

KENTUCKY FOODBORNE AND WATERBORNE OUTBREAK INVESTIGATION MANUAL

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Chapter 1

OUTBREAK DEFINITION AND QUICK REFERENCE GUIDES

- 1) What is an Outbreak?
- 2) Purpose of the Outbreak Investigation
- 3) Steps in Investigating an Outbreak
- 4) Flowchart of an Outbreak Investigation
- 5) Health Care Provider Guidelines for Reporting
Suspected Foodborne Outbreak Related Illnesses
- 6) Health Care Provider Guidelines for Reporting
Suspected Waterborne Outbreak Related
Illnesses

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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 L). 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. The last section of Chapter 1 lists guidelines that health care professionals should follow in reporting a suspected foodborne or waterborne outbreak-related illness.

CHAPTER 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. 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. 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 2.

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.

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.

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 on the next page. 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.

CHAPTER 1

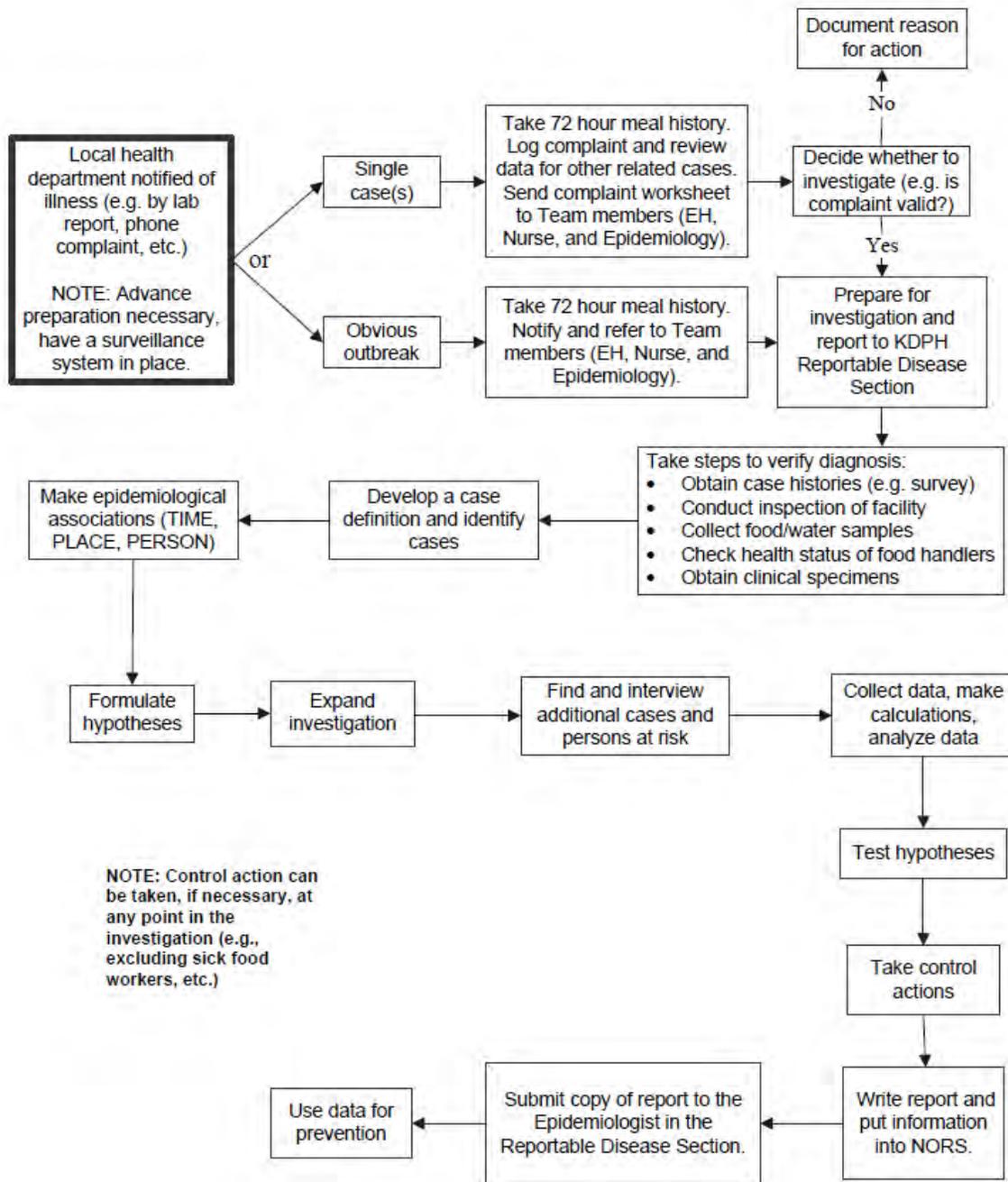
1. Prepare for an outbreak investigation and field work
2. Confirm the existence of an epidemic or outbreak
3. Verify the diagnosis
4. Define a case and identify and count cases
5. Describe the data in terms of person, place and time
6. Develop hypotheses
7. Evaluate hypotheses (Analyze and interpret the data)
8. Refine hypotheses and carry out additional studies
9. Implement control and prevention measures
10. Communicate findings, write a report, and enter into the National Outbreak Reporting System (NORS).

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



EH = Environmental Health
 KDPH = Kentucky Department for Public Health
 NORS = National Outbreak Reporting System

Adapted from Bryan et al 1988 and the Massachusetts Foodborne Illness Investigation and Control Reference Manual

5)

**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 seven to ten 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 it refrigerated. Arrangements should be made to collect and analyze the food samples pending further investigation. Arrangements must be made by the LHD to collect and hold the food items under refrigeration. Questions regarding sample collecting/testing of food samples should be directed to the KDPH 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 food sources, etc.)
- Name of physician (if different than reporter), address, telephone number

General Definition of a Foodborne Outbreak:

2 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.

6)

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 seven to ten 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. Samples requiring chain of custody precautions are to be iced and taken to the nearest certified lab within **6 hours** of collection. 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 food sources, etc.)
- Name of physician (if different than reporter), address, telephone number

General Definition of a Waterborne Outbreak:

2 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.

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Chapter 2

ROLES AND RESPONSIBILITIES

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Roles and Responsibilities

Introduction

Successful investigation and resolution of an outbreak depends on the communication and collaboration of a multi-disciplinary team. The identification of key stakeholders is the initial step to take before an outbreak occurs. Members of an investigation team should be identified, trained and familiar with investigation protocols to ensure that various tasks are fulfilled. Choosing team members who are familiar with the day-to-day activities of the local health department will facilitate a rapid, efficient response. Depending on the disease, some or all of these individuals will be crucial in executing the local health department's (LHD's) response.

All investigation team members should be informed of the epidemiology of the causative agent or suspected agents, and should be instructed on how to complete investigation forms and collect and submit specimens for laboratory testing. Suggested investigation team members include persons who can provide clinical and diagnostic advice, epidemiological support, nursing services, public information, environmental health consultation and inspections, and information technology support. One of the team members should be designated as the TEAM LEADER, who will coordinate all the response activities of the team, and who will be the primary point-of-contact (POC) for the Kentucky Department for Public Health (KDPH) and the local health department. This individual should have knowledge of communicable diseases and experience in investigating an outbreak.

This chapter lists the roles and responsibilities of those job positions and agencies that could be involved in an outbreak investigation. For some positions and agencies, flowcharts are presented at the end of the chapter for a different type of visual representation of roles and responsibilities.

CHAPTER 2

Physicians and Health Care Providers

1. Collect specimens and order lab testing on suspect cases of foodborne or waterborne illness (as well as any other reportable disease).
2. Report to LHD by telephone immediately upon recognition of a suspected outbreak. Although not required by law, the physician should consider contacting the LHD regarding any person with a communicable enteric disease that they know works as a food worker.
3. Cooperate with LHD in the investigation and control of an outbreak, including collecting specimens if requested.
4. Encourage patients to adhere to the prevention and control recommendations of the LHD.

Local Health Department Director

1. Assure a competent workforce. Mobilize Epi Rapid Response Team (ERRT) when necessary, allowing staff to leave clinic to work on a field investigation as needed.
2. Serve as the spokesperson for the LHD with the support, cooperation, and notification of the KDPH in regards to the mutual approval of messages relating to foodborne/waterborne transmission and food/water safety measures.
3. Determine if preventive treatment is needed for those exposed to a foodborne or waterborne illness.

Epidemiology Rapid Response Team (ERRT)/ESF-8 Epidemiology Response Team

1. Initiate investigation and collect case and exposure verification as quickly as possible.
2. Work toward rapid specimen collection of known cases and retention of suspect food and water sources.
3. Inform local hospital infection control staff, emergency room staff, primary care physicians, and other potentially affected entities of a possible outbreak so they can test and report similar cases to a designated member of the ERRT.
4. Develop a hypothesis based on the questionnaire information, the case definition, the environmentalist's inspection, and the laboratory results as how the illness was transmitted, through what food(s), and by what organism or agent.
5. Describe and implement control measures to prevent further illness.

Regional Epidemiologist

Note: During each outbreak investigation the Regional Epidemiologist should coordinate the following steps with the LHD Nurse and/or Epi Rapid Response Team.

1. Receive initial report that includes the needed demographics (name, address, phone number, etc.) and report illness complaint to other team members including the LHD nurse and local environmentalist.
2. Determine suspected organism(s) to be tested based upon diagnostic tests, symptoms, and the onset and duration of illness.
3. Confirm diagnosis with the medical provider.
4. Contact the case(s) after conferring with the medical provider to obtain additional related information.
5. **Alert KDPH Division of Epidemiology and Health Planning-Reportable Disease Section (502-564-3261) of investigation.**
6. Notify appropriate LHD administration/Public Health Director.
7. Enter case(s) into the Kentucky electronic surveillance system used for reporting disease.
8. Contact and encourage private labs to send laboratory isolates to the Division of Laboratory Services for serotyping and Pulsed Field Gel Electrophoresis (PFGE) testing.
9. Look for additional associated cases by informing local medical community of a possible outbreak and encouraging ill persons to seek medical attention. This would include coordinating the **collection of clinical samples**.
10. Collaborate with ERRT on developing a working case definition and a line listing.
11. Administer questionnaire/investigation form. (See Reportable Disease Desk Reference (RDDR) for appropriate foodborne/waterborne outbreak investigation forms, etc. A sample questionnaire is also located in Appendix H).
12. Conduct meal history (72 hours).
13. Create line list in Excel or other database for tracking cases.
14. Analyze data collected from questionnaires, surveys, etc.
15. Describe data: epi curve, attack rate, etc.
16. Create map as required and available (GIS).
17. Formulate a tentative hypothesis and share hypothesis with ERRT.
18. Determine study design if necessary.
19. Coordinate/implement control measures; this may occur early in the investigation. (Refer to Red Book or Control of Communicable Disease Manual (CCDM).)

CHAPTER 2

20. Create, with the joint input of the team members, and submit the final report that includes recommendations to prevent future foodborne and waterborne illnesses from occurring.
21. Enter outbreak information into the National Outbreak Reporting System (NORS). See Appendix I for the NORS report form.

Regional or LHD Nurse

Note: During each outbreak investigation the Regional or LHD Nurse should coordinate the following steps with the Regional Epidemiologist and/or Epi Rapid Response Team

1. Receive initial report that includes the needed demographics (name, address, phone number, etc.) and report illness complaint to other team members including the regional epidemiologist and local environmentalist.
2. Determine suspected organism(s) to be tested based upon diagnostic tests, symptoms, and the onset and duration of illness.
3. Confirm/verify the diagnosis with the medical provider.
4. Contact the case(s) after conferring with the medical provider to obtain additional related information.
5. **Alert KDPH Division of Epidemiology and Health Planning – Reportable Disease Section (502) 564-3261 of investigation.**
6. Notify appropriate LHD administration/Public Health Director as necessary.
7. Enter case(s) into the Kentucky electronic surveillance system used for reporting disease.
8. Encourage private labs to send laboratory isolates to the Division of Laboratory Services for serotyping and Pulsed Field Gel Electrophoresis (PFGE) testing.
9. Look for additional associated cases by informing the local medical community of a possible outbreak and encouraging ill persons to seek medical attention. This would include **coordinating the collection of clinical samples.**
10. Collect and ship clinical laboratory specimens as instructed by laboratory/or state personnel to the Division of Laboratory Services or local hospital/reference lab as needed.
11. Collaborate with ERRT on developing a working case definition and a line listing.
12. Administer questionnaire/investigation form. (A sample questionnaire is located in Appendix H.)
13. Conduct meal history (72 hours).

14. Discuss ill person and non-ill person case findings with the epidemiologist and/or other team members.
15. Coordinate/implement control measures; this may occur early in the investigation. (Refer to Red Book or Control of Communicable Disease Manual (CCDM).)
16. Prepare nursing write-up for inclusion in final report.

Regional or LHD Sanitarian or Environmentalist

1. Receive initial illness report that includes the needed demographics (name, address, phone number, etc.).
2. Refer report to public health nurse and epidemiologist to confirm diagnosis, and determine the need for further investigation.
3. Investigate two or more isolated foodborne/waterborne illness complaints without a confirmed case as a complaint inspection of the food establishment. During the inspection, food managers should be made aware of the complaint and asked about any complaints they may have received.
4. Conduct an inspection of the suspect food establishment if the definition of a foodborne/waterborne outbreak is met.
5. Interview all food preparation employees regarding the detailed preparation of the suspect food.
6. Interview the food manager regarding ill employees and any consumer complaints.
7. Share and coordinate interviews with other team members.
8. Collect and submit suspect food/water samples if available to the Kentucky Division of Laboratory Services. Food samples should be collected and submitted in accordance with the laboratory protocol (See collection sheet, Appendix D). Contact the Division of Public Health Protection and Safety - Food Safety Branch at 502-564-7181 before collection or submission of food samples. Food samples are generally submitted to determine the presence of a specific agent in the food that matches the agent found in the confirmed patient(s). **Food samples are not submitted to the lab for the purpose of diagnosis of the suspect case.**
9. Utilize tools as warranted by the ERRT to prevent the further spread of illness/injury from the food establishment. Examples:
 - Quarantine suspect foods,
 - Voluntary closure of the food establishment,
 - Removal of ill food handlers from the food establishment based on the Kentucky Retail Food Establishment Code and The Kentucky Food, Drug, and Cosmetic Act,
 - Elimination of improper food handling practices.

CHAPTER 2

10. Contact the Food Safety Branch at 502-564-7181 if the suspect food is commercially manufactured. Complete in full a DFS-216 Record of Complaint and Investigation (See Appendix G). This will initiate a product trace back and/or recall if warranted.
11. Once the cause of the foodborne illness is determined, educate the food establishment manager on proper controls to prevent future illness, verify that the controls have been communicated to food handlers, and verify that the controls have been implemented.
12. Food samples must remain in the possession of the collector and be accounted for at all times until they are either directly released to a public health laboratory employee or packaged and shipped by a traceable courier. A chain of custody form is recommended and can be found in Appendix F.

Regional Child Care Consultant

1. Alert the regional epidemiologist or the public health nurse of potential foodborne/waterborne disease outbreak in a child care center.
2. Alert the Early Childhood Mental Health Program Administrator at the KDPH of potential foodborne/waterborne disease outbreak in a child care center.
3. Collaborate with regional epidemiologist, nurse, and environmentalist to prepare and distribute information to local child care centers.
4. Assist regional epidemiologist and public health nurse with active surveillance measures such as screening for ill children at drop-off and assisting with phone calls to centers to determine how many children and staff are out sick with the illness of concern.
5. Accompany and assist the environmentalist during the inspection of the child care center.
6. Educate child care center staff on proper hand washing, diapering, and cleaning procedures. Distribute flyers to centers regarding these procedures. Collaborate with the STARS Quality Coordinator on education and observation of hand washing, diapering, and cleaning procedures. (STARS is a childcare facility rating program.)

KDPH State Epidemiologist/ Division of Epidemiology and Health Planning

1. Alert Division of Public Health Protection and Safety - Food Safety Branch and/or Environmental Management Branch of investigation, and Division of Epidemiology and Health Planning - Preparedness Branch, when necessary.
2. Notify Commissioner, Deputy Commissioner of KDPH, and Cabinet for Health and Family Services (CHFS) Communications Office about situation when appropriate.
3. Consult with LHD/ERRT on investigation, media issues, and control measures.
4. Coordinate use of resources and personnel at KDPH.
5. Involve appropriate epidemiologic personnel at state level.
6. Activate state response team and potentially Department Operations Center when needed.
7. Determine need for federal notification/assistance/Epi-Aid.
8. Initiate and coordinate contact with Centers for Disease Control and Prevention (CDC) to assist with investigation or as an information resource.
9. Coordinate collection and transportation of lab samples between local health departments and Division of Laboratory Services.
10. Follow-up with Regional Epidemiologist on NORS.

KDPH Division of Epidemiology and Health Planning – Infectious Disease Branch – Reportable Disease Section

1. Provide consultation and technical assistance to LHD staff in the epidemiologic investigation of disease outbreaks.
2. Provide guidelines for the epidemiologic investigation and control of a specific outbreak consistent with state and national objectives, current policy, and current medical and scientific literature.
3. Determine whether a particular outbreak warrants further epidemiologic investigation and the nature and extent of additional epidemiologic or laboratory data required.
4. Alert State Epidemiologist, Division of Laboratory Services, and Division of Public Health Protection and Safety – Food Safety Branch and Environmental Management Branch, when appropriate.
5. Keep LHDs informed of the progress of any outbreak investigation.
6. Identify and arrange for additional staff and material resources from the KDPH if an outbreak exceeds the resource capacity of the LHD and the regional office.

CHAPTER 2

7. Provide advice on collection of food, water, or other specimens in coordination with Division of Laboratory Services as well as the Food Safety Branch and Environmental Management Branch of the Division of Public Health Protection and Safety.
8. Recommend and request implementation of control measures.
9. Distribute outbreak surveillance information and summary reports to LHDs, regional offices, physicians and other agencies.
10. Provide training materials instructive in the methods of outbreak investigations.

KDPH Division of Public Health Protection and Safety – Food Safety Branch

1. Alert the State Division of Epidemiology and Health Planning that an investigation has been initiated.
2. Provide technical support and assistance as needed to LHD and/or Division of Epidemiology and Health Planning, Infectious Disease Section.
3. Contact the Division of Laboratory Services for submission of food samples.
4. Contact the United States Department of Agriculture (USDA) Compliance Office if a meat or poultry product under federal-inspection is suspected.
5. Contact the United States Food and Drug Administration (FDA) if the food product under their regulatory authority is suspected.

KDPH Division of Public Health Protection and Safety - Environmental Management Branch

1. Alert the State Division of Epidemiology and Health Planning – Reportable Disease Section that an investigation has been initiated.
2. Provide technical support and assistance as needed.
3. Contact the Division of Laboratory Services for submission of water sample for bacteriological examination, or contact other laboratory services when required.

KDPH Division of Laboratory Services

1. Receive initial alert on the number and expected arrival time of food samples authorized to be collected and sent to the State Food Lab for suspected foodborne illness and disease cases.

ROLES AND RESPONSIBILITIES

2. Receive initial alert on the requested foodborne pathogen(s) to be tested on authorized collected food samples to be sent to the State Food Lab for suspected foodborne illness and disease cases.
3. Prepare or order specialized media, reagents, and materials needed to test each suspect food pathogen.
4. Receive preauthorized food samples collected by authorized food collectors such as registered sanitarians.
5. Analyze or refer food samples for suspect foodborne pathogen(s).
6. Provide a preliminary test report.
7. Call the Division of Public Health Protection and Safety - Food Safety Branch and Division of Epidemiology and Health Planning Reportable Disease Section with positive laboratory test results.
8. Alert Division of Laboratory Management with positive test results if a high alert foodborne illness or outbreak is suspected or confirmed.
9. Provide PFGE testing on bacterial isolates in collaboration with the Division of Epidemiology and Health Planning and the CDC.
10. Dispose, retain, or ship and transfer suspect bacterial foodborne pathogen isolates as directed by CDC, FDA, Food Emergency Response Network (FERN), or federal authority managing a biological food terrorism or defense suspect case.
11. Provide a final lab test report to the Food Safety Branch and Reportable Disease Section.

KDPH Division of Maternal and Child Health - Early Childhood Development Branch – Early Childhood Promotion Section

1. Alert the regional child care consultant and the KDPH Division of Epidemiology of potential foodborne/waterborne illness outbreak.
2. Provide support and assistance to regional child care consultant as needed.

Cabinet for Health and Family Services (CHFS) Office of the Inspector General (OIG)

1. Will be notified by the KDPH Reportable Disease Section of all gastrointestinal illnesses in healthcare facilities under OIG jurisdiction.
2. Will investigate as needed based on OIG guidelines.

CHFS Office of Communications

1. Be aware of potential media interest, particularly location/areas affected by outbreak, number of cases and potential impact on the public at large.

CHAPTER 2

2. Identify potential spokespeople to handle media interviews. In cases of disease outbreaks, physicians or health care providers are excellent spokespeople and often have a reassuring affect on the public.
3. Determine when public communications are necessary. This can vary. If the outbreak appears to be large in scale and other members of the public are at risk, draft and distribute a news release immediately. Similarly, if the outbreak is small but has the potential to produce significant public concern/panic, it is advisable to distribute a statement or possible release explaining the situation.
4. Assist in the creation, print and distribution of communications materials such as media statement, news releases, talking points, fact sheets, flyers or information pamphlets.
5. Be prepared to update web sites with new information and outbreak numbers.
6. Identify health or feature reporters (or other reporters in area who are familiar with public health and commonly cover your agency – sometimes that is the government reporter) and compile a media contact sheet.
7. Determine when and how frequently communications will be distributed. If the outbreak is particularly large and there are daily updates, it might be necessary to send out daily communications.
8. Maintain ongoing communication with outbreak points-of-contact. Generally, this will be a representative(s) from epidemiology, food/health public safety and the laboratory.
9. Familiarize yourself with the details of the outbreak, the nature of the disease and how it is spread.
10. Review media reports to determine accuracy of reporting (and possible need for clarification or correction), how media are using communications and the affect communications are having on public feedback.

Kentucky Department of Corrections (KYDOC)

1. Will be notified by the KDPH Reportable Disease Section when a gastrointestinal illness is reported to the LHD by the correctional facility in the LHD district.
2. Ensures that the correctional facility and the LHD conduct investigations as needed based on the guidelines of KYDOC and LHD staff, respectively.

Kentucky Department of Agriculture

1. Cooperate in the process of the control and eradication of foreign animal diseases that impact the food supply.
2. Cooperate and provide communications with other agencies and organizations; federal, state and local health departments; veterinarians;

- producers; and animal owners within Kentucky in accordance with the Incident Command System.
3. Exclude, detect, control or eradicate serious insect pests and plant diseases that may be contributing to morbidity and mortality in an outbreak.
 4. Regulate the sale and the use of pesticides that could impact the food supply and human health.
 5. Investigate incidents of pesticide misuse relative to a pesticide-based food contamination incident.
 6. Review and interpret laboratory results and provide an appropriate response.
 7. Embargo pre-harvest food ingredients to protect the food supply.
 8. Mobilize expertise in support of the timely and accurate investigation of pesticide, heavy metals and other contamination incidents involving pre-harvest food that carry over to pre- and post-harvest food production.

Kentucky Department of Fish and Wildlife Resources

1. Provide consultation, support and technical assistance to KDPH and local health departments concerning food and water contamination resulting from wildlife.

Kentucky Energy and Environment Cabinet

1. Provide consultation, support and technical assistance if needed regarding a contaminated water supply.
2. Advise in the disposal of hazardous waste materials.

Kentucky Emergency Management

1. Provide a comprehensive and functional communications network between all general and command staff groups.
2. Coordinate with federal, state and local law enforcement.
3. Provide logistical support to the designated lead agency.
4. Coordinate resources.
5. Conduct or coordinate media briefs, if appropriate.
6. Coordinate the Emergency Operations Centers.

CHAPTER 2

Centers for Disease Control and Prevention

1. Provide epidemiologic consultation to KDPH and local health departments.
2. Provide on-site emergency assistance in epidemiologic investigations, if necessary.
3. Provide reference diagnostic support to the state public health laboratory and develop subtyping protocols for foodborne pathogens.
4. Work closely with KDPH and local public health epidemiologists and laboratorians to identify illnesses and clusters of illness.
5. Assist in conducting rapid epidemiologic investigations needed to implicate foods or other sources of infection.
6. Assist in determination of risk factors for illness and development of prevention and control strategies.

U.S. Food and Drug Administration

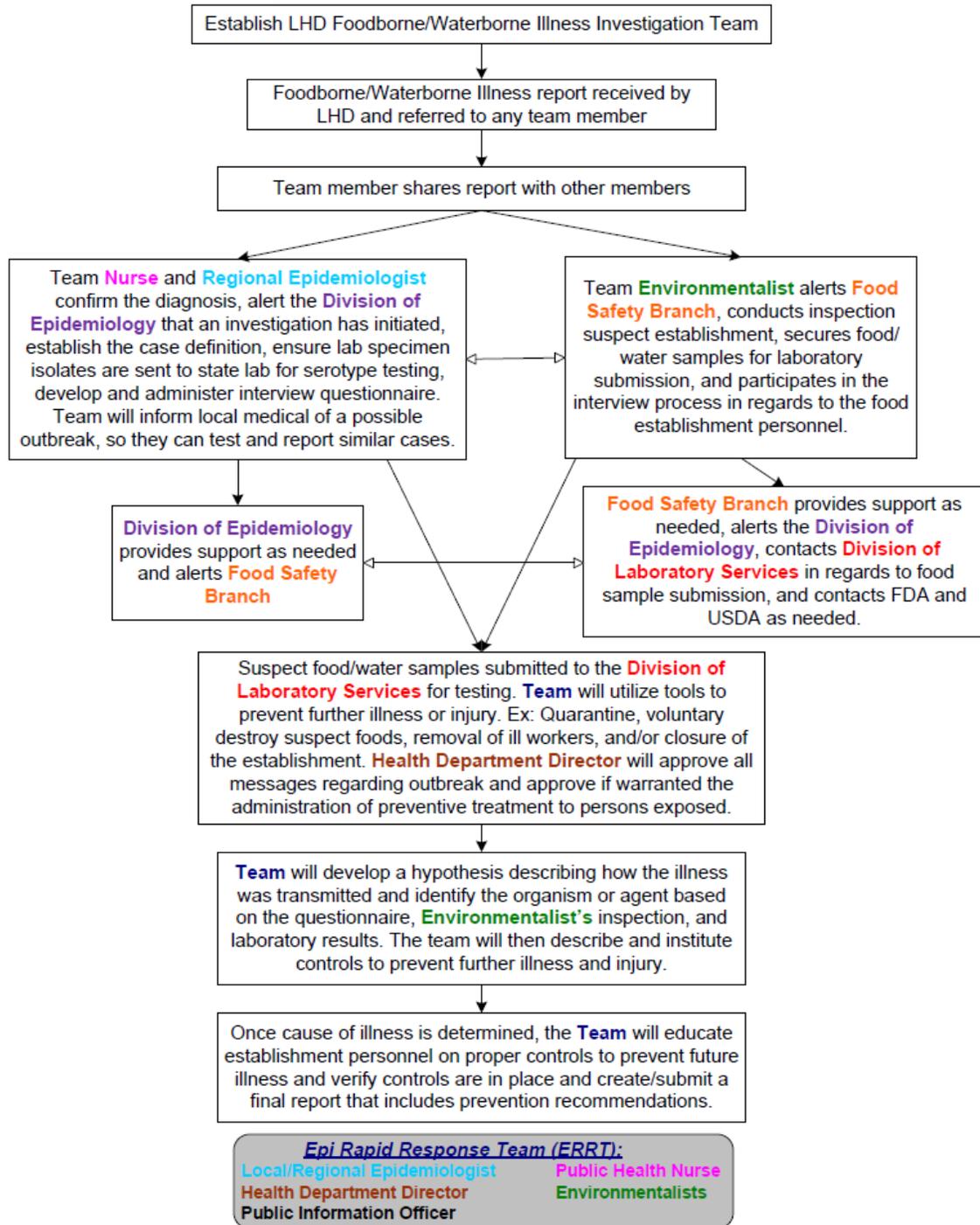
1. Coordinate a voluntary recall of FDA-regulated products that are linked to outbreaks of foodborne disease.
2. Provide coordination, field investigators, laboratory support, technical consultation, regulatory support, and media relations to KDPH and local health departments.
3. Provide policy, technical, and scientific support to investigations.
4. Provide technical and scientific advice and support to field investigators during an outbreak investigation.

