

Chapter 1: Outbreak Definition and Quick Reference Guides

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Overview of Outbreak Definition and Quick Reference Guides

Introduction

Foodborne and waterborne disease outbreaks are of extreme public health importance and are required to be reported to the local health department or the Kentucky Department for Public Health (KDPH) according to Kentucky Administrative Regulation 902 2:020 Section 5 (See Appendix N). An effective outbreak response requires **teamwork** from various programs within the KDPH as well as local health departments (LHDs) and outside agencies. This manual has been designed to provide guidance in the coordination of a foodborne or waterborne disease outbreak response.

The Kentucky manual provides this guidance by including information useful in an outbreak investigation, such as the definition of an outbreak, the roles and responsibilities of each involved job title and agency during the response, and a detailed description of the steps in investigating an outbreak. The need for **open communication** by all members of the outbreak team is emphasized throughout the manual. The last chapter provides instructions on how to prepare a final report, a very important final step in any outbreak investigation.

Chapter 1 includes the definition of an outbreak and the purpose of an outbreak investigation. An overview of the steps in an outbreak investigation is also presented. These steps will be discussed in more detail in Chapter 3. Following the steps, a flowchart of an outbreak investigation is included. Additional flowcharts and detailed responsibilities for specific programs and job titles are included in Chapter 2. Chapter 1 lists guidelines that health care professionals should follow in reporting a suspected foodborne or waterborne outbreak-related illness.

1.1 What is an Outbreak?

An outbreak of foodborne illness is defined as **two or more** persons experiencing a similar illness after ingestion of a common food OR different food in a common place. An outbreak of a waterborne illness is defined as **two or more** persons experiencing a similar illness after having contact with the same source of drinking or recreational water. An outbreak may also be defined as a situation when the observed number of cases exceeds the expected number. However, with certain foodborne illnesses such as botulism or chemical poisoning, a single case justifies an in-depth epidemiological and environmental investigation.

To determine if there is an outbreak, the current number of new cases (incidence) can be compared with past levels of the same disease over a similar time period (base line level). If the number is unusually large or unexpected for the given place and time, an outbreak may be occurring.

When trying to confirm an outbreak, it is important to rule out other causes for increases in numbers of cases. For example, an increase in cases of a certain disease may relate to changes in reporting

requirements. Also, media attention to other outbreaks of the same disease tends to heighten public awareness and can lead to an increased number of cases being reported.

The outbreak team, including regional epidemiologists, nurses, and environmentalists, at each LHD should work together to determine if reported foodborne or waterborne related illnesses should be investigated as an outbreak. Health Department Directors and/or Public Information Officers should be updated and informed about the outbreak and investigation as soon as possible. KDPH staff members are also available to provide advice in determining the occurrence of an outbreak. KDPH staff members should be notified of an outbreak or suspected outbreak so that they are prepared to provide technical assistance to local health departments and partner organizations. See Appendix A for a listing of public health and other agency contacts that may be of assistance during an outbreak investigation. The public health importance of determining the existence of an outbreak and conducting an outbreak investigation is described in Section 1.2.

1.2 Purpose of the Outbreak Investigation

Control and prevention

The primary reason to investigate an outbreak is to control the occurrence of disease and prevent further disease. Therefore, it is necessary to first determine whether the outbreak is ongoing or is over. If the outbreak is ongoing, the first goal should be to prevent new cases. If the outbreak has already occurred, the goal should be to determine the factors or sources that contributed to the outbreak and prevent them from occurring in the future. An infectious disease outbreak is generally considered “over” when at least two incubation periods have elapsed with no additional cases identified.

Surveillance

Outbreak investigations can add valuable information to ongoing public health surveillance activities. The goal of surveillance is not to compile numbers of cases of illness for administrative purposes, but to provide data that are important to guide public health policy and action. Continual surveillance adds to existing knowledge regarding the potential for and occurrence of a disease in a population.

Training opportunities

Outbreak investigations may offer the LHD an opportunity to work closely with more experienced epidemiologists, become familiar with investigative techniques or practices, develop thought processes used in designing questionnaires and interviewing, and gain valuable on-the-job training and experience for future outbreaks.

