

PRINCIPLES OF INFECTIOUS DISEASE EPIDEMIOLOGY

MODULE VIII – PREPARING AN OUTBREAK INVESTIGATION REPORT

Note: You will need to access the course to view the examples associated with this module, as they are not included in this outline.

INTRODUCTION

Module VIII is designed to prepare public health workers to meet the following objectives:

1. Correctly identify the necessary elements of an outbreak investigation report
2. Correctly sequence epidemiologic information within an outbreak report
3. Identify the appropriate recipients of an outbreak report

Reports about an outbreak investigation may take many forms. During an investigation, **interim reports** help to transmit information about:

- what has happened
- what is happening
- what progress is being made

Preparing an interim report can help clarify the investigator's understanding and provide new insights.

Appropriate interim reports during the investigation may include:

- Verbal reports to the outbreak coordination team
- Verbal and written progress reports to administrators
- Information briefings for the media/public

This module will focus on the preparation of a formal, **written report** after the conclusion of the outbreak investigation. Preparing and distributing a report assures that the experience gained and the

discoveries made during the investigation are not lost. They can be used to design and implement improvements in the surveillance system and prevention/control measures. Ultimately, this knowledge can help reduce the risk of similar situations occurring in the future.

A final report should be prepared within 90 days after the outbreak investigation, while the information is still fresh and the findings will have the most impact.

Let's look at each of the report components, in order.

I. TITLE

The title should contain, at a minimum, the type of outbreak, location, and date.

II. SUMMARY

The Summary section should contain all of the key facts that describe what happened. It should be brief and concise. The information can be explained and elaborated in other sections of the report.

The Summary should include the following information:

- Date and place of outbreak
- Number exposed
- Number interviewed
- Numbers of suspect, probable and confirmed cases
- Number hospitalized
- Number of deaths
- Key statistics (see below)
- Causative organism
- Control measures
- Recommendations

Key statistics about the outbreak include:

- Attack rate (if available)
- Hospitalization rate
- Death rate
- Frequency distribution of symptoms
- Median date of exposure
- Median date of onset
- Average incubation period
- Average duration of illness
- Average duration of hospitalization

A reader should be able to read through the summary to gain a basic understanding of how many people were ill, how badly they were affected, what agent caused the problem, how the outbreak was controlled, and any recommendations for preventing future outbreaks.

III. INTRODUCTION

The Introduction can be brief, and should set the scene for the investigation. It should include:

- Date of initial report
- Agency that received the initial report
- Place and date of the outbreak
- Name and official title of the person submitting the report

IV. BACKGROUND

The Background section should provide relevant information about the community and population in which the outbreak occurred, such as:

- A map of the community (or, if the outbreak occurred in an institution, a map of the facility)
- A description of the relevant demographics (size and composition of the population affected, any recent demographic changes, etc.)

V. METHODS

The Methods section should answer the reader's questions about what was done, how and by whom. It should include:

- **What population** was considered to be at risk?
- **What** and **how much** data was collected?
- **From whom** and **from how many people** were data collected?
- **By whom** were data collected?
- **How were case definition(s)** developed and used?
- **How was the well comparison group selected, and how many** people were in it?
- **How were data collected and analyzed?**
 - Records reviewed
 - People interviewed
 - Questionnaires developed and distributed
 - Questionnaire reliability and validity
- **How were laboratory specimens** collected and analyzed?
- **What laboratory standards** were used?
- **What hypotheses** were developed (including tentative ones)?
- **Where, by whom and how were environmental inspections done?** (including the standards used for the inspections, for example, the 2000 city ordinance or 1999 state food code)

The Methods section is usually one of the longer sections of a report.

VI. RESULTS

The Results section should present all of the results from all of the methods used, including laboratory testing, interviews and environmental inspections. The information included in the Summary section can be presented and explained in more detail here (except for the control measures and recommendations).

This section should also include:

- the epidemic curve (histogram) showing illness onset dates

- a summary of the exposure histories of the persons interviewed (for example, their food histories)
- results of statistical probability testing
- test results from the environmental samples
- test results from the human specimens

The Results section is also pretty lengthy.

VII. ANALYSIS

This is the place to present what you have learned from the investigation. It should show your conclusions and interpretations regarding the:

- source of infection
- agent
- reservoir
- mode of transmission
- the group at highest risk

VIII. CONTROL MEASURES

This section should answer the reader's questions about the measures taken to control the outbreak:

- **What methods** were used for outbreak control?
- **How** were they implemented?
- **Where, when and by whom** were they implemented?
- **How was their effectiveness measured?**
- **How effective were they?**

IX. RECOMMENDATIONS

What recommendations can be made, based on what has been learned?

This is the place to suggest changes in policies, procedures, and/or educational efforts in order to:

- prevent future outbreaks
- improve surveillance and detection of outbreaks
- improve the process of outbreak investigation and control

X. OTHER OUTCOMES

This is the place to describe what the outbreak, and the efforts to control it, have done to the population at risk. First, what impact did the outbreak itself have, including both health and economic consequences?

- Did any individuals have serious complications that will cause long-term health problems? Was the health care system adversely impacted by the outbreak, for example by a surge in hospital admissions?
- Were businesses or institutions affected economically (for example, by adverse publicity)?

Just as important is the impact of the control measures on the:

- Population—was their way of life affected? Did their immune status change (because of an immunization effort, for example)?
- Reservoirs—if the reservoir was animal or environmental, how did the control measures change it? Was there a change in the abundance or distribution of the disease agent (because of sanitizing, spraying, trapping or other interventions, for example)?
- Vectors—if there was an animal vector, how was it impacted by the control measures? Are there now fewer vector animals? Are they distributed differently in the environment?

Finally, this is the place to share your other discoveries. Did you learn something new to science in the course of the investigation? Often, outbreaks yield new knowledge that needs to be shared with other public health workers. Examples: new agent, reservoir, vector, temperature range, novel mode of transmission, unusual symptoms or complications, etc.

Outbreaks in MO have contributed to new discoveries, such as:

- Transmission of *E. coli* O157:H7 via drinking water contaminated with sewage (first waterborne outbreak of this agent)
- Discovery of erlichiosis as a new tickborne disease in humans

- Transmission of *Salmonella* via public drinking water. The water was cross-contaminated from an abandoned industrial water tower with birds roosting in it. This led to a new water tower inspection program in the Department of Natural Resources.

XI. DISTRIBUTING THE REPORT

At a minimum, the final report of an outbreak investigation should go to the:

- Investigation team members
- Administrator of the investigating health agency
- DHSS (Regional Communicable Disease Coordinator and state office)

Others may request a copy of the report (for example, an affected business, the press, and/or complainants in a lawsuit related to the outbreak). Final outbreak reports are subject to the state's Open Records (Sunshine) law, so they may be released in some circumstances. The field epidemiologist should refer any such requests to his/her supervisor or administrator.

XII. OTHER REPORTING REQUIREMENTS

Depending upon the type of outbreak, there may be other requirements for filing specific forms in addition to the narrative report. Please consult the Communicable Disease Investigation Reference Manual (CDIRM) for details. <http://www.dhss.mo.gov/CDManual/CDsec30.pdf>