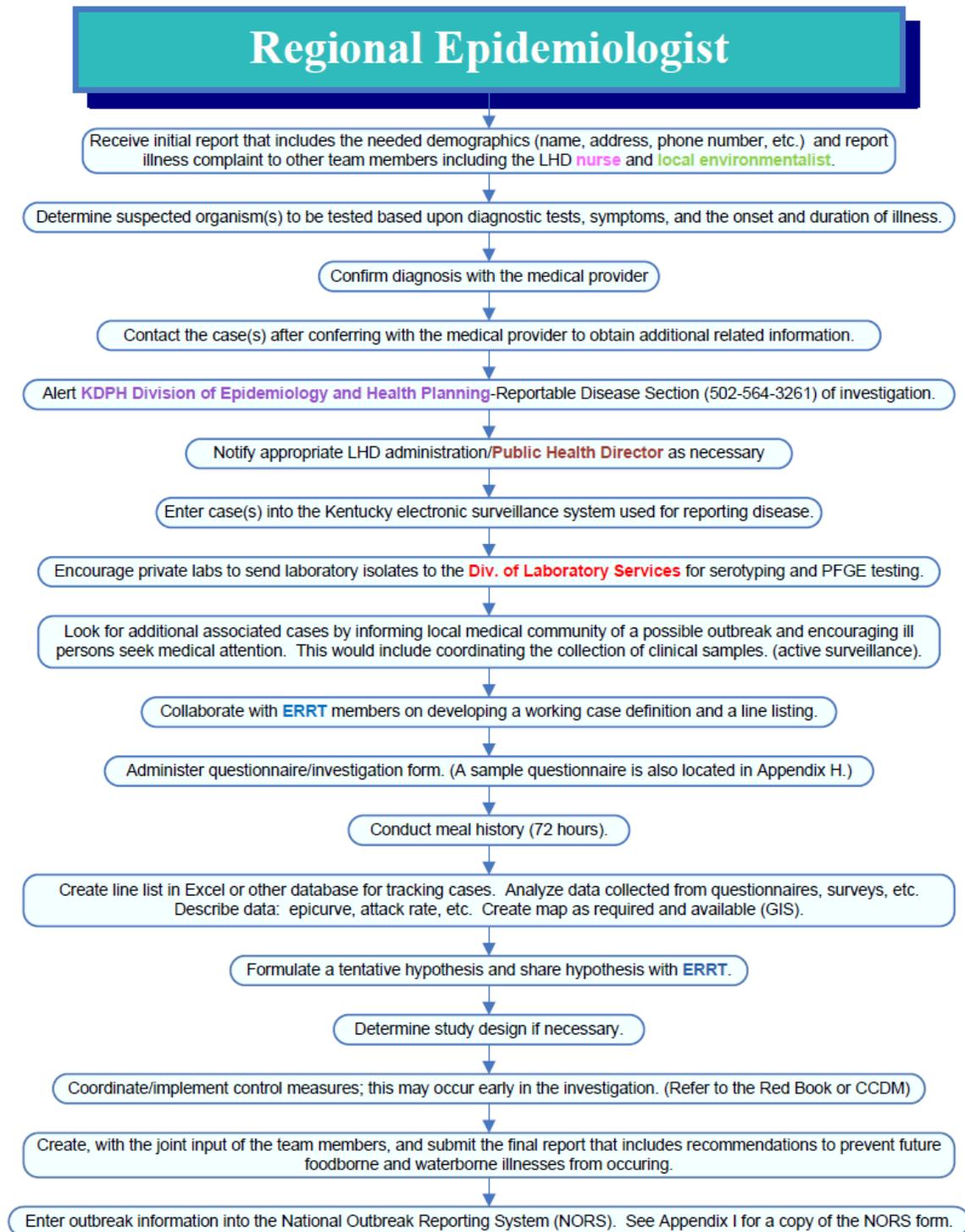
U.S. Department of Agriculture

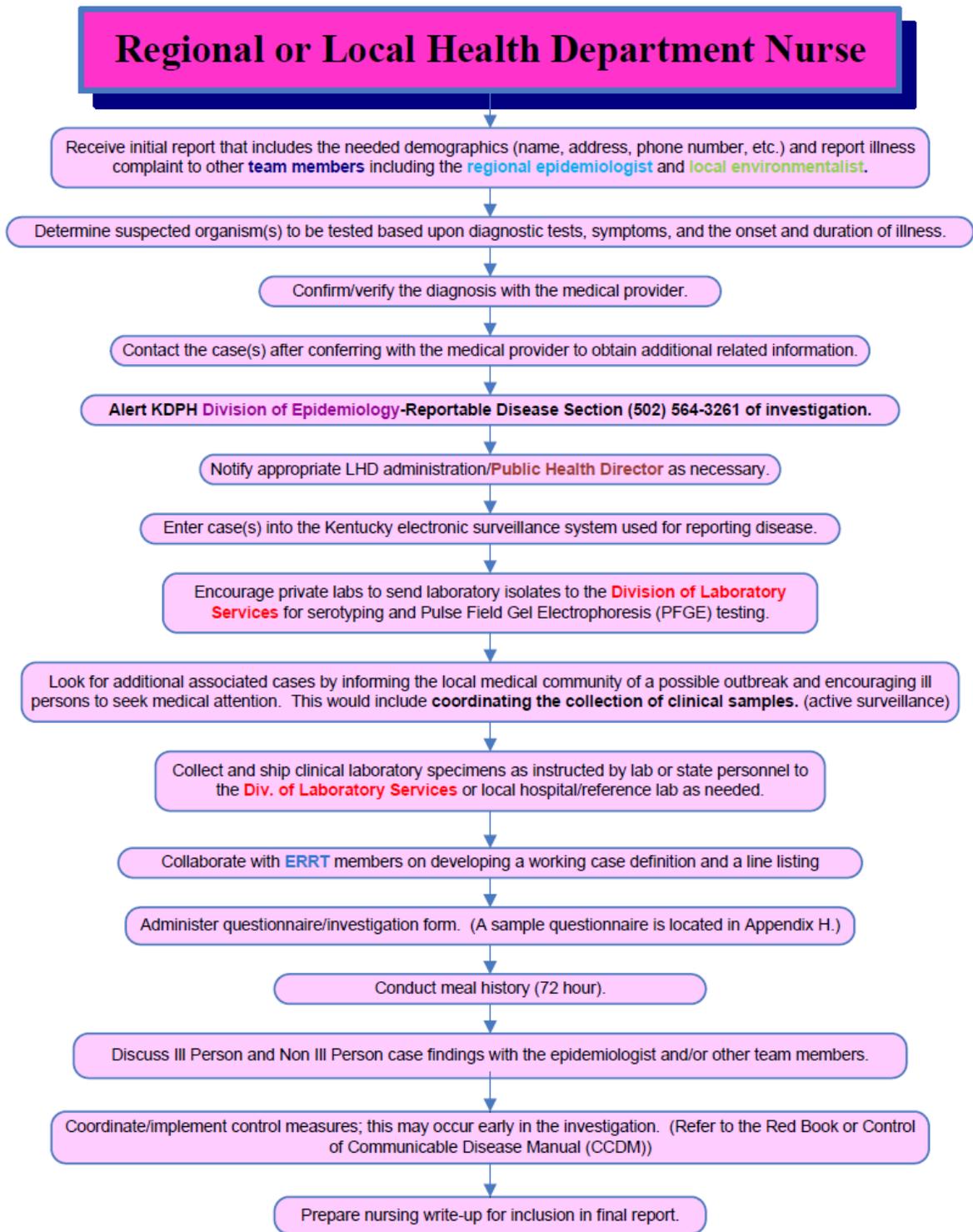
1. Provide coordination, laboratory support, technical consultation, regulatory support, and assistance with media relations.
2. Coordinate voluntary recalls of meat, poultry or egg products linked to outbreaks of foodborne disease.

Flowcharts for certain job titles and programs

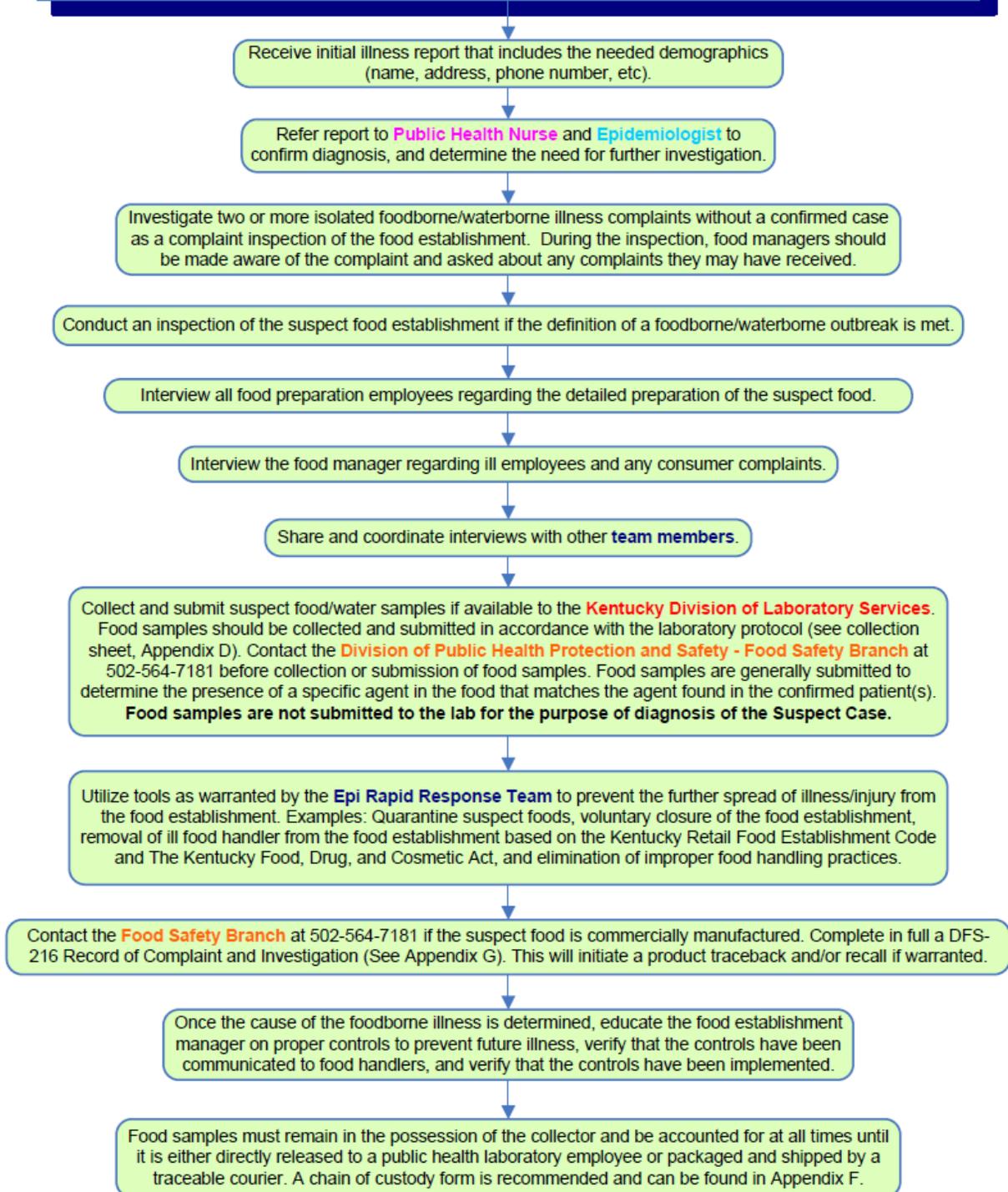
Kentucky Local Health Department Foodborne/Waterborne Illness Investigation Flow Chart







Regional or Local Health Department Sanitarian or Environmentalist



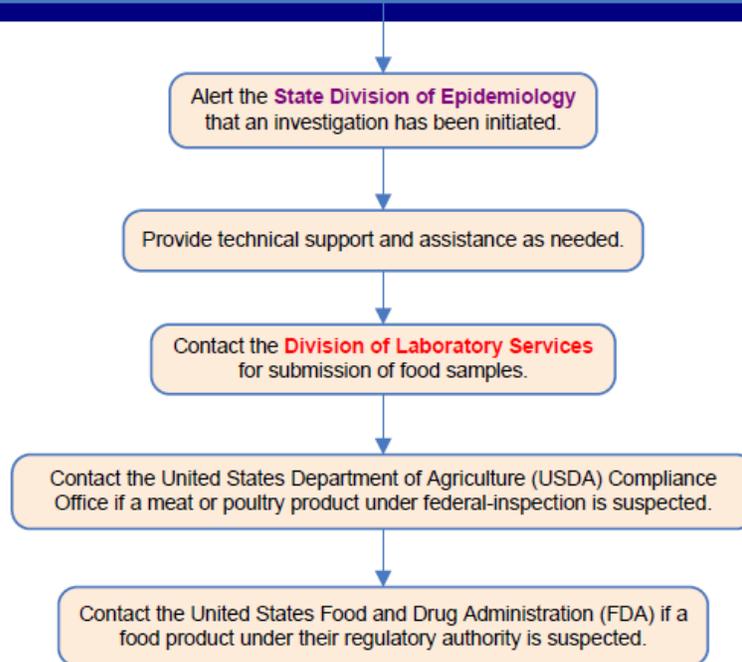
Local Health Department Director

Assure a competent workforce. Mobilize **Epi Rapid Response Team (ERRT)** when necessary. Allowing staff to leave clinic to work on a field investigation as needed.

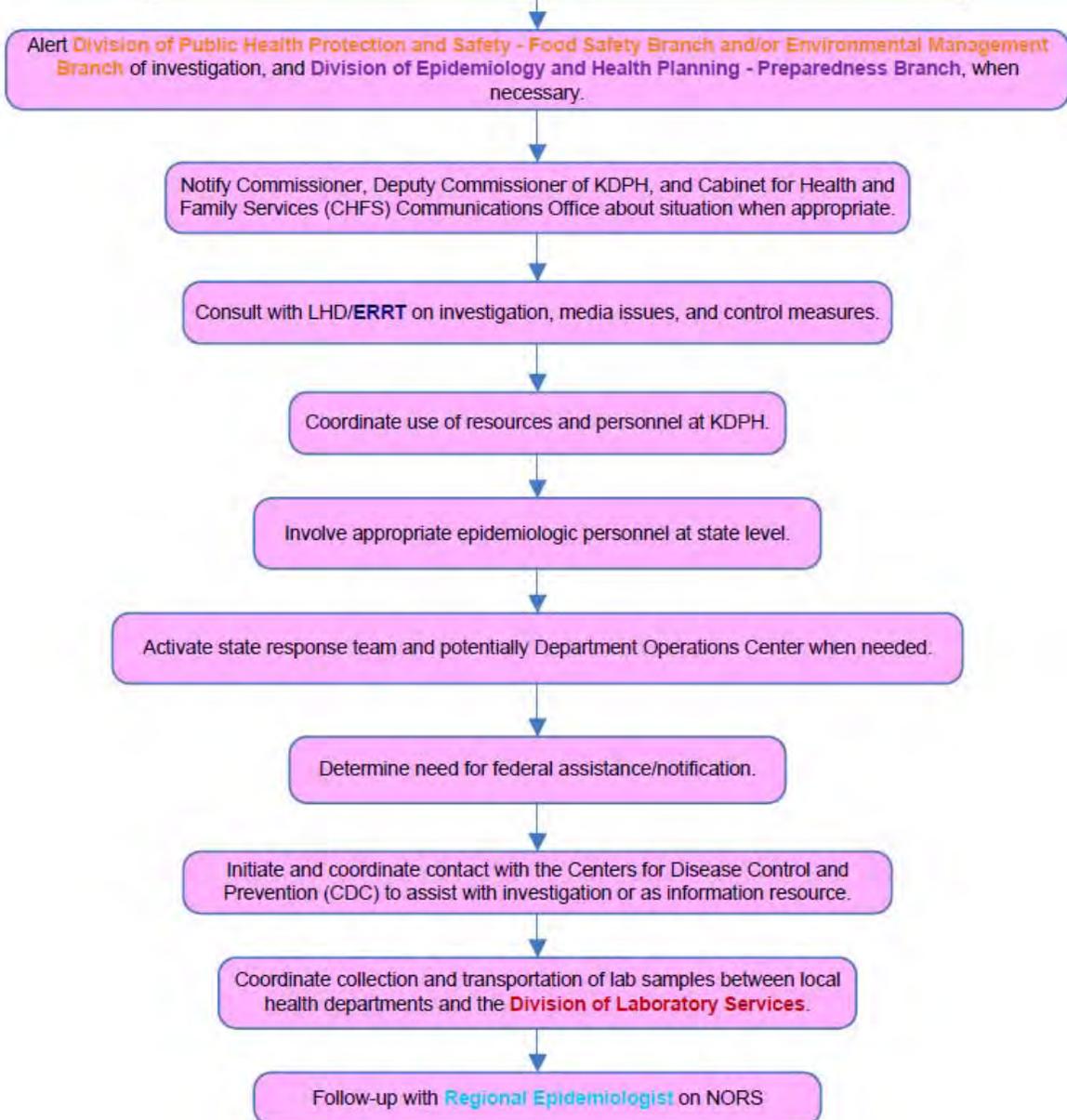
Serve as the spokesperson for the Local Health Department with the support, cooperation, and notification of the Kentucky Department for Public Health in regards to the mutual approval of messages relating to foodborne/waterborne transmission and food safety measures.

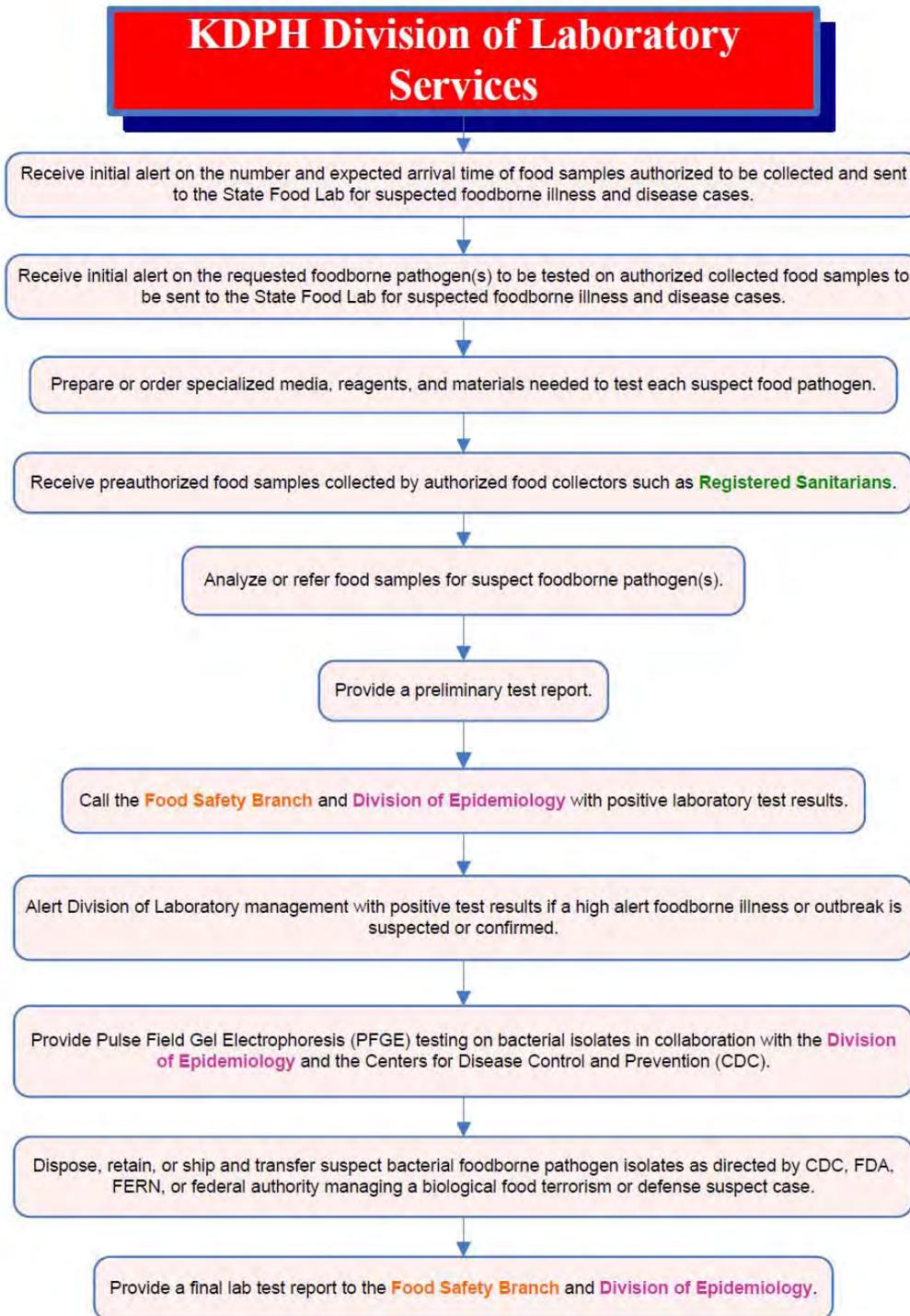
Determine if preventive treatment is needed for those exposed to a foodborne or waterborne illness.

KDPH Division of Public Health Protection and Safety – Food Safety Branch



KDPH State Epidemiologist/Division of Epidemiology and Health Planning





Chapter 3

STEPS IN INVESTIGATING AN OUTBREAK

- 1) Prepare for an Outbreak Investigation and Field Work
- 2) Confirm the Existence of an Epidemic or an 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, Write a Report and Enter into the National Outbreak Reporting System (NORS)

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STEPS IN INVESTIGATING AN OUTBREAK

Introduction

An epidemiologic investigation is an important part of the complete foodborne or waterborne illness investigation which also includes environmental and laboratory investigations. Each part of the investigation compliments the others.

Teamwork and open communication are of utmost importance.

The purpose of the epidemiologic investigation is to identify the causes of a public health problem by collecting data, and formulating and testing hypotheses. It also involves implementing control measures to prevent additional illness and evaluating the impact of those control measures to make sure that the problem has been adequately addressed.

When an outbreak has been identified, the local health department (LHD) should **immediately** notify the Infectious Disease Branch, Reportable Disease Section at the Kentucky Department for Public Health (KDPH) and/or any other state level office (e.g., Division of Public Health Protection and Safety, Division of Laboratory Services, etc.) that might have expertise that could bear on the investigation. The toll free number is 1-888-973-7678. These offices may assist in coordinating the investigation, assist in the investigation itself if requested by the LHD, and can be consulted on collection of food, clinical, and/or environmental specimens.

Following, are 10 standard steps to an outbreak investigation. Though they are listed in sequential order, their order of implementation is often non-sequential. Knowing these steps prepares one to conduct an investigation properly, using common sense and logic to determine when, how often, and to what extent the different steps should be implemented in a real investigation.

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The following steps should be taken in all outbreak investigations.

1. Prepare for an outbreak investigation and field work.
2. Confirm the existence of an epidemic or an 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, write a report, and enter into the National Outbreak Reporting System (NORS).

NOTE 1: It is important to note that while the above list of steps is in a particular order, they do not necessarily have to be carried out in that order. In fact, several steps may be put into action simultaneously. However, confirming the existence of an outbreak and verifying the diagnosis *always* deserve early attention.

NOTE 2: Depending on staffing, resources and time, all the steps may not be covered thoroughly or even covered at all. As stated previously, KDPH is available for guidance and assistance. (Telephone numbers for KDPH are included in this chapter and in Appendix A.)

Step 1.

Prepare for an outbreak investigation and field work

Although the steps in investigating an outbreak are not always implemented sequentially, preparing for an epidemiologic investigation may be considered as the initial step in any outbreak because at least part of the planning can be done before an outbreak occurs. The LHD can begin by training personnel in how to compile line lists, develop questionnaires, conduct interviews, and use software such as Epi Info for data entry and analysis. Physicians, hospitals, and nursing homes should also be trained on the procedures for reporting infectious diseases. It is important to establish rapport with community stakeholders and to provide them with a copy of the Reportable Disease Desk Reference. The LHD should have 6-8 stool culture kits on hand or readily available should an outbreak occur because in most cases stool specimens must be collected within 72 hours of onset of illness to isolate and identify certain pathogens (e.g., *Clostridium perfringens*, *Bacillus cereus*, *Staphylococcus aureus*). Lists of contacts, such as

administrative contacts, additional personnel, sanitarians, regional contacts, physicians, clinical laboratories, or other persons who may become involved in outbreak investigations should be assembled. Resource materials, such as the Red Book or the Control of Communicable Diseases Manual, describing signs and symptoms, incubation times, vectors, probable routes of exposure, and specifics regarding specimen collection (e.g. Appendices B, C, D, and E of this manual) and appropriate collection kits to be used should be maintained and readily available to those responding to the initial calls. "Go kits" for typical outbreaks can be assembled with all of these materials ready to roll out the door at a moment's notice.

These steps may help in more quickly fielding investigators and initiating an investigation. It is also very important for the LHD to realize the limits of the LHD's resources; does the LHD have the means to properly conduct the investigation or is there a need to seek outside assistance? If an outbreak investigation requires additional resources, KDPH should immediately be notified. Once the investigation is underway, the proper clinical specimens should be collected as soon as possible before patients recover and become less likely to submit specimens, or are treated, and before general interest in the investigation wanes. Food and water specimens should also be collected as soon as possible. Being prepared in advance increases the likelihood that this will happen. A presumptive diagnosis may be misleading in the absence of a thorough laboratory work up. A determination must be made regarding the feasibility of conducting an investigation even if the time to collect proper clinical specimens has passed. Each step of the investigation can be impacted by prior preparation.

Once an outbreak is identified, final preparation for field work must occur. What will be needed in the field? Who should go? Will food, water, money, or hotel reservations be needed? Who needs to be informed in the office and at the investigation site? How will communications occur and are contact information sheets and clear directions available? What will be the goal of the field work? What is the timeline? Who are the interested parties or stakeholders? Answers to these types of questions will be crucial to a successful investigation.

Step 2.

