



Outbreak Management and Reporting in Healthcare Settings

Session 3



Learning Objectives

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

- Define an outbreak
- Outline sources of an outbreak alert
- Describe the purpose of outbreak investigation
- Explain the objective of outbreak investigation
- Describe an outbreak management plan
- Outline the steps of managing an outbreak



Definition of an outbreak

- An event involving microbial contamination of food or water
- A greater than expected rate of infection compared with the usual background rate among a specific population in a given area over a particular period of time
- Two or more linked cases of an infection
- A single case of an unusual or rare infection



Sources of an Outbreak Alert

- An effective surveillance system
- The physician
- The nurse
- The hospital Microbiologist
- The epidemiologist
- The patient(s)
- Media



Purpose of Outbreak Investigation

- Identify and control the infection outbreak
- Reduce illness and complications
- Prevent new episodes
- Evaluate surveillance system
- Put in place a surveillance system
- Address public concern
- Teaching and learning
- Research



Objective of Outbreak Investigation

To identify:

- Causal agent
- Source
- Mode of transmission
- Population at risk
- Risk factors



Outbreak Management Plan

As part of preparation:

- Develop a written protocol that provides a framework on management and communication/notification process of an infection or disease outbreak
- Pre-outbreak planning helps in prompt implementation of the process, early detection and control of the outbreak
- Identify key members of Outbreak Management Team



Outbreak Management Team

- Oversees all aspects of an outbreak
- Should meet at the beginning of each outbreak and on an ongoing basis as necessary
- Have members with defined roles and responsibilities



Outbreak Management Team

Membership (sample):

- Administrator
- Infection Control Professional (ICP)
- Hospital epidemiologist
- Infection Control Committee members
- Risk management personnel
- Staff from unit involved:
Head nurse/designate
- Physicians
- Nurses
- Laboratory
- Data manager
- Public health
- Pharmacy
- other relevant staff



Outbreak Management Team Meeting

Main Agenda:

- Literature search
- Control measures
- Case Definition
- Specimen collection
- Availability of resources
- Review of line list
- Staff education
- Outbreak monitoring, and
- communication



10 Steps of Outbreak Management

1. Determine if an outbreak truly exist
2. Confirm diagnosis
3. Define case(s) and initiate case finding
4. Implement immediate control measures
5. Describe findings based on person, place and time
6. Generate a hypothesis
7. Test the hypothesis
8. Implement more prevention and control measures
9. Debrief team(s)/Report
10. Disseminate findings and recommendations



Determine if an Outbreak Truly Exists

- Mobilize Outbreak Management Team
- Inform key stakeholders e.g., unit manager, physician leader, public health unit
- Visit affected unit /ward
- Rule out other reasons for increased numbers
 - Change in reporting
 - Change in diagnostic test
 - Change in case definition
 - Increased awareness
 - Change in population size
- True outbreak or pseudo-outbreak
- Find out if the number of cases exceed the expected number? If yes, declare outbreak



Confirm Diagnosis

- Use clinical and/or laboratory information
- Epidemiological information is also useful
 - Interview patient/staff on a specific unit
 - Assess patients who participated in a specific activity or had specific procedure



Establish case definition

Standard set of criteria used to decide if a person should be classified as suffering from a disease under **investigation:**

- Describe cases in terms of *person, place and time*
- Cases are established based on symptoms
- A good case definition should include most, if not all cases
 - Start broad and refine definition as outbreak progresses to identify definite, probable and suspect cases



Establish case definition Cont....

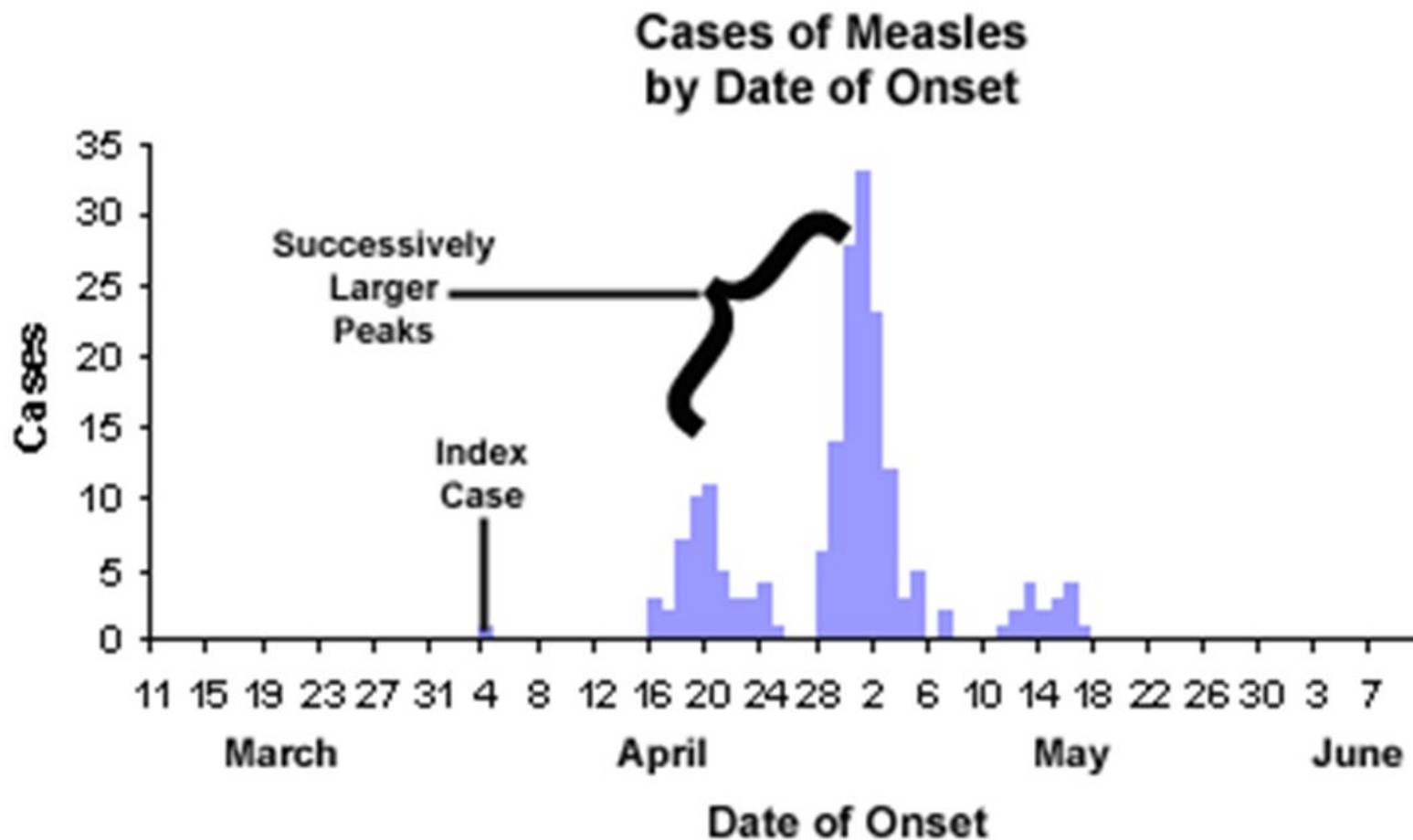
Patient Line List Items:

- Symptoms
- Onset Date
- Resolution data (date symptoms resolve)
- Location
- Samples taken
- Results
- Use case definition to find other cases in the source population

Use the line list data to make graphic representation = an Epidemic (Epi) Curve



Example of an Epidemic Curve





Epidemic Curves

Help describe :

- Mode of transmission/source of infection
- Common source
- Propagated source
- Date of exposure
- Course of exposure
- Outbreak's:
 - Pattern of spread
 - Magnitude
 - Outliers
 - Time trend
 - Exposure and/or disease incubation period



Implement Immediate Control Measures

- May be initiated at any point in the process but ideally ***as soon as possible***
- Measures based on
 - Causative agent e.g. prophylaxis, vaccines
 - Source/reservoir e.g. disinfection, isolation
 - Mode of transmission e.g. additional or transmission based precautions
- Reinforce standard precaution measures
- Targeted to break the chain of infection



Describe findings based on person, place and time

- Recommendations
 - Generally made at the end of the outbreak
 - Based on findings and result
- Conduct a debrief with key participants and discuss what went well and identify areas of improvement
- Focus on strategies to prevent future outbreaks



Formulate hypothesis

- Record, tabulate and review all collected data and summarize commonalities
- Based on data analysis, develop a “best guess”
- Hypothesis on most likely:
 - reservoir/source
 - Mode of transmission
 - Exposure
- Hypothesis should explain majority of cases (there will be some unexplainable cases)
- Conduct hypothesis generating interviews
- Review descriptive data
- If no idea, stop and rethink



Test Hypothesis

- Conducted when infections are associated with:
 - Significant morbidity/mortality
 - Multiple services involved
 - Outbreak related to commercial products
 - Seek assistance from your epidemiologist or public health unit for this endeavour
- Most common outbreak start to resolve before you get to this step
- Microbiological investigation of suspected sources or vehicles of transmission



Implement More Prevention and Control Measures

- Isolation precautions
- Cohort residents and staff
- Prophylaxis of contacts
- Decolonization of carriers
- Limiting visitors



Implement More Prevention and Control Measures Cont.

DO NOT!

- Conduct generalized microbiological screening
- Give antimicrobial prophylaxis
- Allow visitors or relatives enter if not exceptionally necessary



Evaluate Control Measures

- Control measures *are* **critical** to managing the outbreak
- Must be evaluated to determine efficacy-what's working, what's not
- Control measures may change if case numbers do not decrease



Organize the Data in Person, Time and Place

Person

Age, Sex, Medical status
Clinical presentation, use of
medication, Risk factors
Deaths and case fatality rate

Time

Outbreak period-onset of first case
Probable exposure period
Minimum/maximum incubation
period
Epi curve trend: Point source,
propagated, intermittent, continuous

Place

Geographic spread
Provide clues to patient population at risk
May show clustering of cases
Helps determine whether localized outbreak or one with facility –
wide implications



Write Report and Communicate

- Conduct a debrief with key participants and discuss what went well and identify areas of improvement
- Focus on strategies to prevent future outbreaks
- Written report should include:
 - Background
 - Investigation conducted
 - Results (facts, tables and graphs)
 - Discussion / recommendation
- Disseminate widely



Organize the Data in Person, Time and Place

- Time-Epidemic Curve (Epi-curve)
 - Time on X-axis and number of cases on Y-axis
 - Gives you an idea on type of outbreak
 - With known pathogen and incubation, can figure out exposure
- Water sources, animal distribution, Roads, Restaurants, etc.



Summary of Session

- Have outbreak investigation members with defined roles and responsibilities
- Determine if an outbreak really exists
- Establish a Case definition
- Establish and evaluate control measures
- Give feedback