Evaluation

Identifying the cause of outbreaks may be used to evaluate and improve current health programs in the community, identify high-risk groups or etiologic agents previously overlooked and guide future strategies and future allocations in these areas.

Political or legal concerns

There may be overwhelming pressures placed on the LHD by families of **affected** individuals, the media, local politicians, and others to determine the source of an outbreak and whether it may pose a continued or future threat to the community.

Publications and reports

An important objective of an outbreak investigation is to gain additional knowledge regarding the natural history of the disease. Carefully conducted investigations may reveal trends, new or overlooked disease agents, novel vehicles or transmission modes, groups at risk or specific risk factors. New knowledge may also be gained by assessing the impact and effectiveness of control measures.

1.3 Steps in Investigating an Outbreak

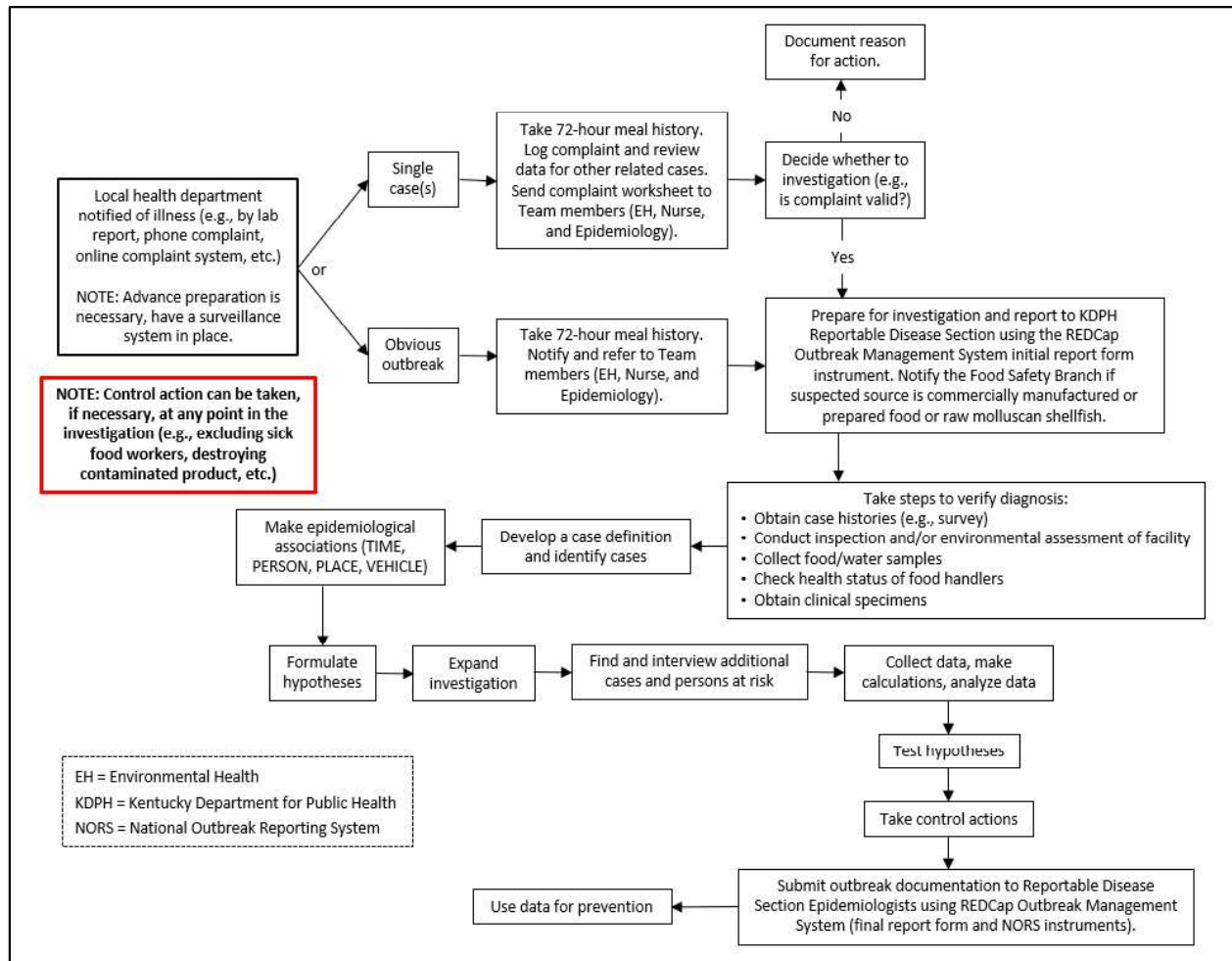
Once a foodborne or waterborne related disease has been reported, the outbreak team should respond quickly and appropriately. A listing of the steps in an outbreak investigation is included in this section. While not all steps may follow in the order listed, all should be considered in a proper investigation. Additional detail on the steps in investigating an outbreak can be found in Chapter 3.