Confirm the existence of an epidemic or an outbreak

Once the health department staff have been alerted to the possibility of some unusual cases, or an unexpected increase in the number of cases of a particular disease or group of symptoms, the first step is to make sure that the information is correct and that there truly is an outbreak to investigate. What determines the existence of an outbreak? The general rule is to compare the current rate of occurrence of the disease to what "normally" occurs to determine if there is a rise in cases *beyond what is normally experienced*. However, for diseases not

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often seen in a given area, two or more cases is usually the general rule for declaring an outbreak.

Reporting of cases of illness can occur for any number of reasons that don't relate to a true outbreak. Misdiagnosis is a common occurrence and usually happens in the absence of proper lab testing. Increases in reporting cases of a disease may happen because a specialist starts practice in an area and identifies and reports previously unrecognized cases. Media coverage may cause clinicians to suspect a particular disease more often and report cases. The reportable disease case definition (see Step 4) may change to include more people as cases. Lab testing can bring about many false increases. For instance, a new lab test may be created making testing possible, a more sensitive lab test might be developed, more samples might be gathered and sent for testing because of increased awareness among clinicians, or an increase in inappropriate testing of people will naturally increase the false positive rate bringing about higher lab reports of the disease. In all of these cases, the rate of occurrence of the disease didn't actually increase, but the number of reported cases appears to indicate that it did.

Thus, one should always strive to establish the true existence of an outbreak by comparing the incidence of the disease in a specified population during a comparable previous time period. Often, individuals may exaggerate the number or severity of cases related to a particular event or report "lots of people have it" for a particular disease and once investigated this is not borne out by the facts. It is often unclear when to conduct a full epidemiologic investigation. There is usually no question when the team is notified about a large number of people getting ill at approximately the same time after eating at the same establishment or attending the same event. However, uncertainty arises when sporadic complaints are reported. The response team will need to consider whether the reports indicate that the affected cases are all suffering from the same illness and whether there is any evidence of an association between them. This underscores the need to follow-up (i.e., determine the validity of and initiate further action if necessary) on every complaint received. It often occurs that single complaints are actually related to an outbreak.

To make the task of establishing an outbreak easier, investigators must be familiar with the reportable disease system, know who to contact to find previous and current rates of diseases, and know common disease trends in the community. This can be done through diligent public health surveillance that provides an accurate assessment of the status of the health of the community and helps to determine any increases or decreases in communicable diseases in the local population. Surveillance data should be reviewed by the LHD on a regular basis to become familiar with the status of all communicable diseases in the area of jurisdiction. Be aware of artificial causes of increases such as: (1)

STEPS IN INVESTIGATING AN OUTBREAK

changes in local reporting; (2) changes in case definitions of reportable diseases; (3) increased local or national interest in particular diseases; (4) new physicians in the area or those who might be specialists in certain diseases; (5) new diagnostic procedures which might identify new or existing infectious agents; and (6) increased populations or new arrivals into the area.

When notified of an incident in which illness has resolved and no new cases have been identified, the decision to conduct an epidemiologic investigation should be based on an assessment of what will be gained. As stated above, an investigation always serves as a learning tool. But, if resources (time, personnel, etc.) are limited, it may not be warranted to conduct a full investigation. Rather, one should ensure that appropriate control measures have been implemented to prevent future outbreaks.

This is especially true of home-based foodborne outbreaks. In many instances, the illness is confined to a finite number of people in a discrete time period. In addition, the health department is often notified well after the fact when there is little or no material left for testing and people have recovered. In this case, the team should review food preparation techniques with the responsible parties and use the opportunity to educate on proper food handling and preparation methods.

Whenever an increase in cases is reported, this is the perfect opportunity to give a "heads up" to each of the investigation partners in the health department. The epidemiologists, communicable disease nurses, and environmentalists should all be aware of the possibility of an investigation from this initial point. Each may have insight into how to determine whether this is truly an outbreak based on prior experience so the intake staff person should not waste an opportunity to collaborate early.

NOTE: Investigation of an outbreak of foodborne or waterborne illness is a team effort where each member has an essential role to perform. In some instances the team may include a number of individuals at the local level (public health nurse, sanitarian, regional epidemiologist) and the state level (state epidemiologist, infectious disease branch, food safety branch, environmental management branch). At times, there may be only one person involved at the local level. **Whatever the circumstances, it is important to remember that KDPH is available for guidance and assistance throughout each step of the investigation.** Phone numbers are listed on the next page.

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KDPH Contacts

Division of Public Health Protection and Safety, Food Safety Branch (502) 564-7181	For policy and technical assistance with the environmental investigation such as initiating enforcement actions and collecting food samples. On-site investigation assistance is often available for larger outbreaks.
Division of Public Health Protection and Safety, Environmental Management Branch (502) 564-4856	For technical assistance with water sample collection.
Division of Epidemiology and Health Planning, Reportable Disease Section (502) 564-3261 1-888-9-REPORT or 1-888-973-7678	For technical assistance with the epidemiologic investigation such as obtaining medical histories and developing questionnaires. On-site investigation assistance is often available for larger outbreaks.
Division of Laboratory Services (502) 564-4446	For technical assistance with the collection protocol for food and clinical specimens.

Step 3. Verify the diagnosis

Verifying the diagnosis is done by obtaining appropriate clinical histories and proper specimens, patient and/or environmental, for laboratory study.

A diagnosis might already be established as is the case when someone notices an increase in positive lab results for a certain disease. It could also happen when area physicians report an increase in the number of patients they are seeing with similar symptoms and at least one doctor tested appropriately and thus already has a diagnosis for the outbreak (which of course must be further confirmed with respect to the actual outbreak but gives the investigator a definite starting point). However, if the diagnosis is not clearly established, then the first step is to obtain clinical histories on the patients.

Obtaining Clinical History

Obtaining accurate clinical histories involves interviewing ill persons, family members and/or physicians, either in person, on the phone, or through a formal survey (discussed in Step 4) to record all relevant symptoms, possible exposures, and other details that might reveal the disease in question. It is also a good

time to ask questions that might illuminate the cause of the outbreak or ways to prevent further cases.

The important elements to cover when obtaining initial clinical histories include anything that might lead to the determination of a specific disease entity that is responsible for this outbreak. Primary among these are specific symptoms of the illness, details that could help determine the incubation period, contacts with other sick people who might already be diagnosed or offer a broader symptom profile, and prominent exposures that may have led to infection or poisoning. All of these categories of information could indicate what kind of disease is the etiologic agent in this outbreak. **Remember, the information gathered is confidential and should be shared with only those individuals involved in the investigation.**

Laboratory Specimen Collection

Review the method of laboratory testing, (e.g., sputum swabs, blood tests, stool culture, and select isolates). Be wary of verbal reports of any disease. Insist on obtaining laboratory evidence of positive test results from established laboratories and accepted tests. Other evidence to support the diagnosis (e.g., a lab-confirmed case in a contact) can sometimes be used in lieu of laboratory results. (Information on submitting clinical specimens is discussed in Step 4 of this chapter). In some instances, there will be outbreaks of unknown etiology, and there will be no laboratory results forthcoming to confirm the diagnosis. This often happens because it is well after the outbreak when the investigation begins or clinicians are likely to treat empirically rather than test so inadequate or no testing has occurred. Cases or outbreaks of diseases of unknown etiology are just as valid as those with known etiologies.

NOTE: Laboratory identification of a pathogen can validate the hypothesis and perhaps allow easier implementation of control and preventive measures.

Therefore, time is of the essence when requesting and collecting clinical, food and water specimens.

- Refer to Appendix C for information on submission of clinical specimens.
- Refer to Appendix D for more information on submission of food specimens.
- Refer to Appendix E for more information on submission of water samples.

When submitting any specimens to the Division of Laboratory Services for analysis, it is crucial to have an idea of what the disease or toxin is so that the lab can test appropriately. It is very expensive to run tests on stool or food samples. A request to "test for all gastrointestinal illnesses that could be in stool sample," or "test for whatever could make people sick in this food," would also be too time consuming for the Division of Laboratory Services. Use symptomatology, probable incubation periods, and other characteristics of the

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outbreak (e.g., likelihood of waterborne, foodborne or environmental contaminants vs. infectious etiologies), to assist in making educated guesses about the agents to be tested for in order to request specific tests to be performed.

Develop a Line Listing

During this step (or even in Step 2), is a great time to start a line listing. A line listing is a simple list of case patients used to keep track of pertinent basic data for cases and potential cases as they are identified. Case names and numbers are listed down the left hand column, and the heading row at the top of the table should contain pertinent information such as the case's age, sex, onset time, and symptoms. This type of organization permits a simple means for comparison of many characteristics at one time, giving a quick way to look for possible patterns, similarities, or associations. Later in the investigation, the team may need to conduct a survey (discussed in Step 4 below) which would be facilitated by having all the case patients listed in one succinct table. As the investigation progresses, one may refine the line list to only include cases that meet a more specific case definition (see Step 4 below) but initially it may be very inclusive of all potential cases in order to facilitate a broader look at verifying the outbreak and the diagnosis.

Example of a Line Listing Table

#	Name	Age	Sex	Onset Date	Onset Time	Symptoms
1	Mary	32	F	6/4/99	1:00 PM	Diarrhea, abd. Cramps
2	Bob	25	M	6/4/99	1:30 PM	Diarrhea
3	Carol	26	F	6/4/99	10:15 AM	Diarrhea, nausea
4	Mark	18	M	6/3/99	11:30 PM	Diarrhea, abd. Cramps

Step 4.

Define a case and identify and count cases (ill people)

Develop the Case Definition

After establishing that an outbreak is occurring and attempting to verify the correct diagnosis, a *crucial* step is to define what constitutes a case in this investigation. This is called the **Case Definition**. The case definition is then used to identify and count cases.

A case definition is a set of criteria for deciding whether an individual ill person should be classified as a case. The case definition places boundaries on who will be counted as a case, so the investigation does not include those with illnesses unrelated to the outbreak. This step helps to get an idea of the magnitude of the problem and records all cases for follow-up in the investigation.

The common elements of a case definition include information on symptoms, laboratory results, and the essential elements of person, place, and time.

Symptoms: People with the same illness do not always have the same symptoms, but they will experience similar ones. It is important to remember that the symptoms of some foodborne and waterborne illnesses can mimic other foodborne and waterborne diseases. For assistance in determining the incubation period and possible etiologic agent, please refer to the Kentucky Field Guide for Foodborne and Waterborne Diseases in Appendix B as well as the Control of Communicable Diseases Manual.

b) Laboratory results: When a laboratory confirmation is made, the task of defining a case is much easier. Hospitals or local clinicians in the affected jurisdiction may be notified that an outbreak exists and asked to notify the LHD of additional cases of the illness under investigation. **Note: during an outbreak of foodborne illness, efforts should be made to send specimens and/or isolates to the Kentucky Division of Laboratory Services (DLS) for further identification, confirmation and to assure coordination of the investigation. Please remember to contact the Infectious Disease Branch before sending specimens.** (See Appendices C, D and E for more information on what testing is done at the DLS.)

c) Person: The outbreak may or may not take place within a particular group of people. Therefore, characteristics such as age, sex, occupation, ethnic group, social affiliations or function attendance greatly assist in qualifying the case definition.

d) Place: When there is a common meal involved, the place is already established. But sometimes the only information available may be that cases are occurring in several different locations over the same time period. It is only after more information becomes available that the case definition will become more specific as to the location of the outbreak.

e) Time: If there appears to be a common meal involved, then the time between consumption of that meal and the onset of symptoms provides an indication of the incubation period. The incubation period and symptoms are helpful in determining which illnesses should be considered as possible causes of the outbreak and thus may facilitate decision-making regarding what types of laboratory tests should be run. As with symptoms, incubation periods can vary among individuals; therefore, one should consider a range of time of exposure for the case definition. For example, in the case of a salmonella outbreak, cases may be defined to

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include those persons who experienced symptoms consistent with the case definition anywhere from 6 – 72 hours after the meal in question.

The initial case definition is usually general so that potential cases are not left out. Once more information is obtained about the outbreak and the team is more certain of the characteristics of true cases, the case definition may be refined to “weed out” extraneous cases. This allows analysis to be more sensitive to true risk factors because ill persons who are probably not related to the current outbreak are excluded.

Case definitions are often broken into sub-categories based on the strength of evidence that this is a true case of the disease or is truly related to the particular outbreak being investigated. These designations are usually, “suspect,” “probable,” and “confirmed.” A suspect case is usually one that has some symptoms similar to known cases, but may be missing a crucial symptom or may not link clearly to known cases and is not lab-confirmed. A probable case usually has all the crucial characteristics but is missing a final component of confirmation, such as a required final lab test, or an epidemiologic link to a known case. A confirmed case meets all the characteristics established in the case definition for a true case. CDC has established guidelines for the suspect, probable and confirmed case definitions for many diseases. Investigators may want to modify these for a particular outbreak investigation to fit the current investigation needs.

With the case definition in place, the next half of the equation is to decide how to find additional cases, (i.e., routine methods versus more intensive methods). Is it reasonable to rely on telephone reporting from physicians? Should case reports be actively solicited from area physicians, laboratories, or hospitals? Should the help of the local media be enlisted? These are all “judgment calls” which must be made while taking into account the severity of the disease, how widespread it is, the urgency of intervention, and the manpower available to find and interview case patients.

Develop the Questionnaire/Survey

A common method of finding cases, organizing and analyzing data is to conduct a questionnaire or survey among the population believed to be at risk. This is particularly effective when the exposure event is already known (e.g., attendees of a wedding). A questionnaire that targets specific questions about foods eaten and symptoms experienced is a valuable epidemiologic tool. A questionnaire is solicited from those ill and well who are associated with the incident and assists in developing better hypotheses about the etiologic agent’s identity, the source of the infection, and the mode and time of transmission.

STEPS IN INVESTIGATING AN OUTBREAK

Key questions to consider when developing a questionnaire:

- What are the demographic characteristics of the individual? (name, age, sex, occupation, home and work addresses, phone numbers)
- Was the individual exposed to potential sources of infection and when?
- What are the symptoms, date of onset, their order of occurrence and duration?
- What medical treatment has been sought and received?
- Did anyone affected get a diagnosis or do they have laboratory results?
- Who else has been exposed to a case during his or her infectious period? (secondary contacts)
- What foods were consumed in the last 72 hours, or other appropriate time frame, before the time of onset? It is also important to interview and obtain food histories from those who ate the same suspect food and did not get sick.

These questions are intended as a guide. They will require modification to fit the particular circumstances surrounding the investigation. Questionnaires can be designed for personal or telephone interviews by the investigator (epidemiologist, nurse, sanitarian, health agent, etc.). Once again, it is important to administer the questionnaire to **all** associated with the exposure event, **both ill and well**.

NOTE: An example of a foodborne illness questionnaire/survey can be found in Appendix H.

There is a computer software program called Epi Info™ which can be used to develop questionnaires and analyze data. (The software is free. A copy can be obtained via the internet at www.cdc.gov/epiinfo). For more information about when to use a questionnaire, contact the Division of Epidemiology and Health Planning, Reportable Disease Section at (502) 564-3261.

Step 5.

Describe the data in terms of PERSON, PLACE and TIME

The purpose of data orientation or epidemiological characterizations is to arrange all incoming data so that patterns or anomalies will be illuminated, both of which might be the key to determining the cause or source of the outbreak. The investigator searches for common associations to strengthen or amend current hypotheses and unusual occurrences to give additional clues. A common method of data orientation is plotting on a graph the cases by time of symptom onset to get an **epidemic curve**.

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NOTE: An **epidemic curve** is a graph that depicts the association of the time of illness onset of all cases that are associated with the outbreak. It helps to determine whether the outbreak originated from a common source or is spread person-to-person. Time is plotted on the horizontal axis and the number of cases is plotted on the vertical axis.

A description of how to prepare an epidemic curve in Excel can be found at the following link provided in the *FOCUS on Field Epidemiology* newsletter, a product of the University of North Carolina Center for Public Health Preparedness.

http://cphp.sph.unc.edu/focus/vol1/issue5/1-5EpiCurves_flash.pdf

From the line listing and/or survey described above (Steps 3 and 4), information will have been collected on the characteristics of the ill persons (age, sex, occupation, exposures to specific foods or other items). Very often, simply by knowing these descriptive aspects and the diagnosis, and then plotting an **epidemic curve**, the source, mode of transmission, and who is at risk can be determined. Once the population at risk has been determined, appropriate control measures can be targeted.

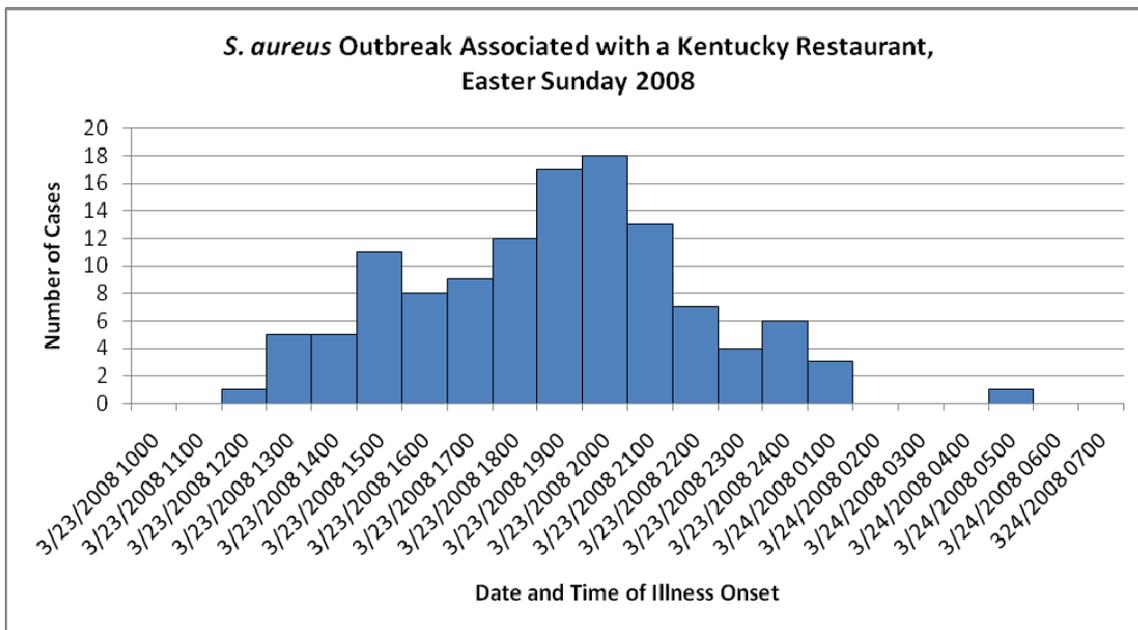
The shape of the epidemic curve may suggest what kind of outbreak is occurring. A *common-source* or *point-source outbreak* looks different than a *propagated-source*, a *person-to-person outbreak* or a *continual source outbreak*. Definitions of these kinds of outbreaks, and an example of each epidemic curve are found below. Epidemic curves are not only useful in pursuit of the investigation but are also helpful when communicating to lay persons (consumers, restaurant operators, etc.) the nature and magnitude of the outbreak spread.

NOTE: The following pages contain definitions and examples of the different kinds of outbreaks:

- Common-Source or Point-Source Outbreak
- Propagated-Source Outbreak or Person-to-Person Outbreak
- Continual-Source Outbreak
- Intermittent-Source Outbreak

Common-Source or Point-Source Outbreak: An outbreak of illness in which susceptible individuals are exposed simultaneously to one source of infection. For example: guests at a company retirement party potluck. The epidemic curve for this type of outbreak is characterized by a sharp rise to a peak followed by a decline usually less abrupt than the rise. See Example 3.1 below. The slower decline is related to the manifestation of varying incubation periods in different individuals. Most people will get sick in a short time frame but others may have delayed onset based on several characteristics, such as the dose of infectious or toxic material they received, their body's defenses, when they ate the meal, and other factors specific to the person.

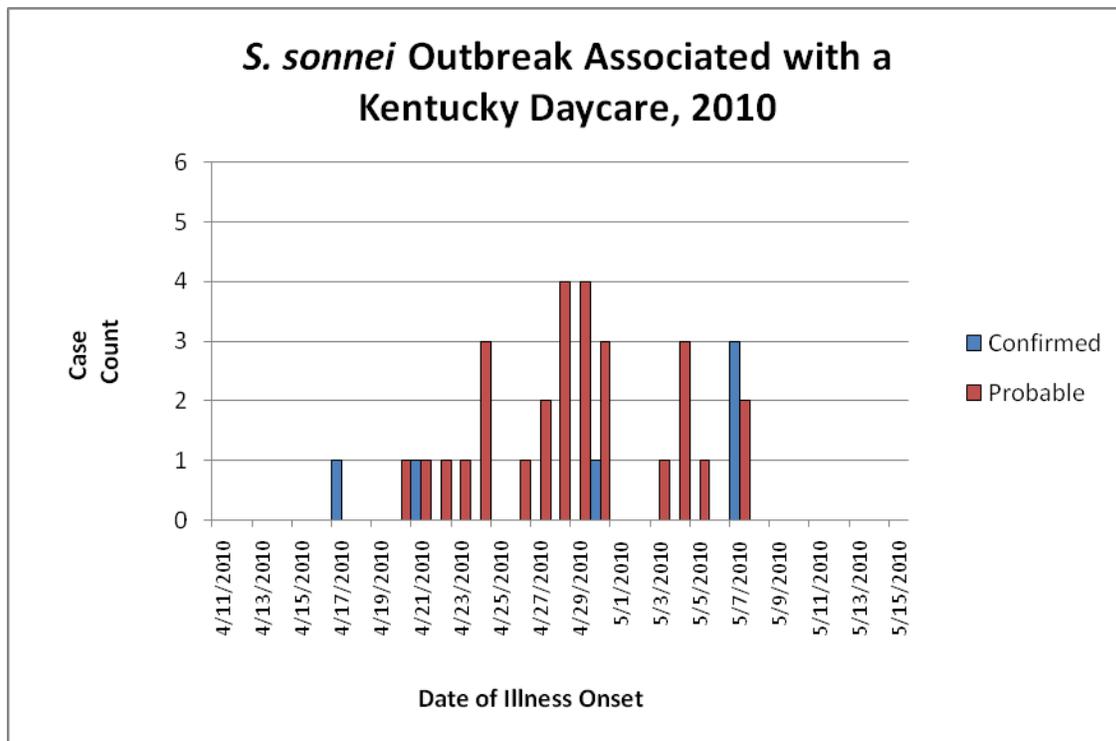
**Example 3.1
Point Source Outbreak Epidemic Curve**



CHAPTER 3

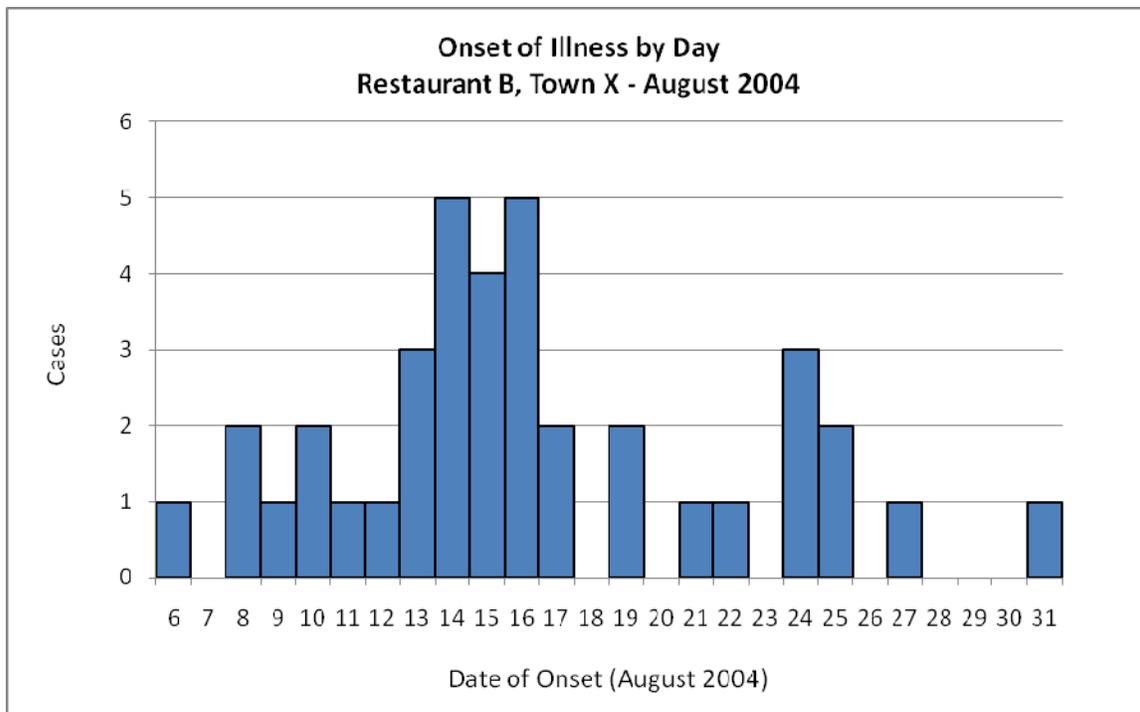
Propagated-Source Outbreak or Person-to-Person Outbreak: An outbreak of disease or illness that is spread from one person to another rather than from a single source. For example: a community-wide outbreak of shigellosis or pertussis. The epidemic curve for this type of outbreak is characterized by a relatively slow, progressive rise. The curve will continue for the duration of several incubation periods of the disease. Propagated outbreaks may exhibit periodic peaks that correspond to incubation cycles of the disease, particularly if the disease is highly infectious. This typically occurs earlier in the outbreak rather than later when infection is more widespread. See Example 3.2 below.

Example 3.2
Propagated-Source Outbreak Epidemic Curve



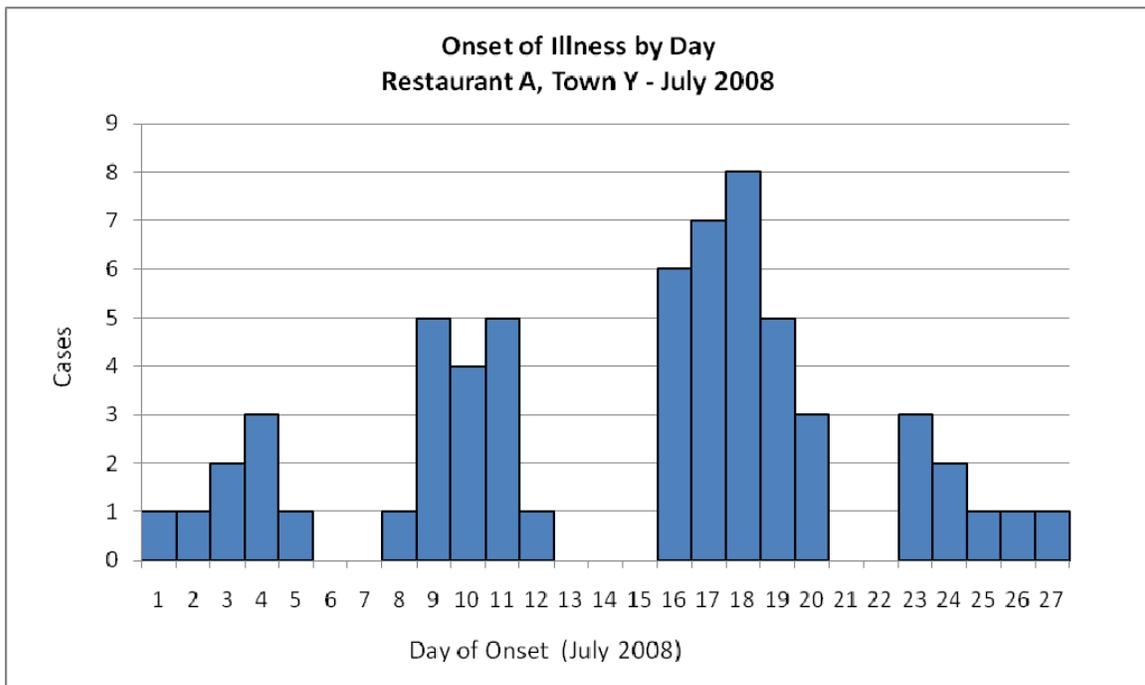
Continual-Source Outbreak: An extended outbreak of disease or illness caused by a source that continues to be contaminated. For example: an outbreak where food is continuously contaminated by an infected food handler. The epidemic curve for this type of outbreak is characterized by ongoing peaks over time (e.g., weeks, months). The peaks may not be as dramatic as a common-source epidemic curve, and the outbreak may not be as obvious (i.e., lower incidence). See Example 3.3 below.

