusters, and quarantine.

5.11 REFERENCES

Centers for Disease Control and Prevention (CDC).(n.d.). *Introduction to epidemiology*.https://www.cdc.gov/training/publichealth101/epidemiology.html

National Center for Disease Control.(n.d.). *Integrated disease surveillance project: Training Manual for State & District Surveillance Officers*. https://www.idsp.mohfw.gov.in/WriteReadData/OldSite/2WkDSOSept08/Resources_files/DistrictSurvMan/Module8.pdf

5.12 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1) Your answer should include the following points:
   - For details, refer to Section 5.3
2) Your answer should include the following points:
   - For details, refer to Section 5.5

Check Your Progress 2

1) Your answer should include the following points:
   - For more details, refer to Section 5.6
2) Your answer should include the following points:
   - For more details, refer to Section 5.7

UNIT 6 PRINCIPLES AND METHODS OF INVESTIGATION: FOOD, WATER, AIR AND VECTOR-BORNE OUTBREAKS*

Structure

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