1. Prepare for an outbreak investigation and field work
2. Confirm the existence of an epidemic or outbreak
3. Verify the diagnosis
4. Define a case and identify and count cases
5. Describe the data in terms of person, place and time
6. Develop hypotheses
7. Evaluate hypotheses (Analyze and interpret the data)
8. Refine hypotheses and carry out additional studies
9. Implement control and prevention measures
10. Communicate findings and enter final outbreak data into the REDCap Outbreak Management System (i.e., final report form and National Outbreak Reporting System (NORS) instruments). This includes line list, epi curve, and other supporting documentation.

1.4 Flowchart of an Outbreak Investigation

Please see Figure 1 for the flowchart of events in the investigation of foodborne or waterborne illness complaints and outbreaks. Additional flowcharts and detailed responsibilities for specified agencies and job titles are included in Chapter 2.

Figure 1: Steps in the Investigation of Foodborne/Waterborne Illness Complaints and Outbreaks



1.5 Health Care Provider Guidelines for Reporting Suspected Foodborne Outbreak-Related Illnesses

Health Care Provider Guidelines for Reporting Suspected Foodborne Outbreak-related Illnesses

If two or more persons are suspected of having a foodborne illness, the health care provider should:

1. **Inquire whether there are other ill persons.**
2. **Immediately contact the Kentucky Department for Public Health (KDPH) Infectious Disease Branch (502-564-3261) and/or your Local Health Department (LHD).***
3. **Collect clinical samples for laboratory analysis.**
4. The KDPH Division of Laboratory Services will accept three to five clinical specimens for norovirus testing. Specimen testing for other enteric pathogens should be sent to a private lab.
5. If suspected food items are available, instruct the individual not to ingest or discard food, but to keep under refrigeration/freezing based on sample condition when collected. Pending further investigation, arrangements should be made to collect and analyze the food samples. Arrangements must be made by the LHD to collect and hold the food items in the refrigerator/freezer. Questions regarding sample collecting/testing of food samples should be directed to the KDPH Division of Laboratory Services (502-782-7708 or call 502-564-4446 and ask for the Food Lab). If the outbreak source is suspected to be a food item, the KDPH Food Safety Branch should be notified at 502-564-7181 and food sample collection and submission should be coordinated through this Branch.

Please provide the following information:

- Brief description of situation
- Names of ill persons
- Address, telephone number
- Age, sex
- Onset of symptoms (date, time)
- Description of symptoms
- Hospitalization status
- Other available information (other ill persons, possible food sources, etc.)
- Name of physician (if different than reporter), address, telephone number

General Definition of a Foodborne Outbreak:

Two or more persons experience a similar illness after ingestion of a common food or different food in a common place.

* 24-hour Division of Epidemiology and Health Planning Emergency
HOTLINE: 1-888-9-REPORT, 1-888-973-7678.



1.6 Health Care Provider Guidelines for Reporting Suspected Waterborne Outbreak Related Illnesses

Health Care Provider Guidelines for Reporting Suspected Waterborne Outbreak-related Illnesses

If two or more persons are suspected of having a waterborne illness, the health care provider should:

1. **Inquire whether there are other ill persons.**
2. **Immediately contact the Kentucky Department for Public Health Infectious Disease Branch (502-564-3261) and/or your Local Health Department (LHD).***
3. **Collect clinical samples for laboratory analysis.**
4. The KDPH Division of Laboratory Services will accept three to five clinical specimens for norovirus testing. Specimen testing for other enteric pathogens should be sent to a private lab.
5. Arrangements will be made by the local health department to collect and analyze the water samples from suspect sources pending further investigation. Samples must arrive in the lab within **30 hours** of collection for normal biological water samples. *Legionella* water samples need to be submitted as soon as possible. Samples requiring chain of custody precautions are to be iced and taken to the nearest certified lab within **6 hours** of collection. DLS must be provided advanced notice before sample collection occurs. Questions regarding sample collecting/testing of water samples should be directed to the Division of Laboratory Services (502-564-4446).