Example 3.3
Continual-Source Outbreak Epidemic Curve



Intermittent-Source Outbreak: An extended outbreak of disease or illness caused by a source in which exposure is not consistent but intermittent in nature. This type of outbreak is characterized by an epidemic curve with irregular peaks and valleys and the incubation period is often unclear. Examples include chemical exposures at a worksite related to specific work processes that occur at different times, irregular emissions from a factory, or a sick food worker who serves on different days at restaurant while infectious over a period of time.

Example 3.4
Intermittent Source Outbreak Epidemic Curve



Step 6. Develop hypotheses

Using the information gathered so far, the next step is to consider which specific exposure(s) may have caused the disease and develop a hypothesis (or several hypotheses). A useful hypothesis is testable, sensible, and fits the full picture of what has been learned as much as is possible. One example of a simple hypothesis is: The cases became ill after eating at a local restaurant. A more specific example, arrived at after further investigation, might be: The illness was caused by eating the potato salad at the Restaurant X's salad bar on Tuesday, June 5th.

As stated in Step 5 above, very often simply by knowing the descriptive aspects, the diagnosis, and then plotting an epidemic curve, the source, mode of transmission and who is at risk can be determined. To test or prove the hypothesis, analytical techniques such as statistical testing need to be applied using the data collected. The epidemiologist is usually the team member who specializes in statistical analysis and should be in charge of this part or consulted about analytic techniques. This may also be carried out by an epidemiologist at the state level or done in collaboration with the state staff.

One very important point in hypothesis development is that it is the job of the team to find the actual cause of the outbreak and not to prove or disprove any particular theory. Many times, a cause may seem obvious at first review but as the investigation progresses facts seem to conflict with this theory. It can be a strong temptation, especially when a scenario fits into the category of "what usually happens" in a certain type of outbreak, to bend the facts to fit the theory rather than bending the theory to fit the facts. The latter course is what should happen and needs to be protected against over-exuberant team members who have a pet hypothesis to prove.

NOTE: Although implementing control and prevention measures is not noted as a step on the outbreak investigation until Step 9, it should be noted that if at any time throughout the entire investigation, an ongoing, potentially hazardous source of illness is discovered, recommendations for control measures should be implemented immediately. Regulatory actions may also need to be taken.

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Step 7.

Evaluate hypotheses (Analyze and interpret the data)

In order to evaluate a hypothesis, one must compare the hypothesis with established facts. There are many ways to do this, including lab testing and environmental investigation, which may confirm or deny the plausibility of a given hypothesis. The primary tools that epidemiologists use in foodborne and waterborne outbreaks are specific study designs. These study designs are particular ways of collecting and analyzing data that allow easy comparisons of hypotheses to facts (the data collected). The basic epidemiologic study designs are the “**Case/Control**” and “**Cohort**” studies.

Cohort Study

Cohort studies are used when a whole group of people who might have been exposed can be surveyed to test hypotheses about what caused the illness. This is the typical study done in foodborne outbreaks when one can identify all who ate at a restaurant, for example. All people had an equal chance of being exposed but only some got sick. This type of study can be done retrospectively, and commonly is in foodborne outbreak investigations. All people who ate at the restaurant during a given period of time are asked what specific food items they ate and if they became ill. We then compare food exposures to illness status to determine what food items might have caused the outbreak.

To do this in a foodborne illness outbreak, food-specific **Attack Rates** (AR) are calculated. Attack rates are used to determine if one or more food items were responsible for causing the illness. The food that caused the problem shows a higher attack rate in persons who ate the food than in those who did not. The AR is usually expressed as a percent. It represents the proportion of ill persons observed due to a specific exposure or event.

Attack Rate (AR)

The Attack Rate is simply the percentage of people who become ill out of all who were exposed. Example: If 228 people attended the catered wedding banquet and 46 got sick, the Attack Rate would be $46 / 228 \times 100$ or 20.2%.

When doing analysis in a cohort study design, the common measure of exposure is the **Relative Risk (RR)**. When several sources of exposure are implicated (a fairly common situation), the epidemiologist can run a model on the computer that compares all the food items at once and arrives at relative risks for each item compared to all the others so that the one with the greatest likelihood of being the culprit can be identified.

Risk

Risk is the percentage of people who become ill divided by all who were at risk and in an acute outbreak setting is represented by the Attack Rate.

And

Relative Risk (RR)

A Relative Risk is a proportion. It is the risk among those exposed to some risk factor divided by the risk among those who are not exposed. For example, in a restaurant outbreak, if 28 of 90 people who ate asparagus got ill (31.11%) while only 3 of 98 who didn't eat it got sick (3.06%), the RR is $31.11 / 3.06 = 10.2$. In other words, people who ate asparagus were 10.2 times more likely to become ill than those who did not eat asparagus.

Case/Control Study

Case/control studies are used primarily when the illness is rare or when it is easier to select participants for the study based on illness status. This is different from a cohort study because participants are selected not on where they ate, or swam, or lived, but on whether they got sick or not. This can be used in the typical restaurant outbreak when there are so many patrons that surveying them all would not be possible. In this case, all or a random selection of sick patrons can be enrolled in the study and then controls, or well people who also ate at the restaurant, can be selected randomly from restaurant patrons or groups of patrons. The primary measure of association that is used with case/control studies is the **Odds Ratio (OR)**. This compares the "odds of exposure" to particular sources of infection between cases and controls, indicating the most likely sources.

Odds

An "Odds" of something happening is the probability of it happening divided by the probability of it not happening. In the case of outbreak investigation, it is applied to the probability of having a risk factor among those who are ill or not ill. For example, if we have 31 sick people in a particular outbreak and 28 of them ate the asparagus, then the odds of exposure to asparagus among the sick is $(28/31) / \{1 - (28/31)\} = 9.33$.

and

Odds Ratio (OR)

The Odds Ratio is a ratio of the odds of having exposure to a particular risk factor among the sick divided by the odds of having the risk factor among those who are not ill. To continue the example above, if we find additionally that 26 ate asparagus among 62 people who did not get sick then the odds of exposure to asparagus among these controls is $(26/62) / \{1 - (26/62)\}$ or 0.72. Thus, the Odds Ratio for the odds of exposure to asparagus between the ill (cases) and not ill (controls) is $9.33 / 0.72$ or 12.96. Interpreting this, ill people were nearly 13 times as likely as not ill people to have eaten asparagus.

Step 8.

Refine hypotheses and carry out additional studies

Analytic studies often reveal results that require modifications of, or fail to confirm, the hypotheses that were originally generated. Additional sources of infection may be identified through the investigation. The existing hypotheses may need to be modified or new hypotheses generated. In either case, the hypotheses will need to be tested requiring further studies be conducted.

For example, based on evidence gathered, the team generates a hypothesis that the salad was the vehicle of transmission in a salmonella outbreak. The next logical questions are, "How did the salad become contaminated with salmonella and could this be verified with the results of the environmental investigation?" In other words, are the epidemiologic results plausible and consistent with other investigational findings? For instance, salad is not usually a food that harbors salmonella. However, it can become contaminated when ill or infected food handlers prepare the salad without adequate hand washing or use of gloves. Compare hypotheses to the results of the environmental investigation. Did the inspector note how the salad was made and served? Was it possible for this scenario to have happened? Was any of the salad available for lab testing? Can laboratory results confirm that salmonella found on the salad matches that found in a patient's stool specimen? Some of the questions that need to be addressed to make sure that the hypothesis is not only statistically sound, but makes sense in the real world are:

- Could the hypothesized events actually have happened?
- Is the hypothesis consistent with environmental aspects of the investigation?
- Is it likely the vehicle of transmission identified became contaminated with the organism that has been isolated?

NOTE: Not all outbreaks have a resolution. In fact, it is rare when everything comes together and a cause can be definitively determined. Investigators should not become discouraged. Careful development of epidemiologic inferences coupled with persuasive clinical and environmental evidence will almost always provide convincing evidence of the source and mode of the spread of a disease. In most cases, there will be enough evidence to present a plausible hypothesis.

Step 9.

Implement control and prevention measures

The implementation of control measures and/or prevention measures can and should be done at the first point in the investigation where these become available. For instance, in hepatitis A outbreaks, vaccination and prophylaxis are prescribed to all persons potentially exposed (e.g., a restaurant) regardless of whether the investigation has revealed the specific source of the infection (i.e., food item in the restaurant). If a diarrheal illness is affecting a community, and it is clear that the source of spread is the municipal water system, the first order of business is to prevent further cases by making a boil water advisory or shutting off the water source, even if the reason for the contamination has not yet been identified. Control and prevention measures should be in the back of the minds of all team members throughout the investigation and pursued when first feasible.

NOTE: Be advised that some control measures should be implemented very early in an outbreak investigation.

However, before initiating a control measure, one needs to consider the effectiveness, timeliness, cost(s) involved, availability of resources, personnel requirements and possible ramifications of proposed actions. Basically, are the recommendations realistic for the situation and if not, what are the alternatives? For example, will Restaurant X be able to install the new dishwasher or the 3-bay sink that was recommended? If not, could they modify the existing dish-washing system to make it safe right now?

All corrective actions must be verified by the LHD Environmental Health Professionals and/or the Division of Public Health Protection and Safety to ensure that steps to reduce or eliminate the hazards have actually occurred. This usually means re-inspection of procedures soon after changes are reported by management, and probably time spent in education of the ever-changing workforce in restaurants.

Step 10.

Communicate the findings, write a report and enter into the National Outbreak Reporting System (NORS)

After analysis of epidemiologic and environmental data, conclusions should be summarized in a report and sent to KDPH. This is one of the most important steps in the outbreak investigation. Not only does the report detail the agency's efforts, but identifies a potential source(s) of the outbreak and suggests control measures to prevent future illness.

The report should follow the usual **scientific format** of introduction, background, methods, results, discussion, recommendations, and references. Do not use the names of case-patients, but LHD personnel or authorized personnel involved in the investigation may be included. The names of facilities or locations where the outbreak occurred may be included at the discretion of the LHD.

The **Background** is a short paragraph describing why the outbreak investigation was initiated and any information needed to understand the situation. It may include who was affected, how many people were ill and how many exposed, where the outbreak occurred, and the severity and clinical presentation of the cases. Note whether or not the outbreak involved a particular setting or social event (e.g., school, restaurant, wedding, festival) or a particular population (e.g., nursing home, day care center).

The **Methods** section should list how cases were identified, how questionnaires were developed, methods used to collect data, as well as clinical and environmental samples, laboratory tests performed, statistical methods, control methods instituted, and other features of the studies implemented during the outbreak investigation.

The **Results** section should list what was discovered in the investigation, results of laboratory testing of clinical or environmental samples, results of the epidemiologic investigation, the sanitarian's report, statistical results, epi-curves, tables, charts and results of any other studies used during the investigation.

The **Discussion** should briefly summarize the findings of the investigation, discuss the implications of the findings and note any limitations of the investigation. Evaluation of control and prevention measures could also be included here but could be entered in the Results section as well. List any important or unique aspects of the outbreak and recommendations for prevention of similar outbreaks in the future.

NOTE: For detailed information on writing a report and sample reports see Chapter 4.

NORS

During the process of preparing the outbreak report or immediately after submitting the final report to KDPH, the regional epidemiologist should enter the outbreak into NORS. NORS is a Centers for Disease Control and Prevention (CDC) developed web based outbreak data entry system for waterborne, foodborne, enteric person to person, animal contact, and environmental contact disease outbreaks. This is an important step to ensure that the CDC is aware of Kentucky's foodborne and waterborne outbreak responses. A sample of the NORS report form is included in Appendix I. Questions regarding NORS should be directed to the KDPH Division of Epidemiology and Health Planning, Reportable Disease Section at (502) 564-3261.

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Chapter 4

DEVELOPMENT OF THE FINAL REPORT

- 1) The Report
- 2) Purpose of the Report
- 3) Outbreak Report Format
- 4) Examples of Reports

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DEVELOPMENT OF THE FINAL REPORT

Introduction

When an investigation is complete, the final responsibility is to provide written documentation of events. This is necessary not only for large outbreaks involving many people but also for complaints of possible foodborne or waterborne illness. This chapter explains the importance of the report and its possible uses. Also included is a detailed explanation of a workable format for writing a report, what should be included in the report and who should receive it. Finally, samples of outbreak reports are included as a guide.

While this chapter focuses on a report written for a more complex outbreak, even single complaints should be documented as completely as possible (on a complaint form). The single complaint must always be regarded as the possible first indication of a larger problem.

1) The Report

The report documents what happened in a foodborne or waterborne illness investigation. It is public record and must be objective, accurate, clear, and timely.

Detail in the document should reflect the complexity of the incident under investigation. A single complaint might result in a "complaint form" being completed with a list of action steps and any follow-up.

A more complicated occurrence (i.e., a large outbreak) might involve people outside your local jurisdiction and require a more comprehensive report. It may be necessary to enlist all involved parties when writing a final report.

2) Purpose of the Report

Whether the report is being written in response to an outbreak or a single complaint, complete documentation is important for the following reasons:

A document for action

In some cases, control and prevention measures will only be instituted in response to a written report. Until an outbreak is documented and summarized in a formal "outbreak report", it is easy for the implicated establishment operator to shift responsibility. The document contains the "official" findings. It should be used in refuting rumors and speculation.

A record of performance

A well-written report documents the magnitude of health problems and justifies program activities. A report clearly states events that occurred and the process that was followed. It should include all steps undertaken by everyone involved. The person writing the report will need to gather that information. The comprehensiveness of the outbreak report should reflect the complexity of the investigation. This accurately documents events and also clearly illustrates staffing resources required to undertake the investigations.

A document for potential legal issues

An investigative report written by health professionals must be written objectively, honestly and fairly. Information in these investigations is frequently used in legal actions. Thus, it is very important that a record exists that accurately documents events in a timely manner to aid in any legal investigations that might ensue.

An enhancement of the quality of the investigation

The process of writing a report and viewing the data in written form may result in new insights. It could precipitate new questions to be answered before a conclusion is reached. The more investigations and outbreaks one writes up, the better the understanding of process and results.

An instrument to present control and preventive measures

The primary reason to undertake an investigation is to control and prevent disease. The written report is an official medium to present control and preventive measures, and perform needs assessments. One may identify new trends, introduce new regulations or policies, identify training needs and reinforce existing regulations. When the report is presented to the owners and managers, encourage them to use it as a catalyst for change. This document is an educational tool and may help to prevent the same problems from reoccurring. (For example, operators who have been educated about the

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availability and safety of a pasteurized egg product will probably choose that over pooled whole, shell eggs.)

3) Outbreak Report Format

There are a variety of ways to compile the information obtained during an investigation into a professional, understandable and usable document. Below is the standard report outline recommended by the Kentucky Department for Public Health (KDPH). The KDPH recommends this format because it logically describes the events that occur during an investigation.

NOTE: This format can be modified to reflect the complexity of the outbreak.

NOTE: Two outbreak report examples (4.1 and 4.2) are provided at the end of this chapter.

Even if there is not the opportunity to compile a complex "outbreak report," it would be helpful to be familiar with the following outbreak report format and understand what information is contained in each section. It will then be easier to adopt any or all of the sections for use when responding to and documenting smaller scale incidents.

A foodborne or waterborne illness outbreak report should include the following sections:

- I. Summary/Abstract**
- II. Background**
- III. Methods**
 - A) Epidemiologic**
 - B) Environmental**
 - C) Laboratory and Clinical**
- IV. Results**
 - A) Epidemiologic**
 - B) Environmental**
 - C) Laboratory and Clinical**
- V. Discussion**
- VI. Recommendations**
- VII. Acknowledgments**
- VIII. Supporting Documentation**

CHAPTER 4

I. Summary/Abstract

The summary or abstract should consist of a paragraph or two that provide the reader with an overview of the main points of the investigation (i.e., the WHO, WHAT, WHERE and WHEN of the outbreak). It should describe what the investigation found, such as what caused the outbreak or what the final causal hypothesis was, based on the evidence.

II. Background

Background information is important and includes anything pertinent to understanding the outbreak or the investigation. This section identifies setting and the type of establishment involved in the outbreak (e.g., take-out restaurant, banquet facility, caterer, fast food establishment, retail store). If applicable, it could also include whether the establishment is part of a national chain, a commissary, a dormitory or a buffet where attendees are likely to eat multiple foods. Such things as previous problems at the same location or outbreaks with similar characteristics that might have added to understanding or guiding the current investigation should be explained and referenced. Any point that is relevant, even the weather in some cases, may be included in the Background section. The Background should also include the specific events that led to the investigation, such as how the outbreak was first reported, steps undertaken to confirm its existence, and all who assisted in the investigation.

III. Methods

The Methods section records what procedures were followed to conduct the investigation. It is important to differentiate this from the Results section in that Methods should not include any findings of the investigation except in rare cases where it is crucial to determining or understanding the methods used. Three primary areas should be covered in most foodborne or waterborne outbreaks:

A. Epidemiologic

Explain how cases were defined. For example, are only laboratory confirmed cases included? Does a case have to experience diarrhea or is abdominal cramping sufficient? Also describe how cases were found or became identified. Include descriptions of interview techniques and copies of questionnaires or surveys if used. If an epidemiologic study, such as a case-control or cohort study, is conducted, this should be described in detail, including how subjects were enrolled in the study, how the data were collected and how the analysis was performed.

B. Environmental

Clearly outline the number and kinds of environmental investigations that occurred and who conducted them. Was a Hazard Analysis and Critical Control Point (HACCP) risk assessment conducted of suspect foods as well as physical facility inspections? Were there any tracebacks of food products?

C. Laboratory and Clinical

It is important to note what kinds of and how many specimens were submitted for laboratory analysis. Was food available for testing? Did cases submit stool specimens or other clinical specimens for analysis? Were food handlers required to submit stool samples for testing? Note where the specimens were sent, what kinds of analyses were performed and who completed the testing. This could involve private, state or federal laboratories.

IV. Results

The previous section outlined steps taken to investigate the outbreak. The Results section informs the readers what was discovered. These results can be presented in tables, graphic figures and/or text:

A. Epidemiologic

- number of questionnaires mailed and returned
- number of people fitting the case definition
- symptoms experienced by cases
- duration of symptoms
- incubation period
- food or meal-specific attack rates
- statistical significance of foods eaten
- epidemic curve of the outbreak
- relationships among cases (if any)

B. Environmental

- the results of the physical facilities inspection (e.g., violations noted)
- the results of any food tracebacks

C. Laboratory and Clinical

- culture or other laboratory results on food handlers, patrons, or other individuals connected to the outbreak
- results on foods or water sources tested

V. Discussion

This section is where all aspects of the investigation are brought together and conclusions are drawn. Interpretation of the results and discussion of pertinent aspects of the investigation, such as reasons for unique associations not seen before as well as limitations to the investigation, are appropriate for the Discussion section.

NOTE: Not all outbreaks have a resolution. In fact, it is rare when everything comes together and a cause can be definitively determined. Do not be discouraged. In most cases, there will be enough evidence to present a plausible hypothesis. Be clear and present a detailed explanation on what has contributed to the conclusion.

VI. Recommendations

This is the opportunity to educate. Be detailed because these recommendations hopefully will be read by many people in the establishment that was investigated. The establishment has a vested interest in following the suggestions. If the outbreak has been large and disruptive, the establishment will not want it to reoccur. In addition to listing general recommendations on good food handling procedures, include specific recommendations that address what might have been overlooked in the particular outbreak (e.g., attempting to transport food long distances at inadequate temperatures).

VII. Acknowledgments

In the spirit of cooperation, it is proper to thank those who assisted in the investigation. This might include health care personnel, the food handlers and/or management of the establishment or other local or state officials.

VIII. Supporting Documentation

When compiling the report, attach copies of all items that are relevant. These would include the following:

- inspection reports
- blank samples of the surveys or questionnaires
- letters to management
- menus
- copies of posted notices
- food testing results

When compiling material, be aware of confidentiality issues.

Information that can lead to the identification of individual cases (e.g., test results that include personal identifiers), should not be included in the outbreak report. The name of the establishment under question is part of the public record and can be disclosed. Data that *cannot* be used to identify individuals can be presented. People cooperate in investigations on the basis of protected confidentiality, and this should be respected.

Distributing the Report

Copies of the report should be made available to all parties involved in the investigation. This would include, but not be limited to, the owner and/or managers of the establishment, the KDPH, and any other local or state agencies affected by or involved in the outbreak or the investigation.

4) Examples of Reports

Two examples of outbreak reports are provided at the end of this chapter (Examples 4.1 and 4.2). **Example 4.1** is the report of an outbreak of folliculitis caused by *Pseudomonas aeruginosa* associated with hot tubs in a resort at Lake Cumberland. **Example 4.2** is a report printed in *Kentucky Epidemiologic Notes and Reports* regarding a multi-state outbreak of *E. coli* O157:H7 associated with raw spinach.

EXAMPLE 4.1 OUTBREAK REPORT

Hot Tub Folliculitis resulting from a stay in a rental unit at a Resort, March 2008

Education, proper maintenance, and regulation are keys to prevention
Jasie K. Logsdon, B.S., M.P.H., Regional Epidemiologist, Lake Cumberland District
Health Department

Summary

On March 25, 2008 the environmentalist at the McCreary County Health Department received a phone call from a concerned parent whose daughter had spent the previous weekend in a cabin at a Resort on Lake Cumberland. Several cases of rash illness had developed among people who had spent time at the resort, including the daughter of the parent who contacted the health department. A total of 11 people were identified as having been at the suspect cabin during March 21 – 23, 2008. Jasie Logsdon, the Lake Cumberland District Health Department (LCDHD) epidemiologist began case finding on March 25, 2008. Through further telephone interviews using a standardized questionnaire, 8 total cases of folliculitis related to exposure to the resort's hot tubs were identified, ranging in age from 3 years old to 54 years old. Laboratory samples collected from three patients were positive for *Pseudomonas aeruginosa*. Environmental samples collected from the hot tub by the District Health Department's environmentalist also tested positive for this organism. On March 27, the Resort was asked to drain, thoroughly clean and sanitize all hot tubs. A follow-up inspection was made on April 1, 2008 to sample the hot tub after cleaning. Results of follow-up water sampling from April 1, were negative for *Pseudomonas aeruginosa* and *E. coli*, indicating that the hot tub was adequately cleaned and sanitized.

Background

Pseudomonas aeruginosa folliculitis (hot tub rash or hot tub folliculitis) is a well-recognized, community-acquired skin infection, which results from the bacterial colonization of hair follicles after exposure to contained, contaminated water (e.g. whirlpools, spas, swimming pools, water slides, bathtubs).¹ Diagnosis of hot tub folliculitis is usually made by visual examination and exposure history. However, a physician may obtain samples from the pus filled bumps for bacterial culture to confirm the diagnosis. Hot tub folliculitis first appears as itchy bumps

¹ Krivda, Stephen J. Pseudomonas Folliculitis. eMedicine from WebMD online. Available: <http://www.emedicine.com/DERM/topic356.htm>

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and develops into dark red tender nodules and/or small pus-filled pimples. The eruptions typically involve the trunk and upper parts of the arms and legs. The rash can be extensive and may affect all areas of the body but is usually most severe under areas covered by a swimsuit. It may be accompanied by headache, nausea, vomiting, abdominal cramps, sore throat, rhinitis, sore eyes, and fever. In a one year period throughout the United States, eight confirmed and two suspected *Pseudomonas* water borne disease outbreaks were documented; five of these outbreaks involved spas, one involved a pool, and four involved both spas and pools². This report describes the outbreak investigation performed at a Resort in Lake Cumberland through a coordinated effort between environmentalists and epidemiologists.

On March 25, 2008, the environmentalist at the McCreary County Health Department received a phone call from a concerned parent whose daughter had spent the previous weekend in a cabin at a Resort on Lake Cumberland. The daughter had subsequently developed a painful rash and swollen hands and feet, and reported that several others were exhibiting similar symptoms. The complainant, a physician's assistant and U.S. Public Health Service assignee to the United States Penitentiary in McCreary County, was concerned that his daughter had a *Staphylococcus aureus* infection. The complainant stated that approximately 30 people could have been exposed to the hot tub and potentially had symptoms. The LCDHD epidemiologist was contacted by another concerned parent stating that her daughter was sick. She was reported to have a rash, swollen hands and feet, and had been quarantined by the Marine Corps at a base in North Carolina.

Investigation Methods

The environmentalist in McCreary County, LCDHD Environmental Director, and LCDHD epidemiologist determined that an investigation must be conducted. LCDHD environmentalists contacted the Kentucky Department for Public Health (KDPH), Division of Public Health Protection and Safety on March 25, 2008 and were instructed to collect a 300 ml water sample from the suspect hot tub to be sent to a private laboratory for analysis. The LCDHD Epidemiologist contacted the KDPH, Division of Epidemiology and Health Planning to advise state officials and consult about the investigation.

Jasie Logsdon, the LCDHD epidemiologist began case finding on March 25, 2008. A case was defined as an individual who had visited the Lake Cumberland Resort over the weekend of March 21-23, 2008 who subsequently developed a rash within 24 hours of last exposure to the hot tub. Phone interviews were

² Centers for Disease Control and Prevention. Surveillance for Waterborne Disease and Outbreaks Associated with Recreational Water --- United States, 2003—2004. MMWR 2006; 55(SS12);1-24 <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5512a1.htm>

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conducted by using a standardized questionnaire for the investigation. This questionnaire was developed by the LCDHD epidemiologist for outbreak investigations and contained questions about symptoms; medical treatment and diagnosis; lab testing; others with similar illness, including names and contact information; close contact with others; sharing of personal items; and exposure to pool, hot tub or sauna. Individuals were asked if they had shared any personal items or if they had other common exposures such as sleeping in the same bed. Based upon symptoms and exposure history, the hot tub was suspected as the source of the outbreak.

Results

The initial investigation revealed that the involved resort on Lake Cumberland rents and manages cabins that are privately owned homes. This rental program is not inspected or permitted by the health department because the cabins are considered individually owned homes. The hot tubs in these cabins are "home-grade" hot tubs and do not fall under health department regulation.

A total of 11 people were identified as having been at the suspect cabin during March 21-23, 2008. A description of the initial two cases follows.

Case 1

A 20 year old female had visited the resort over the weekend of March 21-23, 2008 and developed symptoms on March 23. She experienced painful swelling of lower extremities making it difficult to walk and a rash on her legs, stomach, thighs, back, and arms; she vomited all day after symptom onset. She sought medical attention on March 25 and was given the preliminary diagnosis of staph infection, from two physicians and one physician's assistant, scrapings of the rash were sent for laboratory testing.

Case 2

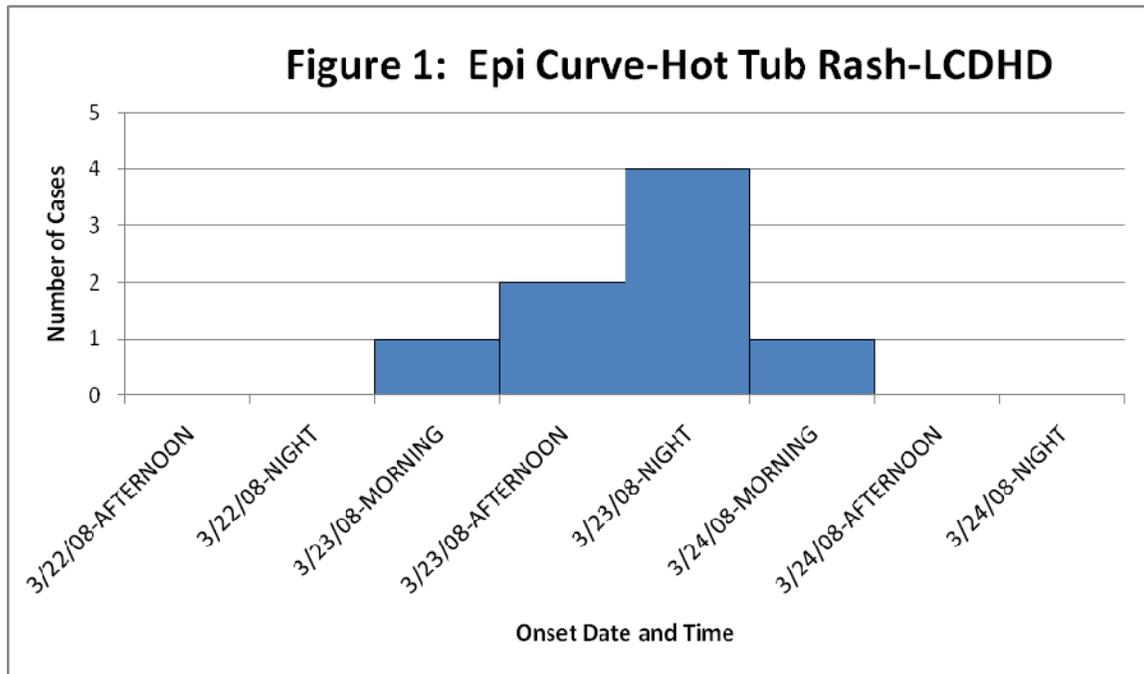
A 19 year old female Marine stationed in North Carolina who had visited the resort over the weekend of March 21-23, 2008, returned to North Carolina on March 24. She began exhibiting symptoms on March 24 during her drive back to North Carolina. She stated she had a rash on her legs, felt "funny", and her toes and hands were aching. She sought medical attention at the infirmary where she was immediately quarantined her to her room with a preliminary diagnosis of a Staph infection. Blood work was done, but the LCDHD was unable to gain contact with anyone in the infirmary at the base. Both individuals had spent time in a hot tub at the cabin.

Through further telephone interviews, 8 total cases of hot tub folliculitis were identified, ranging in age from 3 years old to 54 years old, who met the case definition. All of the cases sought medical treatment, four cases had samples collected for laboratory confirmation. Of the four laboratory samples, three were

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positive for *Pseudomonas aeruginosa* and the fourth was identified as "mixed skin flora."

The mean age of cases was 20 years and 88% were female. Of the 11 individuals who were present at the cabin over the weekend of March 21-23, 2008, 73% spent time in the hot tub. The epidemiologic curve identifying the number of cases and timeline in which they reported illness is shown in Figure 1.



The water sample collected from the hot tub was identified as positive for *Pseudomonas aeruginosa* by Lab Corp. On March 27, the Resort was asked to drain, thoroughly clean and sanitize all hot tubs. A follow-up inspection was made on April 1, 2008 to sample the hot tub after cleaning. Results of follow-up water sampling from April 1, were negative for *Pseudomonas aeruginosa* and *E. coli*, indicating that the hot tub was adequately cleaned and sanitized.

Discussion

Hot tub folliculitis has an incubation period of up to 48 hours after exposure to contaminated water. The rash usually clears on its own within 2-10 days, as it is a self limiting infection. Usually no treatment is necessary for the infection, with the exception of the use of "anti-itch" medications while severe infections may be treated by ciprofloxacin. Laboratory testing usually isn't necessary; however, to rule out Staph infections and confirm a hot tub folliculitis outbreak by exposure to contaminated water, cultures were done. Morehead State Laboratory has the ability to perform specialized water testing. In order to submit specimens to the Morehead State Laboratory, (3) 120mL water samples should be taken and must arrive at the lab within 30 hours. It is important to note that

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the Morehead State Laboratory will charge \$50 per organism tested. For more information, visit their website at <http://www.morehead-st.edu/wtl/>. The State Public Health Laboratory does have the ability to test water for *Pseudomonas aeruginosa*, the most common cause of hot tub folliculitis. In order to submit water for testing for other organisms to the State Public Health Laboratory, (2) 100mL water samples must be collected from a hot tub/spa. For pool or beach samples, (1) 100 mL water sample is required. These samples must also arrive at the lab within 20 hours of collection.

The environmental investigation posed some unique challenges for the Environmentalists as well as the KDPH Division of Public Health Protection and Safety. Since this type of resort is not permitted by the health department as a regulated hotel or recreational water facility, new issues arose with regard to the handling the inspection and recommendations given to the facility. This is an area that the State has not yet addressed because ultimately these are private residences that are "rented."

An educational pamphlet for hot tub folliculitis describing the signs and symptoms, causes, and prevention methods, as well as recommendations for hot tub care and maintenance was created and made available to the Resort. The staff at the resort were educated on proper hot tub care and maintenance, and the cases were all educated on hot tub rash causes, symptoms, and prevention. The Centers for Disease Control and Prevention recommends maintaining a free chlorine or bromine concentration of 2 to 5 parts per million, pH of 7.2-7.8 and lists other important health and safety guidelines for public spas or hot tubs on their website.³ Individuals are recommended to take precautions such as heeding hot tub safety rules, observing the hot tub and its surroundings and talking with staff and other hot tub users when choosing to enjoy a hot tub in the future⁴.

Closing Notes

The outbreak investigation at the Resort in Lake Cumberland demonstrated the need for a coordinated effort between LHD environmentalists and epidemiologists during outbreak investigations. In addition, further guidelines may need to be developed for facilities available for public use that are privately owned and rented. The issue remains as to when this is a private agreement between parties or when this is a public place that should fall under health department regulation. This will have to be addressed at the state level and the policy/procedure passed down to the local level.

³ http://www.cdc.gov/healthyswimming/pdf/spa_operation.pdf

⁴ http://www.cdc.gov/healthyswimming/pdf/spa_user_tips.pdf

EXAMPLE 4.2 OUTBREAK REPORT

E. coli O157:H7 Outbreak Associated with Spinach in Kentucky – September 2006

Kentucky Cabinet for Health and Family Services
Department for Public Health
Division of Epidemiology and Health Planning
Epidemiologic Notes & Reports
Volume 42 Number 1 January/February 2007

Summary

In September 2006, public health officials in Wisconsin and Oregon reported that an outbreak of *E. coli* O157:H7 associated with the consumption of raw spinach was occurring in their region. Officials in New Mexico reported seeing similar cases in their area later that same month. CDC created a one-page questionnaire to be administered to cases which focused on spinach consumption. On September 15, 2006, Kentucky Department for Public Health (KDPH) laboratorians and epidemiologists confirmed that their first case-patient's clinical specimen matched the national outbreak strain. Three additional outbreak cases in Kentucky residents were confirmed later that day. By the end of the month, the Kentucky outbreak included 8 cases, of which 4 required hospitalization, with 2 developing hemolytic-uremic syndrome. Nationwide, 199 cases were associated with the outbreak. The outbreak was eventually traced to four fields in California that were contaminated with pig and cattle feces.

Background

Escherichia coli O157:H7 is a gram negative bacterium that causes an average of 70,000 cases of disease, 20,000 hospitalizations, and 60 deaths yearly in the United States. It is also a frequent cause of hemolytic-uremic syndrome (HUS), a triad of renal insufficiency, anemia, and thrombocytopenia (lowered platelet count) that can lead to permanent need for dialysis and even death. It is one of several hundred types of *E. coli* bacteria and is found in the intestines of cattle, sheep, and goats. It is a common cause of foodborne illness, although the Centers for Disease Control and Prevention (CDC) reports that the incidence of *E. coli* O157:H7 is decreasing. On September 13, 2006, CDC was alerted to an *E. coli* O157:H7 outbreak likely caused by bagged spinach in Wisconsin and Oregon. On the same date, Kentucky epidemiologists were notified of several residents who were infected with *E. coli* O157:H7. This article describes the investigation

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and events related to this outbreak in Kentucky and the national investigation of this outbreak.

Investigation Methods

On September 8, 2006, Wisconsin officials reported to CDC that they had multiple cases of *E. coli* O157:H7 in their state. On September 12, CDC reported to Wisconsin that the pulsed-field gel electrophoresis (PFGE) patterns were matching in their cases. Public health officials in Wisconsin and Oregon conducted a survey of patients' eating habits prior to illness which showed a strong association between disease and raw spinach consumption in patients infected with *E. coli*. State officials in Wisconsin and Oregon notified CDC of their findings on September 13th. New Mexico epidemiologists contacted Wisconsin and Oregon officials on the same date regarding an *E. coli* O157:H7 outbreak in their state which also appeared to be related to the consumption of fresh spinach. State officials and CDC determined that a multi-state outbreak of *E. coli* was in progress. CDC created a one-page questionnaire to be administered to cases which focused on spinach consumption. A case was defined as any person with a lab-confirmed *E. coli* O157:H7 infection which matched the outbreak strain identified in Wisconsin and Oregon by PFGE pattern. On September 15, 2006, KDPH laboratorians and epidemiologists confirmed that their first *E. coli* O157:H7 case-patient's clinical specimen matched the national outbreak strain. Three additional outbreak cases in Kentucky residents were confirmed later that day. Using the CDC spinach questionnaire, Kentucky case patients were questioned by local health department epidemiologists about timing of spinach consumption, location where the spinach was purchased, and if spinach packaging with universal product code (UPC) and lot numbers was available. Data regarding need for hospitalization and development of HUS were obtained on the questionnaire. This questionnaire was used both with Kentucky case patients as well as patients throughout the country during the outbreak. Across the U.S., a confirmed case was defined as a patient with an illness onset date of August 1, 2006-September 18, 2006 or if onset was unknown, a patient with an *E. coli* O157:H7 isolate from August 15, 2006-September 18, 2006 matching the outbreak strain of *E. coli* and from the U.S. By September 22, 2006, a total of eight Kentucky residents were ultimately identified as part of the outbreak.

Regional epidemiologists interviewed seven of the patients by phone or in person and completed the CDC spinach questionnaire. Several patients also completed the general foodborne illness questionnaire to identify other potential exposures. Epidemiologists and environmentalists worked with the state lab and CDC to obtain spinach samples in order to attempt to isolate *E. coli* in the spinach or packaging. Spinach specimens provided by case patients were tested in the state lab for the presence of *E. coli* O157:H7.

Results

National

Ultimately, 199 cases nationwide were confirmed positive for the *E. coli* outbreak strain associated with the outbreak. States reporting the greatest number of confirmed cases were Wisconsin (49), Ohio (25), and Utah (19). Ninety-five percent of patients reported spinach consumption prior to onset of illness. Ninety-eight people required hospitalization, and three people died. Thirty cases of HUS occurred nationally among those infected.

Kentucky

Six Kentucky *E. coli* O157 case patients (75%) were female. Two patients (25%) developed HUS. Four Kentucky patients (50%) required hospitalization. There were no Kentucky fatalities. Of the seven patients who completed interviews detailing their exposures, six (85.7%) recalled eating spinach in the appropriate time frame prior to illness. One patient could not recall whether spinach was consumed prior to illness onset. The ability of the regional epidemiologists and local environmentalists to work throughout the state to interview patients, ship samples to the state lab, and provide state epidemiologists with the spinach questionnaire responses played a critical role in Kentucky's response to the outbreak. State and regional epidemiologists worked in concert to inform the state lab when environmental and patient specimens would be arriving. Regional epidemiologists also quickly provided state epidemiologists with completed questionnaires, thereby enabling state epidemiologists to share information with CDC and the U.S. Food and Drug Administration (FDA). The Public Health Protection and Safety team also was crucial to the success of the state investigation. The local environmentalists collected spinach samples from individuals involved in the outbreak, and worked with epidemiologists at the state level to coordinate testing at the state laboratory. They fielded questions from Kentucky residents about spinach safety. State food safety experts also worked with the laboratory and epidemiologists to arrange for local environmentalist services, and updated local health departments on FDA updates and the number of state residents who were part of the outbreak. The CDC and the FDA used information including lot numbers, lab testing, and spinach brands provided by Kentucky and other involved states to trace the outbreak to four fields in California. Testing performed at these fields revealed that the fields contained pig and cattle feces contaminated with *E. coli* O157:H7 matching the outbreak strain. Investigators also found evidence that wild pigs had been present in the implicated farms.

Discussion

E. coli O157:H7 is a virulent strain of *E. coli* that produces Shiga toxin. It may cause acute watery or bloody diarrhea due to its ability to invade the intestinal wall. It is diagnosed by a clinical stool specimen taken from the patient. The incubation period ranges from 1-8 days following ingestion, but most commonly symptoms begin 3-4 days after ingestion. *E. coli* O157:H7 is transmitted by ingestion of food or liquid contaminated with feces of an infected or asymptomatic carrier. Foods previously implicated in transmission of *E. coli* O157:H7 include raw milk, unpasteurized apple juice, ground beef, uncooked fruits, and vegetables. Petting zoos have also been the source of previous outbreaks. According to the FDA, 18 previous outbreaks have been caused by spinach in the last 10 years, including an outbreak in 2005 in which spinach was implicated. Lettuce or spinach may become contaminated via multiple mechanisms from the farm to consumption (by manure from an infected animal such as a cow; from contaminated irrigation water; from contamination during packaging and processing; or through individual contamination at restaurants or grocery stores). Infection may also result in HUS, or renal insufficiency, anemia, and thrombocytopenia. Children aged younger than five years are most likely to contract HUS, which most commonly occurs around two weeks after infection with *E. coli* O157; approximately 8% of children infected with *E. coli* O157:H7 subsequently develop HUS. Half of the children diagnosed with HUS ultimately require short- or long-term dialysis, and approximately 4% die. Antibiotics have not proven beneficial in the prevention of HUS.

Normally, transmission of *E. coli* infection is prevented by cooking ground beef until no longer pink, avoiding raw milk and unpasteurized products, and good hand hygiene. In this outbreak, the FDA also stated that cooking spinach for 15 seconds at a temperature of 160 degrees Fahrenheit would kill any *E. coli* present, therefore making the spinach safe to eat. It should be noted that meticulous attention to food preparation helps to prevent any foodborne illness. Cooks should be careful to avoid contamination of raw fruits and vegetables with items which have touched uncooked meat. In addition, refrigerating spinach will also prevent the growth of *E. coli* and other types of bacteria. In the present outbreak, however, the product was advertised as "pre-washed". Bagged raw spinach is usually used for salad and is therefore not cooked. The FDA did not recommend rewashing pre-washed spinach, as the *E. coli* often is incorporated into the interior of the spinach leaf and therefore can't be removed by washing at home. Thus, prevention strategies for this type of transmission rely primarily on identification of sources of contamination prior to distribution and prevention of subsequent outbreaks via the same or similar mechanism.

Closing Notes

Ultimately, the outbreak strain was not isolated from spinach supplied by Kentucky patients to the state lab. However, the implicated strain of *E. coli* was isolated from several spinach bags provided by ill patients in other states (New Mexico, Pennsylvania, Utah, and Nebraska). The FDA traced the infection to a spinach processing company by combining the epidemiologic information obtained from the spinach questionnaire with the laboratory testing performed on the implicated bags of spinach. The outbreak was halted by recalls of spinach and spinach products from the implicated companies and FDA advice to consumers to avoid eating raw spinach until the source of the outbreak could be determined. Future plans include development of an industry-wide plan with steps to prevent contamination, thereby reducing the risk of another outbreak.

References

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Holland, W. et al. *Oxford Textbook of Public Health*, Oxford University Press, 1985; 3:284-289.

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Mercer	Kathy Crown-Weber	859-734-4522	Kathlyn.Crown-weber@ky.gov
Monroe	Valerie Hudson	270-487-6782	ValerieS.Hudson@ky.gov
Montgomery	Jan Chamness	859-498-3808	JanM.Chamness@ky.gov
Muhlenberg	Joseph Bean	270-754-3200	JosephO.Bean@ky.gov
North Central	Renee Blair	502-633-1243	Renee.Blair@ky.gov
Northern KY	Lynne Saddler	859-341-4264	Lynne.Saddler@nkyhealth.org
Oldham	Teresa Gamsky	502-222-3516	TeresaD.Gamsky@ky.gov
Pennyrile	James M. Tolley	270-388-9747	JamesM.Tolley@ky.gov

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Purchase	Charles Ross	270-444-9625	CharlesJ.Ross@ky.gov
Three Rivers	Georgia Heise	502-484-3412	GeorgiaF.Heise@ky.gov
Todd	Jennifer Harris	270-265-2362	JenniferM.Harris@ky.gov
Wedco	Crystal Caudill	859-234-0054	Crystal.Caudill@ky.gov
Whitley	Gail Timperio	606-549-3362	CynthiaG.Timperio@ky.gov
Woodford	Melissa Royce	859-873-7238	Melissa.Royce@ky.gov

On Global Distribution List as LHD Directors

Contacts for Outbreak Investigations Additional Contacts

Kentucky Emergency Operations Center
100 Minuteman Parkway
Frankfort, KY 40601
Duty Officer 24/7: (800) 255-2587
Phone: (502) 607-1638
ESF-8 Desk Email: ceoc08@kycsepp.com

Kentucky Department of Agriculture
107 Corporate Drive
Frankfort, KY 40601
Phone: 502-564-4696
Fax: 502-573-0303
<http://www.kyagr.com/>

Kentucky Energy and Environment Cabinet
Department for Environmental Protection
300 Fair Oaks Lane
Frankfort, KY 40601
Phone: 502-564-0323
Fax: 502-564-4245
<http://www.dep.ky.gov/>

APPENDIX A

Kentucky Department of Fish and Wildlife Resources

1 Sportsman's Lane

Frankfort, KY 40601

Phone: 1-800-858-1549

<http://www.kdfwr.state.ky.us/default.aspx>

Kentucky Emergency Management

(See Kentucky Emergency Operations Center above)

Centers for Disease Control & Prevention- www.cdc.gov

U.S. Food & Drug Administration- www.fda.gov

U.S. Department of Agriculture- www.usda.gov

Appendix B

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES

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KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized Alphabetically by Agent)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
<i>Bacillus cereus</i> ("emetic" variety)	2-4 hours (1-6 hours)	Vomiting, with nausea and diarrhea (abrupt onset)	24 hours	Not communicable (preformed enterotoxin)	Fried rice, meats, vegetables	<ul style="list-style-type: none"> ▪ Isolation of 10⁵ <i>B. cereus</i>/gm of implicated food, OR Isolation of <i>B. cereus</i> from stool or vomitus of ill person. ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219
<i>Bacillus cereus</i> ("diarrheal" variety)	6-24 hours	Cramps and diarrhea	24-48 hours	Not communicable (enterotoxin formed in vivo)	Fried rice, meats, vegetables	<ul style="list-style-type: none"> ▪ Isolation of 10⁶ <i>B. cereus</i>/gm of implicated food, OR Isolation of <i>B. cereus</i> from stool of ill person. ▪ Feces, rectal swabs, vomitus. ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219
<i>Campylobacter jejuni</i>	48 hours-5 days (24 hours-10 days)	Cramps and diarrhea (sometimes bloody), with vomiting and fever	48 hours-10 days	2-7 weeks (sometimes bloody)	Raw milk, poultry, water	<ul style="list-style-type: none"> ▪ Isolation of <i>C. jejuni</i> from implicated food, OR Isolation of <i>C. jejuni</i> from stool or blood of ill person ▪ Feces, rectal swabs ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219

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¹ *The KY Field Guide to Foodborne and Water-Borne Diseases* is based on the *Oregon Health Services Compendium of Acute Foodborne Diseases* and a similar table developed by epidemiologists at the Foodborne and Diarrheal Disease Branch, Division of Bacterial and Mycotic Diseases, National Center for Infectious Diseases, Centers for Disease Control and Prevention, and on Tauxe RV, Hughes JM. Foodborne Disease. In: Mandell GL, Benne HJE, Dolin R. Principles and Practice of Infectious Disease 4th ed. NY: Churchill Livingstone; 1995, page 1017 (table 6).

² CDC. Diagnosis and management of foodborne illness: a primer for physicians. MMWR 2001; 50(RR2). Reprinted with the permission of the American Medical Association; the Center for Food Safety and Nutrition, FDA and the Food Safety Inspection Service, USDA. Available on-line at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5002a1.htm>
 CDC. Guide to confirming the diagnosis in Foodborne diseases at http://www.cdc.gov/ncidod/dbmd/outbreak/guide_fd.htm Chin, J, Ed. Control of Communicable Disease Manual. Washington, D.C.: American Public Health Association, 2000.

³ CDC. Diagnosis and management of Foodborne illness: a primer for physicians. MMWR 2001; 50(RR2). Reprinted with the permission of the American Medical Association; the Center for Food Safety and Nutrition, FDA and the Food Safety Inspection Service, USDA. Available on-line at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5002a1.htm>

⁴ "Characteristic foods" for each foodborne and water-borne agent are based on epidemiological data gathered by epidemiologists in the Acute and Communicable Disease Program, Center for Disease Control and Epidemiology, Oregon Health Division, and on Tauxe RV, Hughes JM. Foodborne Disease. In: Mandell GL, Benne HJE, Dolin R. Principles and Practice of Infectious Disease 4th ed. NY: Churchill Livingstone; 1995, page 1017 (table 6).

⁵ Division of Laboratory Services, Kentucky Department for Public Health <http://chfs.ky.gov/dph/info/lab/> 1-502-564-4446.

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized Alphabetically by Agent)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
Ciguatera poisoning	1-6 hours; usually within 24 hours	Diarrhea, nausea, vomiting, paresthesias, reversal of temperature sensation	Days to weeks to months	Not communicable	Large ocean fish (grouper, amberjack barracuda, snapper)	<ul style="list-style-type: none"> ▪ Demonstration of ciguatoxin in epidemiologically implicated fish, OR clinical syndrome among persons who have eaten a type of fish previously associated with ciguatera fish poisoning ▪ Collect epidemiologically implicated fish
<i>Clostridium botulinum</i>	12-48 hours (2 hours to 8 days)	Nausea, vomiting, diarrhea, with or just before onset of descending paralysis	Days to months	Not communicable (preformed enterotoxin)	Improperly canned or similarly preserved foods; honey (infants)	<ul style="list-style-type: none"> ▪ Detection of <i>C. botulinum</i> toxin from implicated food, OR Detection of <i>C. botulinum</i> toxin from human sera, or feces, OR Isolation of <i>C. botulinum</i> from stool of persons with clinical syndrome, OR Consistent clinical syndrome in persons known to have eaten same food as persons with laboratory proven cases. ▪ 25-50 g feces, 10 ml sera in red stoppered tube⁶ ▪ Sterile, leak-proof unbreakable container. Form 219
<i>Clostridium perfringens</i>	10-12 hours (6-24 hours)	Cramps and diarrhea	24-48 hours	Not communicable (enterotoxin formed in vivo)	Meat, poultry, gravy, Mexican foods	<ul style="list-style-type: none"> ▪ Isolation of >10⁵ <i>C. perfringens</i>/gm of implicated food, OR Isolation of <i>C. perfringens</i> in stool of ill persons, OR Detection of enterotoxin by latex agglutination (from stool extracts of culture isolates). ▪ 5-50 g stool ▪ Kit #10

⁶ DLS staff must be contacted before any specimens for botulism will be tested.

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized Alphabetically by Agent)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
<i>Cryptosporidium parvum</i>	2-12 days (usually 7 days)	Profuse watery diarrhea, abdominal cramps, nausea, low-grade fever, anorexia, vomiting (Some infected individuals have no symptoms at all.)	1-2 weeks	Weeks to months	Fruits, produce, or water	<ul style="list-style-type: none"> ▪ Isolation of <i>C. parvum</i> oocysts from implicated food, OR Isolation of <i>C. parvum</i> oocysts from stool of ill persons, OR Demonstration of <i>C. parvum</i> in intestinal fluid, or small bowel biopsy specimens, OR Demonstration of <i>C. parvum</i> antigen in stool by a specific immunodiagnostic test (e.g., enzyme-linked immunosorbent assay (ELISA). ▪ Walnut-sized stool ▪ 10% formalin. Form 219
<i>Escherichia coli</i> Enteroinvasive (EIEC)	12-48 hours	Cramps and diarrhea, with fever, headache	5-10 days	Weeks to months	Uncooked vegetables, salads, water, cheese	<ul style="list-style-type: none"> ▪ Demonstration of <i>E. coli</i> of same serotype in implicated food and stools in persons, OR Isolation of <i>E. coli</i> of the same serotype shown to be enteroinvasive or enterotoxigenic from stool of ill persons ▪ Feces, rectal swabs ▪ Enteric pathogens kit with buffered glycerol saline. Must be refrigerated. Form 219
<i>Escherichia coli</i> enterotoxigenic (ETEC) ⁷	24-48 hours (21-68 hours)	Cramps, watery diarrhea, some vomiting Usual symptom profile: diarrhea 80-100% cramps 82% vomiting <50% nausea <50% fever <50% myalgia <50% headache <50%	24 hours-11 days (medium 3 days)	Weeks to months	Seafood (crab, shrimp and scallops), salads and other foods served cold	<ul style="list-style-type: none"> ▪ Demonstration of <i>E. coli</i> of same serotype in implicated food and stools in persons, OR Isolation of <i>E. coli</i> of the same serotype shown to be enteroinvasive or enterotoxigenic from stool of ill persons ▪ Feces, rectal swabs ▪ Enteric pathogens kit with buffered glycerol saline. Must be refrigerated. Form 219

⁷ Symptom profiles and characteristic foods are taken from Dalton CB, Mintz ED, Wells JG et al. Outbreaks of enterotoxigenic *Escherichia coli* infection in American adults: a clinical and epidemiologic profile. *Epidemiol Infect* 1999; 123:9–16.