Please provide the following information:

- Brief description of situation
- Names of ill persons
- Address, telephone number
- Age, sex
- Onset of symptoms (date, time)
- Description of symptoms
- Hospitalization status
- Other available information (other ill persons, possible exposure sources, etc.)
- Name of physician (if different than reporter), address, telephone number

General Definition of a Waterborne Outbreak:

Two or more persons experience a similar illness after having contact with the same source of drinking or recreational water

* 24-hour Division of Epidemiology and Health Planning Emergency
HOTLINE: 1-888-9-REPORT, 1-888-973-7678.



1.7 Triggers for Activation of Plan:

The steps and procedures described in this Foodborne and Waterborne Outbreak Investigation Manual should be used any time there is an outbreak or suspected outbreak where the source is suspected to be food or water.

- **General Definition of a Foodborne Outbreak:** Two or more persons experience a similar illness after ingestion of a common food or different food in a common place.
- **General Definition of a Waterborne Outbreak:** Two or more persons experience a similar illness after having contact with the same source of drinking or recreational water.

Additionally, if any of the following triggers exist, LHD or KDPH leadership should be alerted to consider activation of the LHD All-Hazards Response Plan or KDPH All-Hazards Response Plan (ESF-8 Annex of the Kentucky Emergency Operations Plan).

SITUATIONS AND ASSUMPTIONS:

The situations below define specific triggers which may prompt LHD or KDPH leadership to consider activation of the LHD All-Hazards Response Plan or KDPH All-Hazards Response Plan (ESF-8 Annex of the Kentucky Emergency Operations Plan) in response to a foodborne or waterborne outbreak. At the most basic level, events that may lead to activation of these plans include those which:

- 1) require more resources than available during normal operations;
- 2) require careful coordination of activities of multiple partners;
- 3) include the involvement of Category A bioterrorism agents; and/or
- 4) require increased communication between private and public partners, the media and the public.

TRIGGERS:

Very large outbreak- defined as when the outbreak size exceeds the jurisdiction(s) capacity to respond.

- A large number of cases occurring over a short time period.
- A large number of cases occurring over an extended time period (i.e. cases continue to be above baseline for an extended period of time)
- A large number of cases occurring in a geographic region or jurisdiction (i.e. cases are above baseline for jurisdiction for a specific time period)
- Multiple lab confirmed cases with matching WGS patterns over a short period of time
- Multiple states reporting lab confirmed cases with matching WGS patterns over a short period of time.

Very severe pathogen

- An increase in hospitalizations caused by a specific pathogen or with a similar syndrome
- An increased death rate from a pathogen or syndrome that is above the expected death rate for that pathogen or syndrome

Novel pathogen or contamination of food or water source

- Initial cases of an emerging infectious disease with the potential for significant illness or death (i.e. Hepatitis E, *C. difficile*, *Cronobacter*, free living ameba, etc.)
- Unusual symptoms or treatment response for a known pathogen

Intentional outbreak

- Suspected or known intentional contamination of water or food with a pathogen, toxin, chemical or other hazard

High profile situation/outbreak

- Outbreak involving a large restaurant chain
- Outbreak involving a recreational venue (lake, water park, amusement park, etc.)
- Outbreak involving a large gathering of people (conference, tournament, concert, festival, etc.)
- Other characteristics, such as a high-profile illness, national impact, high media attention, etc., which might justify activation

Laboratory Triggers

- Unusually high pathogen, toxin, or chemical concentrations in sample
- Unusual pathogen serotype or species
- Unexpected pathogen for food vehicle or sample
- Combination of pathogens or chemicals
- Novel pathogen or variant
- WGS-indistinguishable isolates from apparently unrelated foods
- WGS-indistinguishable isolates from human specimens which match cases occurring in other geographic regions, jurisdictions, or states