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized Alphabetically by Agent)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
<i>Escherichia coli</i> enterohemorrhagic (<i>E. coli</i> O157:H7 & others)	48 hours-8 days (24 hours-10 days)	Bloody diarrhea, with cramps, vomiting, fever; hemolytic uremic syndrome (2-7% of cases)	5-10 days	1-4 weeks	Beef, venison, raw milk, water, produce	<ul style="list-style-type: none"> ▪ Demonstration of <i>E. coli</i> isolates from stools that are enterotoxigenic or enterohemorrhagic. ▪ Feces, rectal swabs ▪ Enteric pathogens kit with buffered glycerol saline. Must be refrigerated. Form 219
Heavy Metals (antimony, arsenic, cadmium, copper, iron, lead, mercury, tin, zinc)	5 minutes - 8 hours (usually <1 hour)	Vomiting, with nausea, cramps, and diarrhea	Usually self-limited	Not communicable	Acidic foods and beverages prepared, stored or cooked in containers coated, lined or contaminated with offending metal	<ul style="list-style-type: none"> ▪ Demonstration of high concentration of metal in epidemiologically implicated food ▪ Collect suspect food or metal container
<i>Listeria monocytogenes</i>	24 hours (9-50 hours)	Fever, with diarrhea, myalgia, headache Usual symptom profile: fever 72% diarrhea 68% myalgia 56% cramps 55% vomiting 35%	3-7 days	Not known	Inadequately pasteurized milk, precooked meat	<ul style="list-style-type: none"> ▪ Isolation of <i>Listeria monocytogenes</i> of the same serotype from two or more ill persons exposed to epidemiologically implicated food or to food from which the same-type <i>Listeria monocytogenes</i> has been isolated ▪ Feces, rectal swabs ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219
Norwalk virus and other caliciviruses	24-48 hours (10-72 hours)	Vomiting, with diarrhea, headache and myalgia Usual symptom profile: diarrhea 80% vomiting 60% nausea 75% fever 30%	24-72 hours	Duration of vomiting and diarrhea	Shellfish, water, salads, frosting, "handled" foods	<ul style="list-style-type: none"> ▪ Diagnosed is often based on symptoms, onset times, and ruling out other enteric pathogens, OR Identification of virus in stool by polymerase chain reaction (PCR). ▪ Stool or vomitus of ill person ▪ Sterile, leak-proof container without preservatives. Must be refrigerated. Form 275

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized Alphabetically by Agent)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
Paralytic shellfish poisoning	30 minutes–3 hours	Paresthesias, feeling of floating, loss of balance, dry mouth, double vision, dysarthria, shortness of breath	Days	Not communicable	Clams, mussels, cockles	<ul style="list-style-type: none"> ▪ Detection of toxin in epidemiologically implicated fish, OR detection of large numbers of shellfish-poisoning associated species of dinoflagellates in water from which epidemiologically implicated mollusks are gathered ▪ Collect epidemiologically implicated fish
Poisonous mushrooms (muscimol, muscarine, psilocybin, coprinus artrementaris, ibotenic acid)	<2 hours	Vomiting, diarrhea, confusion, visual disturbances, salivation, diaphoresis, hallucinations, disulfiram-like reaction	Usually selflimited	Not communicable	Wild mushrooms	<ul style="list-style-type: none"> ▪ Clinical syndrome among persons who have eaten mushroom identified as toxic type, OR demonstration of toxin in epidemiologically implicated mushroom or food containing mushrooms ▪ Collect mushrooms or food containing mushrooms
<i>Salmonella spp</i> (non-typhoid)	12-36 hours (6 hours-10 days)	Cramps and diarrhea, with vomiting and fever	4-7 days	Several days to several years, depending on type Concentrations/ infectivity typically higher when symptomatic	Poultry, eggs, meat, raw milk (cross contamination important)	<ul style="list-style-type: none"> ▪ Isolation of <i>Salmonella</i> from implicated food or water, OR Isolation of <i>Salmonella</i> from stool from ill persons. ▪ Feces, rectal swabs ▪ Enteric pathogens kit with buffered glycerol saline. Form 219
Scombroid fish poisoning (histamine fish poisoning)	1 minute–3 hours; usually within 6 hours	Cramps, diarrhea, headache, nausea, flushing, urticaria	3-6 hours	Not communicable	Mishandled fish (mahi-mahi, tuna, mackerel, bluefish, salmon, bonito, skipjack)	<ul style="list-style-type: none"> ▪ Demonstration of histamine in epidemiologically implicated fish, OR clinical syndrome among persons who have eaten a type of fish previously associated with histamine fish poisoning (fish of order Scombroidei) ▪ Collect epidemiologically implicated fish

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized Alphabetically by Agent)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
Shellfish poisoning (diarrheic, neurotoxic, amnesic)	20 minutes - 2 hours	Cramps, diarrhea, headaches, vomiting, amnesia, seizures	Days	Not communicable	Mussels, oysters	<ul style="list-style-type: none"> ▪ Detection of toxin in epidemiologically implicated food OR detection of large numbers of shellfish-poisoning associated species of dinoflagellates in water from which epidemiologically implicated mollusks are gathered ▪ Collect any amount of epidemiologically implicated shellfish
<i>Shigella</i>	24-48 hours (12 hours-6 days)	Cramps and diarrhea (may be bloody), with fever	4-7 days	4 weeks after illness	Eggs, salads, lettuce	<ul style="list-style-type: none"> ▪ Isolation of <i>Shigella</i> from implicated food, OR Isolation of <i>Shigella</i> from stool of ill persons. ▪ Feces, rectal swabs ▪ Enteric pathogens kit with buffered glycerol saline. Form 219
<i>Staphylococcus aureus</i>	2-4 hours (30 minutes-8 hours)	Vomiting, with nausea, cramps, and diarrhea (abrupt onset)	24-48 hours	Not communicable (preformed enterotoxin)	Sliced/chopped ham and meats, custards, cream fillings, mushrooms, egg salad	<ul style="list-style-type: none"> ▪ Isolation of an enterotoxin producing strain of <i>S. aureus</i> in implicated food, OR Isolation of enterotoxin producing strain of <i>S. aureus</i> from stool of ill persons ▪ <i>Staphylococcus aureus</i> Feces, rectal swabs ▪ Enteric pathogens kit with buffered glycerol saline. Form 219
<i>Vibrio parahaemolyticus</i>	12-24 hours (2-48 hours)	Cramps watery, diarrhea, with nausea, vomiting, and fever	2-5 days	Not communicable	Seafood, especially crabs and oysters	<ul style="list-style-type: none"> ▪ Isolation of 10⁵/g <i>V. parahaemolyticus</i> from implicated food (usually seafood), OR Isolation of <i>V. parahaemolyticus</i> from stool of ill persons. ▪ Feces, rectal swabs ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized Alphabetically by Agent)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
<i>Vibrio cholerae</i> non-O1 and non-O139	12-24 hours (12 hours-5 days)	Profuse watery diarrhea and vomiting, which can lead to severe dehydration and death within hours	72 hours-7 days; causes life threatening dehydration	Several days	Shellfish	<ul style="list-style-type: none"> ▪ Isolation of <i>V. cholerae</i> non-O1 or non-O139 from stool of ill person. Isolation of <i>V. cholerae</i> non-O1 or non-O139 from implicated food is supportive evidence. ▪ Feces, rectal swabs ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219
<i>Vibrio cholerae</i> O1 and O139	24-72 hours (12 hours-5 days)	Diarrhea, vomiting water	72 hours-7 days	Usually a few days after recovery except carrier state	Shellfish, water or foods contaminated by infected food handlers	<ul style="list-style-type: none"> ▪ Isolation of toxigenic <i>V. cholerae</i> O1 or O139 from implicated food, OR Isolation of <i>V. cholerae</i> O1 or O139 from stool or vomitus of ill persons, OR Significant rise (fourfold) in vibriocidal antibodies. ▪ Feces, rectal swabs ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219
<i>Yersinia enterocolitica</i>	36-48 hours (24 hours-10 days)	Cramps, diarrhea, fever, headache, vomiting, pseudoappendicitis	1-3 weeks	2-3 weeks	Milk, tofu, pork	<ul style="list-style-type: none"> ▪ Isolation of organism from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food ▪ Feces, rectal swabs ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized by Symptomology)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
Agents typified by nausea and vomiting, without fever, within 8 hours of consuming.						
<i>Bacillus cereus</i> ("emetic" variety)	2-4 hours (1-6 hours)	Vomiting, with nausea and diarrhea (abrupt onset)	24 hours	Not communicable (preformed enterotoxin)	Fried rice, meats, vegetables	<ul style="list-style-type: none"> ▪ Isolation of 10⁵ <i>B. cereus</i>/gm of implicated food, OR Isolation of <i>B. cereus</i> from stool or vomitus of ill person. ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219
<i>Staphylococcus aureus</i>	2-4 hours (30 minutes-8 hours)	Vomiting, with nausea, cramps, and diarrhea (abrupt onset)	24-48 hours	Not communicable (preformed enterotoxin)	Sliced/chopped ham and meats, custards, cream fillings, mushrooms, egg salad	<ul style="list-style-type: none"> ▪ Isolation of an enterotoxin producing strain of <i>S. aureus</i> in implicated food, OR Isolation of enterotoxin producing strain of <i>S. aureus</i> from stool of ill persons ▪ Feces, rectal swabs ▪ Enteric pathogens kit with buffered glycerol saline. Form 219
Agents typified by abdominal cramps and diarrhea, without fever, within 24 hours of consuming.						
<i>Bacillus cereus</i> ("diarrheal" variety)	6-24 hours	Cramps and diarrhea	24-48 hours	Not communicable (enterotoxin formed in vivo)	Fried rice, meats, vegetables	<ul style="list-style-type: none"> ▪ Isolation of 10⁵ <i>B. cereus</i>/gm of implicated food, OR Isolation of <i>B. cereus</i> from stool of ill person. ▪ Feces, rectal swabs, vomitus. ▪ Enteric pathogens kit with

¹ *The KY Field Guide to Food-Borne and Water-Borne Diseases* is based on the *Oregon Health Services Compendium of Acute Food-borne Diseases* and a similar table developed by epidemiologists at the Food-borne and Diarrheal Disease Branch, Division of Bacterial and Mycotic Diseases, National Center for Infectious Diseases, Centers for Disease Control and Prevention, and on Tauxe RV, Hughes JM. Food-Borne Disease. In: Mandell GL, Benne HJE, Dolin R. Principles and Practice of Infectious Disease 4th ed. NY: Churchill Livingstone; 1995, page 1017 (table 6).

² CDC. Diagnosis and management of food-borne illness: a primer for physicians. MMWR 2001; 50(RR2). Reprinted with the permission of the American Medical Association; the Center for Food Safety and Nutrition, FDA and the Food Safety Inspection Service, USDA. Available on-line at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5002a1.htm>

CDC. Guide to confirming the diagnosis in food-borne diseases at http://www.cdc.gov/ncidod/dbmd/outbreak/guide_fd.htm Chin, J, Ed. Control of Communicable Disease Manual. Washington, D.C.: American Public Health Association, 2000.

³ CDC. Diagnosis and management of food-borne illness: a primer for physicians. MMWR 2001; 50(RR2). Reprinted with the permission of the American Medical Association; the Center for Food Safety and Nutrition, FDA and the Food Safety Inspection Service, USDA. Available on-line at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5002a1.htm>

⁴ "Characteristic foods" for each food-borne and water-borne agent are based on epidemiological data gathered by epidemiologists in the Acute and Communicable Disease Program, Center for Disease Control and Epidemiology, Oregon Health Division, and on Tauxe RV, Hughes JM. Food-Borne Disease. In: Mandell GL, Benne HJE, Dolin R. Principles and Practice of Infectious Disease 4th ed. NY: Churchill Livingstone; 1995, page 1017 (table 6).

⁵ Division of Laboratory Services, Kentucky Department for Public Health <http://chfs.ky.gov/dph/info/lab/> 1-502-564-4446.

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized by Symptomology)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
						Cary-Blair preservative. Must be refrigerated. Form 219
<i>Clostridium perfringens</i>	10-12 hours (6-24 hours)	Cramps and diarrhea	24-48 hours	Not communicable (enterotoxin formed in vivo)	Meat, poultry, gravy, Mexican foods	<ul style="list-style-type: none"> ▪ Isolation of >10⁵ <i>C. perfringens</i>/gm of implicated food, OR Isolation of <i>C. perfringens</i> in stool of ill persons, OR Detection of enterotoxin by latex agglutination (from stool extracts of culture isolates). ▪ 5-50 g stool ▪ Kit #10
Agents typified by abdominal cramps and diarrhea, with fever, within 12-48 hours of consuming.						
<i>Campylobacter jejuni</i>	48 hours-5 days (24 hours-10 days)	Cramps and diarrhea (sometimes bloody), with vomiting and fever	48 hours-10 days	2-7 weeks	Raw milk, poultry, water	<ul style="list-style-type: none"> ▪ Isolation of <i>C. jejuni</i> from implicated food, OR Isolation of <i>C. jejuni</i> from stool or blood of ill person ▪ Feces, rectal swabs ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219
<i>Escherichia coli</i> Enteroinvasive (EIEC)	12-48 hours	Cramps and diarrhea, with fever, headache	5-10 days	Weeks to months	Uncooked vegetables, salads, water, cheese	<ul style="list-style-type: none"> ▪ Demonstration of <i>E. coli</i> of same serotype in implicated food and stools in persons, OR Isolation of <i>E. coli</i> of the same serotype shown to be enteroinvasive or enterotoxigenic from stool of ill persons ▪ Feces, rectal swabs ▪ Enteric pathogens kit with buffered glycerol saline. Must be refrigerated. Form 219
<i>Salmonella spp</i> (non-typhoid)	12-36 hours (6 hours-10 days)	Cramps and diarrhea, with vomiting and fever	4-7 days	Several days to several years, depending on type Concentrations/ infectivity typically higher when symptomatic	Poultry, eggs, meat, raw milk (cross contamination important)	<ul style="list-style-type: none"> ▪ Isolation of <i>Salmonella</i> from implicated food or water, OR Isolation of <i>Salmonella</i> from stool from ill persons. ▪ Feces, rectal swabs ▪ Enteric pathogens kit with buffered glycerol saline. Form 219

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized by Symptomology)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
<i>Shigella</i>	24-48 hours (12 hours-6 days)	Cramps and diarrhea (may be bloody), with fever	4-7 days	4 weeks after illness	Eggs, salads, lettuce	<ul style="list-style-type: none"> ▪ Isolation of <i>Shigella</i> from implicated food, OR Isolation of <i>Shigella</i> from stool of ill persons. ▪ Feces, rectal swabs ▪ Enteric pathogens kit with buffered glycerol saline. Form 219
<i>Vibrio parahaemolyticus</i>	12-24 hours (2-48 hours)	Cramps watery, diarrhea, with nausea, vomiting, and fever	2-5 days	Not communicable	Seafood, especially crabs and oysters	<ul style="list-style-type: none"> ▪ Isolation of 10⁵/g <i>V. parahaemolyticus</i> from implicated food (usually seafood), OR Isolation of <i>V. parahaemolyticus</i> from stool of ill persons. ▪ Feces, rectal swabs ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219
<i>Yersinia enterocolitica</i>	36-48 hours (24 hours–10 days)	Cramps, diarrhea, fever, headache, vomiting, pseudoappendicitis	1-3 weeks	2-3 weeks	Milk, tofu, pork	<ul style="list-style-type: none"> ▪ Isolation of organism from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food ▪ Feces, rectal swabs ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219
Agents typified by vomiting, diarrhea, cramps, myalgias, and headache with fever, within 24 hours of consuming.						
<i>Listeria monocytogenes</i>	24 hours (9-50 hours)	Fever, with diarrhea, myalgia, headache Usual symptom profile: fever 72%, diarrhea 68%, myalgia 56%, cramps 55%, vomiting 35%	3-7 days	Not known	Inadequately pasteurized milk, precooked meat	<ul style="list-style-type: none"> ▪ Isolation of <i>Listeria monocytogenes</i> of the same serotype from two or more ill persons exposed to epidemiologically implicated food or to food from which the same-type <i>Listeria monocytogenes</i> has been isolated ▪ Feces, rectal swabs ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized by Symptomology)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
Agents typified by vomiting, diarrhea, myalgias, and headache without fever, within 24-48 hours of consuming.						
Norwalk virus and other caliciviruses	24-48 hours (10-72 hours)	Vomiting, with diarrhea, headache and myalgia Usual symptom profile: diarrhea 80%, vomiting 60%, nausea 75%, fever 30%	24-72 hours	Duration of vomiting and diarrhea	Shellfish, water, salads, frosting, "handled" foods	<ul style="list-style-type: none"> ▪ Diagnosed is often based on symptoms, onset times, and ruling out other enteric pathogens, OR Identification of virus in stool by polymerase chain reaction (PCR). ▪ Stool or vomitus of ill person ▪ Sterile, leak-proof container without preservatives. Must be refrigerated. Form 275
Agents typified by watery diarrhea and headache without fever, within 24-48 hours of consuming.						
<i>Escherichia coli</i> enterotoxigenic (ETEC) ⁶	24-48 hours (21-68 hours)	Cramps, watery diarrhea, some vomiting Usual symptom profile: diarrhea 80-100% cramps 82%, vomiting <50%, nausea <50% ,fever <50%, myalgia <50% headache <50%	24 hours-11 days (medium 3 days)	Weeks to months	Seafood (crab, shrimp and scallops), salads and other foods served cold	<ul style="list-style-type: none"> ▪ Demonstration of <i>E. coli</i> of same serotype in implicated food and stools in persons, OR Isolation of <i>E. coli</i> of the same serotype shown to be enteroinvasive or enterotoxigenic from stool of ill persons ▪ Feces, rectal swabs ▪ Enteric pathogens kit with buffered glycerol saline. Must be refrigerated. Form 219
<i>Vibrio cholerae</i> O1 and O139	24-72 hours (12 hours-5 days)	Diarrhea, vomiting	72 hours-7 days	Usually a few days after recovery except carrier state	Shellfish, water or foods contaminated by infected food handlers	<ul style="list-style-type: none"> ▪ Isolation of toxigenic <i>V. cholerae</i> O1 or O139 from implicated food, OR Isolation of <i>V. cholerae</i> O1 or O139 from stool or vomitus of ill persons, OR Significant rise (fourfold) in vibriocidal antibodies. ▪ Feces, rectal swabs ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219

⁶ Symptom profiles and characteristic foods are taken from Dalton CB, Mintz ED, Wells JG et al. Outbreaks of enterotoxigenic *Escherichia coli* infection in American adults: a clinical and epidemiologic profile. *Epidemiol Infect* 1999; 123:9–16.

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized by Symptomology)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
<i>Vibrio cholerae</i> non-O1 and non-O139	12-24 hours (12 hours-5 days)	Profuse watery diarrhea and vomiting, which can lead to severe dehydration and death within hours	72 hours-7 days; causes life threatening dehydration	Several days	Shellfish	<ul style="list-style-type: none"> ▪ Isolation of <i>V. cholerae</i> non-O1 or non-O139 from stool of ill person. Isolation of <i>V. cholerae</i> non-O1 or non-O139 from implicated food is supportive evidence. ▪ Feces, rectal swabs ▪ Enteric pathogens kit with Cary-Blair preservative. Must be refrigerated. Form 219
Agents typified by bloody diarrhea without fever, within 48 hours of consuming.						
<i>Escherichia coli</i> enterohemorrhagic (<i>E. coli</i> O157:H7 & others)	48 hours-8 days (24 hours-10 days)	Bloody diarrhea, with cramps, vomiting, fever; hemolytic uremic syndrome (2-7% of cases)	5-10 days	1-4 weeks	Beef, venison, raw milk, water, produce	<ul style="list-style-type: none"> ▪ Demonstration of <i>E. coli</i> isolates from stools that are enterotoxigenic or enterohemorrhagic. ▪ Feces, rectal swabs ▪ Enteric pathogens kit with buffered glycerol saline. Must be refrigerated. Form 219
Botulism						
<i>Clostridium botulinum</i>	12-48 hours (2 hours to 8 days)	Nausea, vomiting, diarrhea, with or just before onset of descending paralysis	Days to months	Not communicable (preformed enterotoxin)	Improperly canned or similarly preserved foods; honey (infants)	<ul style="list-style-type: none"> ▪ Detection of <i>C. botulinum</i> toxin from implicated food, OR Detection of <i>C. botulinum</i> toxin from human sera, or feces, OR Isolation of <i>C. botulinum</i> from stool of persons with clinical syndrome, OR Consistent clinical syndrome in persons known to have eaten same food as persons with laboratory proven cases. ▪ 25-50 g feces, 10 ml sera in red stoppered tube⁷ ▪ Sterile, leak-proof unbreakable container. Form 219

⁷ DLS staff must be contacted before any specimens for botulism will be tested.

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized by Symptomology)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
Cryptosporidiosis						
<i>Cryptosporidium parvum</i>	2-12 days (usually 7 days)	Profuse watery diarrhea, abdominal cramps, nausea, low-grade fever, anorexia, vomiting (Some infected individuals have no symptoms at all.)	1-2 weeks	Weeks to months	Fruits, produce, or water	<ul style="list-style-type: none"> ▪ Isolation of <i>C. parvum</i> oocysts from implicated food, OR Isolation of <i>C. parvum</i> oocysts from stool of ill persons, OR Demonstration of <i>C. parvum</i> in intestinal fluid, or small bowel biopsy specimens, OR Demonstration of <i>C. parvum</i> antigen in stool by a specific immunodiagnostic test (e.g., enzyme-linked immunosorbent assay (ELISA). ▪ Walnut-sized stool ▪ 10% formalin. Form 219
Agents most readily diagnosed from the history of eating a particular type of food.						
Heavy Metals (antimony, arsenic, cadmium, copper, iron, lead, mercury, tin, zinc)	5 minutes - 8 hours (usually <1 hour)	Vomiting, with nausea, cramps, and diarrhea	Usually self-limited	Not communicable	Acidic foods and beverages prepared, stored or cooked in containers coated, lined or contaminated with offending metal	<ul style="list-style-type: none"> ▪ Demonstration of high concentration of metal in epidemiologically implicated food ▪ Collect suspect food or metal container
Poisonous mushrooms (muscimol, muscarine, psilocybin, coprinus atremmentaris, ibotenic acid)	<2 hours	Vomiting, diarrhea, confusion, visual disturbances, salivation, diaphoresis, hallucinations, disulfiram-like reaction	Usually self-limited	Not communicable	Wild mushrooms	<ul style="list-style-type: none"> ▪ Clinical syndrome among persons who have eaten mushroom identified as toxic type, OR demonstration of toxin in epidemiologically implicated mushroom or food containing mushrooms ▪ Collect mushrooms or food containing mushrooms

KENTUCKY FIELD GUIDE FOR FOODBORNE AND WATERBORNE DISEASES¹

(Organized by Symptomology)

Agent ¹	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for Confirmation: Type and amount of specimens and handling requirements for shipping to DLS ⁵
Shellfish poisoning (diarrheic, neurotoxic, amnesic)	20 minutes - 2 hours	Cramps, diarrhea, headaches, vomiting, amnesia, seizures	Days	Not communicable	Mussels, oysters	<ul style="list-style-type: none"> ▪ Detection of toxin in epidemiologically implicated food OR detection of large numbers of shellfish-poisoning associated species of dinoflagellates in water from which epidemiologically implicated mollusks are gathered ▪ Collect any amount of epidemiologically implicated shellfish
Ciguatera poisoning	1-6 hours; usually within 24 hours	Diarrhea, nausea, vomiting, paresthesias, reversal of temperature sensation	Days to weeks to months	Not communicable	Large ocean fish (grouper, amberjack barracuda, snapper)	<ul style="list-style-type: none"> ▪ Demonstration of ciguatoxin in epidemiologically implicated fish, OR clinical syndrome among persons who have eaten a type of fish previously associated with ciguatera fish poisoning ▪ Collect epidemiologically implicated fish
Scombroid fish poisoning (histamine fish poisoning)	1 minute–3 hours; usually within 6 hours	Cramps, diarrhea, headache, nausea, flushing, urticaria	3-6 hours	Not communicable	Mishandled fish (mahi-mahi, tuna, mackerel, bluefish, salmon, bonito, skipjack)	<ul style="list-style-type: none"> ▪ Demonstration of histamine in epidemiologically implicated fish, OR clinical syndrome among persons who have eaten a type of fish previously associated with histamine fish poisoning (fish of order Scombroidei) ▪ Collect epidemiologically implicated fish
Paralytic shellfish poisoning	30 minutes–3 hours	Paresthesias, feeling of floating, loss of balance, dry mouth, double vision, dysarthria, shortness of breath	Days	Not communicable	Clams, mussels, cockles	<ul style="list-style-type: none"> ▪ Detection of toxin in epidemiologically implicated fish, OR detection of large numbers of shellfish-poisoning associated species of dinoflagellates in water from which epidemiologically implicated mollusks are gathered ▪ Collect epidemiologically implicated fish

Appendix C

COLLECTION AND SUBMISSION OF CLINICAL SAMPLES

- 1) Collection and Packaging of Enteric Pathogens
- 2) Collection and Packaging of Norovirus Specimens
- 3) Collection and Packaging of Intestinal Parasites
- 4) Lab Form 219
- 5) Lab Form 275

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COLLECTION AND SUBMISSION OF CLINICAL SAMPLES

1)

Collection and Packaging of Enteric Pathogens

Supplies Needed for Enteric Pathogens



Cary Blair Transport Media with Indicator
Zorb Sheet
Plastic Zippered Bag



Aluminum Can with
Biohazard label
*Ensure rubber gasket is in lid



Laboratory Form 219
or
Outreach Form



Outer Can with Lid

Collection of Specimen

DO NOT DISCARD LIQUID IN THE VIAL

1. Store Cary Blair media at room temperature.
2. Check expiration date of specimen vial.
3. Make sure two identifiers or lab label is on specimen vial.
4. Specimen should be sent to the laboratory as soon as possible. This medium is intended for use as a transport medium and should not be used as a storage or enrichment medium.

Stool Specimens

1. Collect stool specimen into clean container.
DO NOT mix urine or water with sample.
2. Open vial carefully. Using the collection spoon attached to the cap, add enough specimen until the liquid reaches the arrow on the label. Approximately one gram.
3. Replace cap tightly and agitate vial.

Swab Specimens

1. Remove cap and immerse swab into medium.
2. Break swab shaft evenly with the lip of the vial.
3. Replace cap and tightly.

Packaging and Shipping

1. Place sample vial back into zippered bag with Zorb sheet.
2. Place zippered bag inside the aluminum can and tighten lid.
3. Wrap lab form around outside of aluminum can and place inside the outer can. Address label should be on the outside of the outer can. Specimen must be mailed to KY Public Health Lab on the day of collection.



02/2011

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COLLECTION AND SUBMISSION OF CLINICAL SAMPLES

2)

Collection and Packaging of Norovirus Specimens

Supplies Needed for Norovirus



Kit Components:

- 2- Freezer Blocks
- 1- 95kPa bag
- 1- Lab Form 275
- 1- Wooden Spatula
- 1- Vial with Zorb Sheet in Ziploc Bag

Collection of Specimen

- | | |
|---|---|
| <ol style="list-style-type: none">1) Make sure two identifiers are on the specimen vial and name is correct on the lab slip.2) Fill out lab form completely.3) On lab form, write in Norovirus testing. | <ol style="list-style-type: none">1) Pass stool into a clean container or onto a clean piece of paper.2) Using the wooden spatula, add a portion of stool about the size of a large marble to the vial and close tightly.3) If sending a swab, break off into the vial and close tightly. |
|---|---|

Packaging and Shipping



Place sample vial into ziploc bag with Zorb sheet.



Place sample/samples inside 95kPa bag.



Place sample bag on top of frozen freezer blocks and replace styrofoam lid.



Place Lab Form 275 on top of closed styrofoam box



Close box and place appropriate label on top of the box

12/2007

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COLLECTION AND SUBMISSION OF CLINICAL SAMPLES

3)

Collection and Packaging of Intestinal Parasites

Supplies Needed for Intestinal Parasites

				
10% Formalin Vial with built-in collection spoon Zorb Sheet Plastic Zippered Bag	Zn-PVA Vial with built-in collection spoon Zorb Sheet Plastic Zippered Bag	Aluminum Can with Biohazard label *Ensure rubber gasket is in lid	Laboratory Form 219 or Outreach Form	Outer Can with Lid with Mailing Label attached

Collection of Specimen

DO NOT DISCARD LIQUID IN THE VIAL

- | | |
|--|--|
| <ol style="list-style-type: none">1. Store Formalin and Zn-PVA vials at room temperature.2. Check expiration date of specimen vial.3. Make sure two identifiers or lab label is on specimen vial.4. Three specimens spaced a few days apart should be sent for examination. The Formalin/Zn-PVA vial system assures the preservation of parasites if present in fecal material when there is a delay in transportation. | <ol style="list-style-type: none">1. Collect stool specimen into clean container. DO NOT mix urine or water with sample.2. Using the built-in spoon, add sufficient stool to each vial to bring the liquid up to the "Fill to Here" line. Tighten cap and shake firmly to ensure specimen is mixed.3. Wash hands thoroughly. |
|--|--|

Packaging and Shipping

1. Place sample vial back into zippered bag with Zorb sheet.
2. Place zippered bag inside the aluminum can and tighten lid.
3. Wrap lab form around outside of aluminum can and place inside the outer can. Address label should be on the outside of the outer can. Specimen should be mailed to the KY Public Health Lab in a timely manner.



2/2011

KY Division of Laboratory Services (502)564-4446

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COLLECTION AND SUBMISSION OF CLINICAL SAMPLES

4) Lab Form 219 - Front

Form 219
Revised 5/8/00

"This form, when filled in, contains patient information that must be protected in accordance with the Health Insurance Portability & Accountability Act."

Kentucky Public Health Laboratory 100 Sower Blvd., North Loading Dock P.O. Box 2020 Frankfort, Kentucky 40602-2020 Phone 502/564-4446 Fax: 502/564-7019 Please complete a separate form for each specimen. Yellow copy may be retained by the submitter.	<h2 style="margin: 0;">Special Microbiology</h2>
PATIENT INFORMATION:	
Name (Last, First, MI) _____	
Social Security # _____	Sex _____ Race _____ Age _____ DOB _____
Home Address _____	
City _____	State _____ Zip Code _____ County _____
Send Report To:	
Submitter _____	
Street Address (PO BOX) _____	
City _____	State _____ Zip Code _____
Specimen Information:	
Purpose of Exam _____	<input type="checkbox"/> Clinical Specimen
Specimen Source _____	<input type="checkbox"/> Referred Culture
Date of Collection _____	Bloody Diarrhea <input type="checkbox"/> Yes <input type="checkbox"/> No
Examination Requested: (Please mark one)	
<input type="checkbox"/> Smear Exam for GC	<input type="checkbox"/> Enteric Pathogens
<input type="checkbox"/> Direct Smear <input type="checkbox"/> Smear from Culture	<input type="checkbox"/> Miscellaneous Bacterial Culture
<input type="checkbox"/> Culture Confirmation of <i>Neisseria gonorrhoeae</i> (GC)	Organism Suspected:
<input type="checkbox"/> Intestinal Parasites	
<input type="checkbox"/> Pinworm Prep	
<input type="checkbox"/> Other _____	
Other pertinent Medical Data: *Please complete this section when submitting Miscellaneous Bacterial Cultures	
FOR LABORATORY USE ONLY:	
Date Received:	Laboratory Number:

Please Use "L" Label or Fill In Completely

APPENDIX C

4) Lab Form 219 - Back

Test	Acceptable Specimen	Preservative/ Comments:
Smear Exam for <u>Neisseria gonorrhoeae</u> (GC)	Direct urethral exudate	None
Culture confirmation of <u>Neisseria gonorrhoeae</u>	Culture on applicable culture media	CO ₂ environment
Enteric Pathogens	1. Stool 2. Rectal Swabs 3. Culture on applicable culture media	Enteric Pathogens Kit Please call Special Bacteriology at 502/ 564-4446 for instructions.
Miscellaneous Bacterial Culture	Culture on applicable culture media	Please indicate any pertinent medical data, such as: clinical diagnosis; recent surgery/transplant; animal bites; diabetes, liver disease, etc.
Intestinal Parasites	Stool	10% Formalin
Miscellaneous Parasites	Specimens, such as arthropods, insects, or adult parasites	Please call Special Bacteriology at 502/ 564-4446 for instructions.
Pinworm Prep	See special collection instructions included in state kit.	Adhesive collection paddle, provided in state kit.

COLLECTION AND SUBMISSION OF CLINICAL SAMPLES

5) Lab Form 275 - Front

"This form, when filled in, contains patient information that must be protected in accordance with the Health Insurance Portability Accountability Act."

<p>Lab 275 (Rev 8/2009) KY Division of Laboratory Services 100 Sower Blvd Suite 204 Frankfort KY 40601 (502) 564-4446 FAX (502) 564-7019 Stephanie K. Mayfield Gibson, MD FCAP</p>	<p>Tests Requested</p>	<p>CLINICAL DATA</p>																																																		
<p>Viral Isolation and Immunology</p> <p>Patient Information: (can use label here with complete info)</p> <p>Name (Last, First, MI)</p> <p>Social Security # Sex EO Age (dd-mm-yyyy)</p> <p>Home Address</p> <p>City</p> <p>State ZIP County</p> <p>Send Reports to:</p> <p>Submitter</p> <p>Street Address / P O Box</p> <p>City</p> <p>State ZIP</p> <p>Phone Fax</p> <p>Physician (if other than Submitter)</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"> <th style="text-align: left;">Viral Isolation:</th> <th style="text-align: left;">Specimen Type / Date Collected</th> </tr> <tr> <td>Influenza _____ <input type="checkbox"/></td> <td>Throat Swab _____</td> </tr> <tr> <td>Hospitalization _____ <input type="checkbox"/></td> <td>NP Swab _____</td> </tr> <tr> <td>Institutionalized _____ <input type="checkbox"/></td> <td>Nasal Swab _____</td> </tr> <tr> <td>Pregnant (____ weeks) _____</td> <td>Genital Swab _____</td> </tr> <tr> <td>Herpes _____ <input type="checkbox"/></td> <td>CSF _____</td> </tr> <tr> <td>Enterovirus _____ <input type="checkbox"/></td> <td>Other _____</td> </tr> <tr> <td>Other _____</td> <td></td> </tr> <tr style="background-color: #cccccc;"> <th style="text-align: left;">Agent Detection:</th> <th style="text-align: left;">Date Collected</th> </tr> <tr> <td>B. Pertussis _____ <input type="checkbox"/></td> <td>FA Slide _____</td> </tr> <tr> <td>Herpes virus _____ <input type="checkbox"/></td> <td>FA Slide _____</td> </tr> <tr style="background-color: #cccccc;"> <th style="text-align: left;">Serology:</th> <th style="text-align: left;">Date Collected Serum</th> </tr> <tr> <td>Toxoplasmosis _____ <input type="checkbox"/></td> <td>_____</td> </tr> <tr> <td>CMV _____ <input type="checkbox"/></td> <td>_____</td> </tr> <tr> <td>Herpes _____ <input type="checkbox"/></td> <td>_____</td> </tr> <tr> <td>Measles (Rubeola) _____ <input type="checkbox"/></td> <td>_____</td> </tr> <tr> <td>Varicella zoster _____ <input type="checkbox"/></td> <td>_____</td> </tr> <tr> <td>Mumps _____ <input type="checkbox"/></td> <td>_____</td> </tr> <tr> <td>ARBOVIRUSES: _____ <input type="checkbox"/></td> <td></td> </tr> <tr> <td> West Nile _____ <input type="checkbox"/></td> <td>Serum _____</td> </tr> <tr> <td> Other _____</td> <td>CSF _____</td> </tr> <tr style="background-color: #cccccc;"> <th style="text-align: left;">PCR</th> <th style="text-align: left;">Date Collected</th> </tr> <tr> <td>NOROVIRUS _____ <input type="checkbox"/></td> <td>Stool _____</td> </tr> <tr> <td></td> <td>Other _____</td> </tr> <tr> <td>Other, Specify: _____</td> <td>Serum _____</td> </tr> </table>	Viral Isolation:	Specimen Type / Date Collected	Influenza _____ <input type="checkbox"/>	Throat Swab _____	Hospitalization _____ <input type="checkbox"/>	NP Swab _____	Institutionalized _____ <input type="checkbox"/>	Nasal Swab _____	Pregnant (____ weeks) _____	Genital Swab _____	Herpes _____ <input type="checkbox"/>	CSF _____	Enterovirus _____ <input type="checkbox"/>	Other _____	Other _____		Agent Detection:	Date Collected	B. Pertussis _____ <input type="checkbox"/>	FA Slide _____	Herpes virus _____ <input type="checkbox"/>	FA Slide _____	Serology:	Date Collected Serum	Toxoplasmosis _____ <input type="checkbox"/>	_____	CMV _____ <input type="checkbox"/>	_____	Herpes _____ <input type="checkbox"/>	_____	Measles (Rubeola) _____ <input type="checkbox"/>	_____	Varicella zoster _____ <input type="checkbox"/>	_____	Mumps _____ <input type="checkbox"/>	_____	ARBOVIRUSES: _____ <input type="checkbox"/>		West Nile _____ <input type="checkbox"/>	Serum _____	Other _____	CSF _____	PCR	Date Collected	NOROVIRUS _____ <input type="checkbox"/>	Stool _____		Other _____	Other, Specify: _____	Serum _____	<p>Purpose of request: <input type="checkbox"/> diagnostic (give onset) <input type="checkbox"/> immune status <input type="checkbox"/> antibody status Other _____</p> <p>Date of Onset: _____</p> <p>Symptoms: YES NO</p> <p>Fever _____ <input type="checkbox"/> <input type="checkbox"/></p> <p>Neurological _____ <input type="checkbox"/> <input type="checkbox"/></p> <p>Headache _____ <input type="checkbox"/> <input type="checkbox"/></p> <p>Respiratory _____ <input type="checkbox"/> <input type="checkbox"/></p> <p>Gastrointestinal _____ <input type="checkbox"/> <input type="checkbox"/></p> <p>Fatigue _____ <input type="checkbox"/> <input type="checkbox"/></p> <p>Rash _____ <input type="checkbox"/> <input type="checkbox"/></p> <p>Lesions _____ <input type="checkbox"/> <input type="checkbox"/></p> <p>Other _____</p> <p>Immunizations / Date</p> <p>None _____ <input type="checkbox"/></p> <p>MMR _____</p> <p>Influenza _____</p> <p>Varicella _____</p> <p>Other _____</p> <p style="background-color: #cccccc;">Contacts / Recent Travel</p> <p>Tick bite _____</p> <p>Mosquito bite _____</p> <p>Community _____</p> <p>Other _____</p> <p>Travel _____</p>
Viral Isolation:	Specimen Type / Date Collected																																																			
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APPENDIX C

5) Lab Form 275 - Back

Specimen Submission: Select appropriate specimens for the clinical symptoms present, collect at proper intervals during illness, and handle as indicated below.

Specimen Required (without preservatives)	Preparation	Shipping
Serum, 3 ml or Whole Blood, 6 ml	For antibody and/or immune status: submit a single serum For diagnostic determination: * by IgM tests - a single serum (a 2 nd serum may be requested later) by IgG tests -paired sera: <u>acute</u> phase collect within 7 days of onset of illness. <u>convalescent</u> phase collect 10 to 21 days later.	Ambient or refrigerated temperature
FA Slides for antigen detection	Slides/shippers provided by State Lab.	
Throat Washings	Use 5 - 10 ml sterile Hank's Balanced Salt Solution or sterile saline. 3 or 4 washings from the patient may be pooled in a sterile screw-cap jar. Seal tightly.	
Throat Swabs, Rectal Swabs, Vaginal / cervical Swabs	A swab collection outfit is provided by the State Lab but any <u>Viral</u> transport medium is acceptable.	
Spinal Fluid	Submit in a sterile screw-cap tube and seal tightly.	
Feces	Place in a sterile container and seal tightly.	Specimens arriving within 24 hours of collection may be shipped refrigerated. If there will be longer storage or shipping times freezing is best. **
Vesicle Fluid, or Pustule Crusts,	Collect fluids on swabs and place in 1 ml of liquid (sterile Hank's or saline) in screw-cap container and seal tightly.	
Autopsy Tissues	Place each tissue in a separate sterile screw-cap container and seal tightly. Label each organ.	
Urine, fresh 10 ml	Place in a sterile screw-cap container and seal tightly.	
		Must be transported to the laboratory within 4 hours.

* A significant rise in antibody ratios or titers may determine a recent infection. It is important that there is enough time between acute and convalescent sera to allow for antibody rise. A history of transfusion within 6 weeks of serum collection will invalidate serologic test results.

** When it is necessary to ship clinical samples frozen, use enough dry ice to last the trip. Seal the sample container with waterproof tape to protect the specimen from the CO₂. Wrap in absorbent material to minimize breakage and to contain any spills.

If the agent suspected is Respiratory Syncytial Virus (RSV) or Cytomegalovirus (CMV) the specimen should be refrigerated but do not freeze. It should arrive at the laboratory within 4 hours of collection.

A completed submission form #275 must be enclosed for each patient !
Dates of specimen collection, and when appropriate, date of onset of illness are required!

Appendix D

COLLECTION AND SUBMISSION OF FOOD SAMPLES

- 1) Collection and Submission of Food Sample for Bacteriological Examination
- 2) Lab Form 504

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COLLECTION AND SUBMISSION OF FOOD SAMPLES

1)

Collection and Submission of Food Sample for Bacteriological Examination

Supplies Needed for Food Sample Collection



1— Food Collection Kit



1—Submission Form
LAB 504



1—State Seal

Collection



1

1. Select food to be sampled.
2. Obtain a minimum of 100 grams (3.5 oz) using the aseptic scoops, knife or tongue depressors provided in the food collection kit or, intact unopened containers.



2

3. If the sample is not in the original container, transfer to a sterile four ounce sampling bottle, whirl-pak bag or sample bag.
4. Identify sample source on sample form (LAB 504).
5. Seal with official seal. Pack in leak proof container, when in doubt refrigerate sample during transport. Use freezer packs or dry ice. Frozen samples should be kept frozen.



3

6. Fill out the submission form for each sample (LAB 504). Authorized Collector and Sanitarian ID, Date and Time of Collection, Owner/Occupant, County, and Submitter ID must be on the submission form.



4

7. Place sample and completed food sample form in styrofoam mailable cooler or other type of mailable package.



5



6

8. Remove backing from mailing label and affix to cooler or package.



7

9. The laboratory will accept and test authorized food samples only. Contact the Food Safety Branch at (502) 564-7181 and the Division of Epidemiology, Infectious Disease Branch, Reportable Disease Section at (502) 564-3261 for authorization of all food samples before shipping.

10. Ship or transport food samples overnight/next day. Recommend sample collection on Monday, Tuesday, or Wednesday only and mail the same day.

If you have any questions about collection or submission of food samples, contact the Division of Laboratory Services at (502) 564-4446.

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COLLECTION AND SUBMISSION OF FOOD SAMPLES

2) Lab Form 504

Lab form 504 (Rev. 5-00)

Sample Collection Data and Analysis Report

Kentucky Cabinet for Health Services, Department for Public Health
 Division of Laboratory Services
 100 Sower Blvd., North Loading Dock, P.O. Box 2020
 Frankfort, Kentucky 40602-2020
 Phone: 502/564-4446 Fax: 502/564-7019

Please complete a separate form for each sample submitted. Back copy may be retained by the submitter.

Sample No.: _____ Date Collected: _____ Cost of Sample: _____

Collector/ Health Dept.: _____ (Name and Title) Sample Procured From: _____ (Signature)

Reason for Collection: _____ Establishment Number: _____

Amount in Lot before Sampling: _____

Description of Sample (Code No. if any), & Method of Collection: _____

Mail Report To: _____ Address: _____ Zip: _____

Manufacturer/ Health Dept.: _____ Address: _____ Zip: _____

Other (Name): _____ Address: _____ Zip: _____

Remarks: _____

Requested Laboratory Analysis: Bacteriological Chemical Other

<input type="checkbox"/> Standard Plate Count	<input type="checkbox"/> Listeria monocytogenes	<input type="checkbox"/> Pesticide Residue	<input type="checkbox"/> Rodent Contamination
<input type="checkbox"/> Coliform Count	<input type="checkbox"/> Staphylococcus	<input type="checkbox"/> Thiamine	<input type="checkbox"/> Insect Contamination
<input type="checkbox"/> Sterility	<input type="checkbox"/> Salmonella	<input type="checkbox"/> Iron	<input type="checkbox"/> Preservatives (List)
<input type="checkbox"/> E. coli	<input type="checkbox"/> Mold & Yeast	<input type="checkbox"/> Excessive Water	<input type="checkbox"/> Other (Describe)
<input type="checkbox"/> E. coli 0157: H7	<input type="checkbox"/> Antibiotics	<input type="checkbox"/> Food Additives (List)	

Laboratory Receiving Record (This block to be completed upon receipt in the laboratory)

Lab Received: _____ From: _____
Date Initials Lab Number Signature of Submitter

State Seal Attached? Yes No Sample Received: Refrigerated Frozen Other

Report of Laboratory Analysis:

Comments:

Date Started	Date Completed	Date Reported	Signature of Analyst: _____ Laboratory Services
--------------	----------------	---------------	---

No Further Regulatory Action is indicated on this sample

Analysis indicates sample is in violation of the following law and/or regulations based thereon. (Check appropriate one):

KRS 217.801 Lead Based Paint Law; KRS 217.005 to 217.215 KY Food, Drug, & Cosmetic Act; 217.650 to 217.710 KY Hazardous Substances Labeling Act; KRS 217C KY Milk and Milk Products Act; KRS 152.105 to 152.190 Regulates Use and Control of Radiation.

Sample Considered: Adulterated Misbranded Other

Further Regulatory Action: Resample Reinspect Official Action Other

Signature	Title	Agency	Date
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Appendix E

COLLECTION AND SUBMISSION OF WATER SAMPLES

- 1) Important Information to Review Prior to the Collection of Water Samples**
- 2) Collection and Submission of Water Samples for Bacteriological Examination**
- 3) Lab Form 507**

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COLLECTION AND SUBMISSION OF WATER SAMPLES

1) Important information to review prior to the collection of water samples

Water collection procedures and water submission times vary per suspected pathogen and technique used by the Kentucky Department for Public Health (KDPH), Division of Laboratory Services (DLS). For this reason, **the DLS must be consulted before any water samples are collected or submitted** in a waterborne illness outbreak.

DLS Phone Number: 502-564-4446

When investigating a waterborne illness outbreak, the collection and submission guide for bacteriological examination is a general guide for testing recreational water or private water supplies, which includes wells or cisterns. The DLS will test the water samples for coliforms. These are indicator organisms only, which suggest the water is contaminated with fecal material.

When a specific pathogenic bacteria or parasite is suspected as the cause of a waterborne outbreak, approval should be obtained from the Environmental Management Branch at (502) 564-4856 and the Division of Epidemiology and Health Planning, Infectious Disease Branch, Reportable Disease Section at (502) 564-3261 before collection of any water samples. Once approval is given, contact the DLS at (502) 564-4446 for guidelines on the collection and submission of water samples based on the suspected pathogen.

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COLLECTION AND SUBMISSION OF WATER SAMPLES

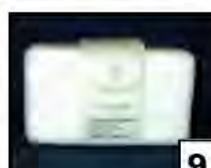
2)

Collection and Submission of Water Sample for Bacteriological Examination

Supplies Needed for Water Sample Collection

			
1—Sterile, clear plastic sample bottle containing Sodium Thiosulfate Tablet or Powder	1—Zip seal bag	1— Styrofoam mailer 1— Mailing label/seal	1—Submission Form

Collection

	<ol style="list-style-type: none"> 1. Select a tap or hose bib which has been in use and does not leak. Do not sample from a drinking fountain or gate valve. Remove all attachments from sample tap prior to sampling. 	
	<ol style="list-style-type: none"> 2. Flush tap for 2-5 minutes before collecting sample. Do not flush tap if source of contamination is suspected to be within the lines of the sampling site. 	
	<ol style="list-style-type: none"> 3. Identify sample source on sample form (LAB 507). 	
	<ol style="list-style-type: none"> 4. Fill the sample bottle to the 100 mL line and close the bottle securely. 	
	<ol style="list-style-type: none"> 5. Check the bottle for leaks by shaking and inverting several times. 	
	<ol style="list-style-type: none"> 6. Insert water bottle in the zip seal bag provided with the water sample kit and seal. 	
	<ol style="list-style-type: none"> 7. Fill out the submission form for each sample (LAB 507). Authorized Collector and Sanitarian ID, Date and Time of Collection, Owner/Occupant, County, and Submitter ID must be on the submission form. 	
	<ol style="list-style-type: none"> 8. Place bag and completed water sample form in the Styrofoam mailer. 	
	<ol style="list-style-type: none"> 9. Remove backing from mailing label and seal Styrofoam mailer along the short axis. 	
	<ol style="list-style-type: none"> 10. Swimming pools and Beaches require 1 (one) 100 mL sample. Testing that will include Pseudomonas, such as for Public spa, whirlpool, hot tub or other therapeutic pool requires 2 (two) 100 mL samples. These can be sent along with the complete form in an appropriate size box to lessen the cost of postage. 	
	<ol style="list-style-type: none"> 11. Samples must arrive in the laboratory within 30 hours of collection. Samples requiring chain of custody precautions are to be iced and taken to the nearest certified laboratory within 6 hours of collection. Recommend sample collection on Monday, Tuesday, or Wednesday only and mail the same day. 	

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COLLECTION AND SUBMISSION OF WATER SAMPLES

3) Lab Form 507

LAB 507
REV. 7-98

Kentucky Public Health Laboratory
100 Sower Blvd., North Loading Dock,
PO Box 2020

Frankfort, Kentucky 40602-2020

Phone: 502/ 564-4446 Fax: 502/ 564-7019

(Please complete a separate form for each sample. Yellow copy may be retained by the submitter.)

Water Bacteriology Analysis Report

Authorized Collector: _____ San.No: _____ Collection Date: _____ Collection Time: _____ Occupant or Owner: _____ Request Identifying No: _____ Site No.: _____ Sample No.: _____ Sample Seq. No: _____ County: _____ Submitter (Use LHN Site#): _____			
Please Indicate if Sample is Other Than a Drinking Water Sample: Dairy Water <input type="checkbox"/> Swimming Pool or Beach <input type="checkbox"/> Other _____			
Check if sample from a Semi-Public <input type="checkbox"/> or Public <input type="checkbox"/> drinking water source Chlorine Residual: Total _____ ppm/Free _____ ppm. pH of Sample _____ Temp: _____ <i>(Semi-Public and Public water samples must be accompanied by a completed Natural Resources Form #DEP4008)</i> <input type="checkbox"/> Check here if accompanied by Chain-of-custody form			
Collector's Remarks: _____ _____ _____			
Laboratory Findings: 			
Date & Time Received	Laboratory Number	Date & Time Reported	Technologist

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Appendix F

CHAIN OF CUSTODY

- 1) **Division of Laboratory Services Chain of Custody Form**

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CHAIN OF CUSTODY

1)

**DIVISION OF LABORATORY SERVICES
CHAIN OF CUSTODY / PROPERTY FORM**

LAB USE ONLY

LAB NUMBER: _____
EOC NUMBER: _____

NAME OF PERSON FROM WHOM RECEIVED:	
LOCATION WHERE SAMPLE WAS OBTAINED:	ADDRESS:
TIME OBTAINED:	REASON OBTAINED:
DATE OBTAINED:	
BT SAMPLES ONLY:	
SAMPLE SCANNED FOR: RADIOLOGICAL () CHEMICAL () (please attach a copy of results)	

ITEM NUMBER	QUANTITY	DESCRIPTION OF ARTICLES

CHAIN OF CUSTODY

ITEM NO.	DATE/ TIME	RELEASED BY	RECEIVED BY	PURPOSE OF CHANGE
		Signature	Signature	
		Print Name	Print Name	
		Signature	Signature	
		Print Name	Print Name	
		Signature	Signature	
		Print Name	Print Name	
		Signature	Signature	
		Print Name	Print Name	

Revised 5/07

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Appendix G

RECORD OF COMPLAINT AND INVESTIGATION

**1) Record of Complaint and Investigation Form
(DFS – 216)**

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RECORD OF COMPLAINT AND INVESTIGATION

1) Form DFS-216

DFS-216(4-95)

CABINET FOR HUMAN RESOURCES
KENTUCKY DEPARTMENT FOR HEALTH SERVICES
 Frankfort, KY 40621-0001
RECORD OF COMPLAINT AND INVESTIGATION

Est./Permit No.	Health Authority	Sanitarian Code	Action Code	County
FORM OF COMPLAINT	<input type="checkbox"/> Telephone <input type="checkbox"/> Letter <input type="checkbox"/> Visit			DATE OF COMPLAINT (Month/Day/Year)
SOURCE OF COMPLAINT	<input type="checkbox"/> Consumer <input type="checkbox"/> Other Governmental Agency <input type="checkbox"/> Trade/Industry			
COMPLAINT IDENTIFICATION	Name and Address (Include ZIP Code)			Telephone Number: () ()
COMPLAINT OR INJURY	Description of Complaint/Injury			
PRODUCT AND LABELING	Product Name		Name and Location of Store Where Purchased	
	Date Purchased		Amount Remaining	
MANUFACTURER/DISTRIBUTOR OF PRODUCT	Package Code		Product Used (If Yes, Enter Date) No <input type="checkbox"/> Yes <input type="checkbox"/>	
	Name and Address (Include ZIP Code)			
INJURY OR ILLNESS RESULTED NO _____ YES _____ [If YES, complete items (a) through (c)]	a. Type Symptoms - List by number first to last ___ Nausea ___ Prostration ___ Vomiting ___ Paralysis ___ Diarrhea ___ Other, ___ Fever (___ °F) (explain)		b. Attending Physician ___ No ___ Yes (If yes, give name/address/phone #)	
		c. Hospitalization Required ___ No ___ Yes (If yes, give name/address/phone #)		

How long after consuming the product did these symptoms occur? _____ minutes/hours
 List in detail all other products (food, drink, medicine) consumed during the 36 hour period before onset of illness:

Was medical aid obtained concerning this illness? ___ Yes ___ No; Date and time medical aid was obtained: _____
 What was the attending physician's diagnosis? _____

Other agency responsible: ___ Yes ___ No; Referred to other agency ___ Yes ___ No
 Name and Address of Agency _____