Environmental Triggers

- Unusual food source or pathogen vehicle
- Contamination without clear natural pathway
 - Evident contamination at an unexpected step in production or preparation
- Evidence of tampering
- Persistent contamination after disinfection
- Unusual pathogen distribution pattern
- Notification from a Federal, State, or local agency of an issue – a local food recall, illness in a production facility, etc.
- Food recall with a specific distribution pattern and associated human cases (i.e., WGS match of human specimens and food samples)
- Water contamination advisory with associated human cases

Criminal Intelligence Triggers

- A confirmed terrorist attack upon a food or water source
- Similar unusual incidents occurring locally and elsewhere within the country
- Claims of responsibility
- Economically motivated adulteration incidents
- Sabotage incidents by disgruntled workers
- Involvement of Category A bioterrorism agents



NOTIFICATION:

Upon the activation of a foodborne or waterborne outbreak response, the following must be notified as appropriate:

Local Jurisdiction:

When a local healthcare jurisdiction is threatened or impacted by an emergency or disaster that may affect a neighboring jurisdiction, local public health agencies shall promptly share incident related information regardless of county or state borders. At minimum, affected local health agencies will notify the following, as applicable, by the quickest means possible:

- Local Health Jurisdictions
 - Health Department Directors
 - Environmental Health Directors
 - Regional Epidemiologists
 - ERRT Members (as appropriate)
 - Public Information Officer
 - Public Health Preparedness Personnel
 - Regional Preparedness Coordinators
 - Hospital Preparedness Program Coordinators
 - County Emergency Management Officials
- Respective State Department of Health
 - State Epidemiologist/Deputy State Epidemiologist
 - Preparedness Program Manager
 - Reportable Diseases Section Supervisor and/or Epidemiologist
 - Division of Public Health Protection and Safety
 - Food Safety Branch
 - Environmental Health Branch
 - Division of Laboratory Services

Department for Public Health:

Upon receiving notification from affected areas, the Kentucky Department for Public Health shall gather incident-related information from the affected local jurisdiction and promptly disseminate information to the following, as applicable:

- State Health Officer
- State Epidemiologist/Deputy State Epidemiologist
- Preparedness Program Manager
- Reportable Diseases Section Supervisor
- Division of Public Health Protection and Safety
 - Food Safety Branch
 - Milk Safety Branch
 - Environmental Health Branch
- Division of Laboratory Services
- Regional Preparedness Coordinators
- State Emergency Management Agency
 - Emergency Management Duty Officer
- Bordering State Department of Health (if applicable)
 - State Health Officer
 - State Epidemiologist/Deputy State Epidemiologist



- Preparedness Program Manager
- Respective Local Healthcare Jurisdictions (that may be affected by the incident)
 - Health Department Directors
 - Environmental Health Directors
 - Regional and/or Local Epidemiologists
 - Public Health Preparedness Personnel
- Department of Health and Human Services' (HHS) Office of the Assistant Secretary for Preparedness & Response (ASPR)
 - HHS's Region IV ASPR Office
 - HHS Region IV Regional Emergency Coordinator
 - HHS Region IV Hospital Preparedness Program Coordinator
- Other state and local agencies, as applicable

Incident-Specific Information Dissemination:

The following incident-related information shall be disseminated using established information sharing processes via communication systems or incident management software systems:

- Type of incident
- Name of incident location
- Area of impact
- Number people displaced or injured
- Identify triggering incident as suspect or confirmed
- Health and medical response capacity impact
- Laboratory confirmation and case definition, as available
- Request for public health and medical assistance; if required
- Resources for tracking situation (links to applicable websites, etc.)
- Anticipated public information/health guidance release to include recommendations for the public and copies of news releases

Triggers for Media Communication:

The factors the communications office considers when contacting the media about an outbreak are as follows:

- Impact on the Public:
 - Are people at risk?
 - How many have been affected?
- Size of the Outbreak:
 - Is this a local, state, or national issue?
- Seriousness of the Illness:
 - Is the illness deadly?
 - What is the health status of those affected?
 - How is the illness spread?
- Investigation Status:
 - What is the status of the investigation?
- Has the source of the outbreak been identified?