Complaint investigation and action taken: _____

Investigator (Name and Title) _____ Date _____

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Appendix H

SAMPLE QUESTIONNAIRE

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APPENDIX H

SECTION 2: General Exposures

9. Family, friends, or co-workers with similar illness: Yes No Don't know

Describe: _____

10. Usual sources of drinking water: Tap water Bottled water Water from refrigerator

11. Usual sources of ice: Tap water Bottled water Store-bought Ice from refrigerator

12. Type of water supply: Public Private Don't know

13. Type of sewage: Public Private Don't know

14. Recent (one month prior to onset) problems with water supply or sewage system:

Yes No Don't know

15. Recent (one month prior to onset) recreational water activities (swimming, water-skiing, boating, Water Park):

Yes What/Where: _____ No Don't know

16. Animal exposure in month preceding illness:

Puppies/Kittens: Yes Type: _____ No Don't know

Swine/Sheep: Yes Type: _____ No Don't know

Poultry/Cattle: Yes Type: _____ No Don't know

Rodents/Birds: Yes Type: _____ No Don't know

Reptiles: Yes Type: _____ No Don't know

Other: Yes Type: _____ No Don't know

17. Any Pets Ill? Yes No Don't know

18. Farm/petting zoo in month preceding illness: Yes No Don't know

Where: _____ When: ___/___/___ Type of animal(s) _____

19. Travel in month preceding illness: Yes No Don't know

Travel in the U.S: Where: _____ When: ___/___/___

Travel outside of the U.S: Where: _____ When: ___/___/___

Mode of Travel: Airplane Bus Car Cruise Ship Train Other

Identifier, such as flight no. airline, etc. _____

20. Social events in seven days preceding illness (parties, weddings, etc):

Yes No Don't know When: ___/___/___

What: _____ Where: _____

Others ill? _____

SAMPLE QUESTIONNAIRE

SECTION 3: Food and Beverage History (Refer to the five days preceding illness onset)

21. Grocery store(s) where food was purchased: _____

22. Restaurants/take out: Yes No Don't know

Where: _____ When: ___ / ___ / ___ Foods Eaten: _____

Where: _____ When: ___ / ___ / ___ Foods Eaten: _____

Where: _____ When: ___ / ___ / ___ Foods Eaten: _____

Where: _____ When: ___ / ___ / ___ Foods Eaten: _____

23. Food and beverage history by day and meal: Limited Food History Recall

	Breakfast	Lunch	Dinner	Other
Day of Onset				
One Day Before Onset				
Two Days Before Onset				
Three Days Before Onset				
Four Days Before Onset				
Five Days Before Onset				

APPENDIX H

24. Specific food and beverage items consumed:

Y	?	N	Meat, Poultry, Fish, Egg, and Dairy	Y	?	N	Fresh Produce
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Eggs: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tomatoes: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unpasteurized milk: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Carrots: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pasteurized milk: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lettuce in a salad: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ice cream/frozen yogurt: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lettuce on a sandwich: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Soy milk: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Spinach: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cottage cheese: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Any sprouts: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ricotta: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Any basil, parsley, cilantro: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cheese slices: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Broccoli: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Any cheese spread: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Any beans or lentils: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Feta: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mushrooms: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mexican-style (queso fresco, queso blanco)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Potatoes: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Any fancy imported cheese: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cantaloupe: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ground beef: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Honeydew: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other ground meat: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Watermelon: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Chicken: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Raspberries: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pork/ham: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strawberries: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Deli meats: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bananas: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hot dogs/sausage: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Apples: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Seafood: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Grapes: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fish: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Any organic produce: _____
Y	?	N	Pre-made/Processed Foods	Y	?	N	Other
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Store-bought potato/egg/pasta salad: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Nuts (walnut, almonds, peanuts, etc): _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hummus: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dried fruit: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tofu: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Orange Juice: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cereal: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Apple cider: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Baby food: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Peanut butter: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Frozen dinners: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yogurt: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pre-made dinners requiring reheat: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tahini, sesame: _____

Counseling (initial once completed):

- _____ Mode of transmission/prevention/control
- _____ Proper hand washing and personal hygiene
- _____ Avoid sharing personal hygiene products
- _____ Washing all fruits and vegetables; proper food storage and thorough cooking of meats
- _____ Avoiding cross contamination (surfaces, cutting boards, utensils, stored food in refrigerator)
- _____ Avoid direct contact with reptiles (lizards, snakes, iguanas, turtles)
- _____ Risks associated with unpasteurized milk/juice
- _____ Avoid preparation of food for others

Environmentalist Notified: Yes No If so, whom? Name: _____

Interviewer Name and Agency: _____

Send completed questionnaire to the Reportable Disease Section, secure fax: 502-696-3803

Appendix I

NATIONAL OUTBREAK REPORTING SYSTEM (NORS) FORMS

- 1) Foodborne Outbreak Form (CDC 52.13)
- 2) Waterborne Outbreak Form (CDC 52.12)

For additional information contact the KDPH Division of
Epidemiology and Health Planning,
Reportable Disease Section, (502) 564-3261

or

the CDC NORS website

<http://www.cdc.gov/outbreaknet/nors/>

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1) Foodborne Outbreak Form (CDC 52.13)



General

National Outbreak Reporting System

Foodborne Disease Transmission, Person-to-Person Disease Transmission, Animal Contact

This form is used to report enteric foodborne, person-to-person, and animal contact-related disease outbreak investigations. This form has 5 sections: General, Laboratory, Person-to-Person, Animal Contact, and Food, as indicated by tabs at the top of each page. Complete the General and Laboratory tabs for all modes of transmission and complete additional sections as indicated by the mode of transmission. Please complete as much of all sections as possible.



CDC USE ONLY

CDC Report ID	State Report ID
---------------	-----------------

Form Approved
OMB No. 0920-0001

General Section

Primary Mode of Transmission (check one)

Food (Complete General, Lab, and Food tabs)

Water (Complete CDC 52.12)

Animal contact (Complete General, Lab, and Animal Contact tabs)

Person-to-person (Complete General, Lab, and Person-to-Person tabs)

Environmental contamination other than food/water (Complete General and Lab tabs)

Indeterminate/Other/Unknown (Complete General and Lab tabs)

Investigation Methods (check all that apply)

Interviews only of ill persons

Case-control study

Cohort study

Food preparation review

Water system assessment: Drinking water

Water system assessment: Nonpotable water

Treated or untreated recreational water venue assessment

Investigation at factory/production/treatment plant

Investigation at original source (e.g., farm, water source, etc.)

Food product or bottled water traceback

Environment/food/water sample testing

Other

Comments

Dates (mm/dd/yyyy)

Date first case became ill (required) ____/____/____	Date last case became ill ____/____/____
Date of initial exposure ____/____/____	Date of last exposure ____/____/____
Date of report to CDC (other than this form) ____/____/____	
Date of notification to State/Territory or Local/Tribal Health Authorities ____/____/____	

Geographic Location

Reporting state: _____

Exposure occurred in multiple states

Exposure occurred in a single state, but cases resided in multiple states

Other states: _____

Reporting county: _____

Exposure occurred in multiple counties in reporting state

Exposure occurred in a single county, but cases resided in multiple counties in reporting state

Other counties: _____

City/Town/Place of exposure: _____

Do not include proprietary or private facility names

Primary Cases

Number of Primary Cases		Sex (estimated percent of the primary cases)		
# Lab-confirmed cases	(A)	Male	%	
# Probable cases	(B)	Female	%	
# Estimated total primary ill				
	# Cases	Total # of cases for whom info is available	Approximate percent of primary cases in each age group	
# Died			<1 year	%
# Hospitalized			1-4 years	%
# Visited Emergency Room			5-9 years	%
# Visited health care provider (excluding ER visits)			10-19 years	%
			20-49 years	%
			50-74 years	%
			≥ 75 years	%
			Unknown	%

CDC 52.13 Rev. 03/2008
Revised Outbreak Reporting System
(2011662) 1

APPENDIX I

General					
Incubation Period, Duration of Illness, Signs or Symptoms for Primary Cases only					
Incubation Period <i>(circle appropriate units)</i>			Duration of Illness <i>(among recovered cases-circle appropriate units)</i>		
Shortest		Min, Hours, Days	Shortest		Min, Hours, Days
Median		Min, Hours, Days	Median		Min, Hours, Days
Longest		Min, Hours, Days	Longest		Min, Hours, Days
Total # of cases for whom info is available			Total # of cases for whom info is available		
<input type="checkbox"/> Unknown incubation period			<input type="checkbox"/> Unknown duration of illness		
Signs or Symptoms <i>(*refer to terms from appendix, if appropriate, to describe other common characteristics of cases)</i>					
Feature	# Cases with signs or symptoms		Total # cases for whom info available		
Vomiting					
Diarrhea					
Bloody stools					
Fever					
Abdominal cramps					
HUS					
Asymptomatic					
*					
*					
*					
Secondary Cases					
Mode of Secondary Transmission <i>(check all that apply)</i>			Number of Secondary Cases		
<input type="checkbox"/> Food <input type="checkbox"/> Water <input type="checkbox"/> Animal contact <input type="checkbox"/> Person-to-person <input type="checkbox"/> Environmental contamination other than food/water <input type="checkbox"/> Indeterminate/Other/Unknown			# Lab-confirmed secondary cases		(A)
			# Probable secondary cases		(B)
			Total # of secondary cases		
			Total # of cases (Primary + Secondary)		
Environmental Health Specialists Network <i>(if applicable)</i>					
EHS-Net Evaluation ID: 1.) _____ 2.) _____ 3.) _____					
Traceback <i>(for food and bottled water only, not public water)</i>					
<input type="checkbox"/> Please check if traceback conducted					
Source name <i>(if publicly available)</i>	Source type <i>(e.g. poultry farm, tomato processing plant, bottled water factory)</i>	Location of source		Comments	
		State	Country		
Recall					
<input type="checkbox"/> Please check if any food or bottled water product was recalled					
Type of item recalled:					
Comments:					
Reporting Agency					
Agency name: _____			E-mail: _____		
Contact name: _____			Contact title: _____		
Phone no.: _____			Fax no.: _____		
Remarks <i>Briefly describe important aspects of the outbreak not covered above. Please indicate if any adverse outcomes occurred in special populations (e.g., pregnant women, immunocompromised persons)</i>					

Laboratory	Person-to-Person	Animal Contact				
Laboratory Section						
Etiology known? <input type="checkbox"/> Yes <input type="checkbox"/> No						
If etiology is <i>unknown</i> , were patient specimens collected? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown						
If yes, how many specimens collected? (provide numeric value) _____						
What were they tested for? (check all that apply) <input type="checkbox"/> Bacteria <input type="checkbox"/> Chemicals/Toxins <input type="checkbox"/> Viruses <input type="checkbox"/> Parasites						
Etiology <small>(Name the bacterium, chemical/toxin, virus, or parasite. If available, include the serotype and other characteristics such as phage type, virulence factors, and metabolic profile. Confirmation criteria available at http://www.cdc.gov/foodborneoutbreaksguide_fd.htm or MMWR2000/Vol. #9/SS-1/App. B)</small>						
Genus	Species	Serotype	Confirmed outbreak etiology	Other Characteristics	Detected in*	# Lab-confirmed cases
			<input type="checkbox"/> yes			
			<input type="checkbox"/> yes			
			<input type="checkbox"/> yes			
			<input type="checkbox"/> yes			
*Detected in (choose all that apply): 1 - patient specimen 2 - food specimen 3 - environment specimen 4 - food worker specimen						
Isolates <small>(For bacterial pathogens, provide a representative for each distinct pattern; provide lab ID for all specimens submitted for viral sequencing)</small>						
State Lab ID	PulseNet Outbreak Code	CDC PulseNet Pattern Designation for Enzyme 1	CDC PulseNet Pattern Designation for Enzyme 2	Other Molecular Designation	Other Molecular Designation	
Person to Person						
Major setting of exposure (choose one)						
<input type="checkbox"/> Camp		<input type="checkbox"/> Hotel		<input type="checkbox"/> Private setting (residential home)		<input type="checkbox"/> School
<input type="checkbox"/> Child day care		<input type="checkbox"/> Nursing home		<input type="checkbox"/> Religious facility		<input type="checkbox"/> Ship
<input type="checkbox"/> Community-wide		<input type="checkbox"/> Prison or detention facility		<input type="checkbox"/> Restaurant		<input type="checkbox"/> Workplace
<input type="checkbox"/> Hospital		<input type="checkbox"/> Other, please specify: _____				
Attack rates for major settings of exposure						
Group (based on setting)			Estimated exposed in major setting*	Estimated ill in major setting	Crude attack rate [(estimated ill / estimated exposed) x 100]	
residents, guests, passengers, patients, etc.						
staff, crew, etc.						
*e.g., number of persons on ship, number of residents in nursing home or affected ward						
Other settings of exposure (choose all that apply)						
<input type="checkbox"/> Camp		<input type="checkbox"/> Hotel		<input type="checkbox"/> Private setting (residential home)		<input type="checkbox"/> School
<input type="checkbox"/> Child day care		<input type="checkbox"/> Nursing home		<input type="checkbox"/> Religious facility		<input type="checkbox"/> Ship
<input type="checkbox"/> Community-wide		<input type="checkbox"/> Prison or detention facility		<input type="checkbox"/> Restaurant		<input type="checkbox"/> Workplace
<input type="checkbox"/> Hospital		<input type="checkbox"/> Other, please specify: _____				
Animals and their environment						
Selling of exposure	Type of animal	Remarks				

APPENDIX I

Food			
Food-specific data			
<input type="checkbox"/> Food vehicle undetermined		Total # of cases exposed to implicated food _____	
Food	1	2	3
Name of food <i>(excluding any preparation)</i>			
Ingredient(s) <i>(enter all that apply)</i>			
Contaminated ingredients <i>(enter all that apply)</i>			
Reason(s) suspected <i>(enter all that apply from list in appendix)</i>			
Method of processing <i>(enter all that apply from list in appendix)</i>			
Method of preparation <i>(select one from list in appendix)</i>			
Level of preparation <i>(select one from list in appendix)</i>			
Contaminated food imported to US?	<input type="checkbox"/> Yes, Country _____ <input type="checkbox"/> Yes, Unknown <input type="checkbox"/> No	<input type="checkbox"/> Yes, Country _____ <input type="checkbox"/> Yes, Unknown <input type="checkbox"/> No	<input type="checkbox"/> Yes, Country _____ <input type="checkbox"/> Yes, Unknown <input type="checkbox"/> No
Was product <i>both</i> produced under domestic regulatory oversight <i>and</i> sold?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Location where food was prepared <i>(Check all that apply)</i>		Location of exposure (where food was eaten) <i>(Check all that apply)</i>	
<input type="checkbox"/> Restaurant – ‘Fast-food’ <i>(drive up service or pay at counter)</i>	<input type="checkbox"/> Nursing home, assisted living facility, home care	<input type="checkbox"/> Restaurant – ‘Fast-food’ <i>(drive up service or pay at counter)</i>	<input type="checkbox"/> Nursing home, assisted living facility, home care
<input type="checkbox"/> Restaurant – Sit-down dining	<input type="checkbox"/> Hospital	<input type="checkbox"/> Restaurant – Sit-down dining	<input type="checkbox"/> Hospital
<input type="checkbox"/> Restaurant – Other or unknown type	<input type="checkbox"/> Child day care center	<input type="checkbox"/> Restaurant – Other or unknown type	<input type="checkbox"/> Child day care center
<input type="checkbox"/> Private home	<input type="checkbox"/> School	<input type="checkbox"/> Private home	<input type="checkbox"/> School
<input type="checkbox"/> Banquet Facility <i>(food prepared and served on-site)</i>	<input type="checkbox"/> Prison, jail	<input type="checkbox"/> Banquet Facility <i>(food prepared and served on-site)</i>	<input type="checkbox"/> Prison, jail
<input type="checkbox"/> Caterer <i>(food prepared off-site from where served)</i>	<input type="checkbox"/> Church, temple, religious location	<input type="checkbox"/> Caterer <i>(food prepared off-site from where served)</i>	<input type="checkbox"/> Church, temple, religious location
<input type="checkbox"/> Fair, festival, other temporary or mobile services	<input type="checkbox"/> Camp	<input type="checkbox"/> Fair, festival, other temporary or mobile services	<input type="checkbox"/> Camp
<input type="checkbox"/> Grocery store	<input type="checkbox"/> Picnic	<input type="checkbox"/> Grocery store	<input type="checkbox"/> Picnic
<input type="checkbox"/> Workplace, not cafeteria	<input type="checkbox"/> Other <i>(describe in Prepared/Remarks)</i>	<input type="checkbox"/> Workplace, not cafeteria	<input type="checkbox"/> Other <i>(describe in Eaten/Remarks)</i>
<input type="checkbox"/> Workplace cafeteria	<input type="checkbox"/> Unknown	<input type="checkbox"/> Workplace cafeteria	<input type="checkbox"/> Unknown
Remarks:		Remarks:	

Food	
Contributing Factors <i>(Check all that contributed to this outbreak)</i>	
<input type="checkbox"/> Contributing factors unknown	
Contamination Factor	
<input type="checkbox"/> C1 <input type="checkbox"/> C2 <input type="checkbox"/> C3 <input type="checkbox"/> C4 <input type="checkbox"/> C5 <input type="checkbox"/> C6 <input type="checkbox"/> C7 <input type="checkbox"/> C8 <input type="checkbox"/> C9 <input type="checkbox"/> C10 <input type="checkbox"/> C11 <input type="checkbox"/> C12 <input type="checkbox"/> C13 <input type="checkbox"/> C14 <input type="checkbox"/> C15 <input type="checkbox"/> C-N/A	
Proliferation/Amplification Factor <i>(bacterial outbreaks only)</i>	
<input type="checkbox"/> P1 <input type="checkbox"/> P2 <input type="checkbox"/> P3 <input type="checkbox"/> P4 <input type="checkbox"/> P5 <input type="checkbox"/> P6 <input type="checkbox"/> P7 <input type="checkbox"/> P8 <input type="checkbox"/> P9 <input type="checkbox"/> P10 <input type="checkbox"/> P11 <input type="checkbox"/> P12 <input type="checkbox"/> P-N/A	
Survival Factor	
<input type="checkbox"/> S1 <input type="checkbox"/> S2 <input type="checkbox"/> S3 <input type="checkbox"/> S4 <input type="checkbox"/> S5 <input type="checkbox"/> S-N/A	
The confirmed or suspected point of contamination <i>(Check one)</i>	
<input type="checkbox"/> Before preparation <input type="checkbox"/> Preparation	
If 'before preparation': <input type="checkbox"/> Pre-Harvest <input type="checkbox"/> Processing <input type="checkbox"/> Unknown	
Reason suspected <i>(Check all that apply)</i>	
<input type="checkbox"/> Environmental evidence	<input type="checkbox"/> Laboratory evidence
<input type="checkbox"/> Epidemiologic evidence	<input type="checkbox"/> Prior experience makes this a likely source
Was food-worker implicated as the source of contamination? <input type="checkbox"/> Yes <input type="checkbox"/> No	
If yes, please check only one of the following	
<input type="checkbox"/> Laboratory and epidemiologic evidence	
<input type="checkbox"/> Epidemiologic evidence	
<input type="checkbox"/> Laboratory evidence	
<input type="checkbox"/> Prior experience makes this a likely source	
School Questions	
<i>(Complete this section only if school is checked in either sections "Location where food was prepared" or "Location of exposure (where food eaten)"</i>	
1. Did the outbreak involve a single or multiple schools?	
<input type="checkbox"/> Single	
<input type="checkbox"/> Multiple (If yes, number of schools: _____)	
2. School characteristics <i>(for all involved students in all involved schools)</i>	
a. Total approximate enrollment (number of students)	
<input type="checkbox"/> Unknown or undetermined	
b. Grade level(s)	
<input type="checkbox"/> Preschool	
<input type="checkbox"/> Grade school <i>(grades K-12)</i>	
Please check all grades affected: <input type="checkbox"/> K <input type="checkbox"/> 1st <input type="checkbox"/> 2nd <input type="checkbox"/> 3rd <input type="checkbox"/> 4th <input type="checkbox"/> 5th <input type="checkbox"/> 6th <input type="checkbox"/> 7th <input type="checkbox"/> 8th <input type="checkbox"/> 9th <input type="checkbox"/> 10th <input type="checkbox"/> 11th <input type="checkbox"/> 12th	
<input type="checkbox"/> College/university/technical school	
<input type="checkbox"/> Unknown or Undetermined	
c. Primary funding of involved schools	
<input type="checkbox"/> Public	
<input type="checkbox"/> Private	
<input type="checkbox"/> Unknown	
3. Describe the preparation of the implicated item: <i>(check all that apply)</i>	4. How many times has the state, county or local health department inspected this school cafeteria or kitchen in the 12 months before the outbreak?*
<input type="checkbox"/> Heat and serve <i>(item mostly prepared or cooked off site, reheated on-site)</i>	<input type="checkbox"/> Once
<input type="checkbox"/> Served a-la-carte	<input type="checkbox"/> Twice
<input type="checkbox"/> Serve only <i>(preheated or served cold)</i>	<input type="checkbox"/> More than two times
<input type="checkbox"/> Cooked on-site using primary ingredients	<input type="checkbox"/> Not inspected
<input type="checkbox"/> Provided by a food service management company	<input type="checkbox"/> Unknown or Undetermined
<input type="checkbox"/> Provided by a fast-food vendor	
<input type="checkbox"/> Provided by a pre-plate company	
<input type="checkbox"/> Part of a club or fundraising event	
<input type="checkbox"/> Made in the classroom	
<input type="checkbox"/> Brought by a student/teacher/parent	
<input type="checkbox"/> Other <i>(describe in General/Remarks)</i>	
<input type="checkbox"/> Unknown or Undetermined	
	5. Does the school have a HACCP plan in place for the school feeding program?*
	<input type="checkbox"/> Yes
	<input type="checkbox"/> No
	<input type="checkbox"/> Unknown or Undetermined
	<small>*If multiple schools are involved, please answer according to the most affected school</small>

APPENDIX I

Food

6. Was implicated food item provided to the school through the National School Lunch/Breakfast Program?

- Yes
- No
- Unknown or Undetermined

If yes, was the implicated food item donated/purchased by:

- USDA through the Commodity Distribution Program
- The state/school authority
- Other (describe in General/Remarks)
- Unknown or Undetermined

Ground Beef

1. What percentage of ill persons (for whom information is available) ate ground beef raw or undercooked? _____ %
2. Was ground beef case-ready? Yes No Unknown
(Case-ready ground beef is meat that comes from a manufacturer packaged for sale that is not altered or repackaged by the retailer)
3. Was the beef ground or reground by the retailer?
 Yes No Unknown
If yes, was anything added to the beef during grinding (such as shop trim or any product to alter the fat content)? _____

Additional Salmonella Questions

(Complete this section for Salmonella outbreaks)

1. Phage type(s) of patient isolates:

- _____ if RDNC* then include # _____

* Reacts, Does Not Conform

Eggs

1. Were eggs (check all that apply)

- in shell, unpasteurized?
- in shell, pasteurized?
- packaged liquid or dry?
- stored with inadequate refrigeration during or after sale?
- consumed raw?
- consumed undercooked?
- pooled?

2. Was Salmonella enteritidis found on the farm? Yes No Unknown

Comment (e.g., eggs and patients isolates matched by phage type): _____

Please: reporting burden of this collection of information is estimated to average 20 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC, Project Clearance Officer, 1600 Clifton Road, MS D-31, Atlanta, GA, 30333, ATTN: PPA (0270-0004) or DO NOT MAIL, CASE REPORTS, TO THIS ADDRESS.

2) Waterborne Outbreak Form (CDC 52.12)

General		National Outbreak Reporting System				
		Waterborne Disease Transmission				
<small>This form is used to report waterborne disease outbreak investigations. This form has 6 parts, indicated by tabs at the top of each page. Part 1 asks for the minimum or basic information about the outbreak investigation. Part 2 asks for epidemiological data and clinical specimen test results. Parts 3, 4, 5 and 6 collect information about types of water exposure (treated recreational water, untreated recreational water, drinking water, and water not intended for drinking/unknown intent). Only 1 of these 4 water exposure parts should be completed for an outbreak investigation report.</small>						
<small>CDC USE ONLY</small>						
CDC Report ID		State Report ID		<small>Form Approved OMB No. 0829-0004</small>		
General Section						
Primary Mode of Transmission (check one)						
<input type="checkbox"/> Food (Complete CDC 52.13)		<input type="checkbox"/> Person-to-person (Complete CDC 52.13)				
<input type="checkbox"/> Water (Complete tabs for General, Water-General and type of water exposure)		<input type="checkbox"/> Environmental contamination other than food/water (Complete CDC 52.13)				
<input type="checkbox"/> Animal contact (Complete CDC 52.13)		<input type="checkbox"/> Indeterminate/Other/Unknown (Complete CDC 52.13)				
Investigation Methods (check all that apply)						
<input type="checkbox"/> Interviews only of ill persons		<input type="checkbox"/> Treated or untreated recreational water venue assessment				
<input type="checkbox"/> Case-control study		<input type="checkbox"/> Investigation at factory/production/treatment plant				
<input type="checkbox"/> Cohort study		<input type="checkbox"/> Investigation at original source (e.g., farm, water source, etc.)				
<input type="checkbox"/> Food preparation review		<input type="checkbox"/> Food product or bottled water traceback				
<input type="checkbox"/> Water system assessment: Drinking water		<input type="checkbox"/> Environment/food/water sample testing				
<input type="checkbox"/> Water system assessment: Nonpotable water		<input type="checkbox"/> Other				
Comments						

Dates (mm/dd/yyyy)						
Date first case became ill (required) _____			Date last case became ill _____			
Date of initial exposure _____			Date of last exposure _____			
Date of report to CDC (other than this form) _____						
Date of notification to State/Territory or Local/Tribal Health Authorities _____						
Geographic Location						
Reporting state: _____						
<input type="checkbox"/> Exposure occurred in multiple states						
<input type="checkbox"/> Exposure occurred in a single state but cases resided in multiple states						
Other states: _____						
Reporting county: _____						
<input type="checkbox"/> Exposure occurred in multiple counties in reporting state						
<input type="checkbox"/> Exposure occurred in a single county but cases resided in multiple counties in reporting state						
Other counties: _____						
City/Town/Place of exposure: _____						
<small>Do not include proprietary or private facility names</small>						
Primary Cases						
Number of Primary Cases		Sex (estimated percent of the primary cases)				
# Lab-confirmed cases		Male		%		
# Probable cases		Female		%		
# Estimated total primary cases						
	# Cases	Total # of cases for whom info is available	Approximate percent of primary cases in each age group			
# Died			<1 year	%	20-49 years	%
# Hospitalized			1-4 years	%	50-74 years	%
# Visited Emergency Room			5-9 years	%	≥ 75 years	%
# Visited health care provider (excluding ER visits)			10-19 years	%	Unknown	%

APPENDIX I

Water-General					
Clinical Specimens - Laboratory Results (refer to the laboratory findings from the outbreak investigation)					
1. Were clinical diagnostic specimens taken from persons? <input type="checkbox"/> Yes <input type="checkbox"/> No (go to next tab) <input type="checkbox"/> Unknown (go to next tab) If Yes, from how many persons were specimens taken? _____					
Specimen Type*	Specimen Subtype**	Tested for § (list all that apply)			
<small>* Specimen Type: 1-Autopsy Specimen (specify subtype), 2-Biopsy (specify), 3-Blood, 4-Bronchial Alveolar Lavage (BAL), 5-Cerebrospinal Fluid (CSF), 6-Conjunctiva/Eye Swab, 7-Ear Swab, 8-Endotracheal Aspirate, 9-Saliva, 10-Serum, 11-Skin Swab, 12-Sputum, 13-Stool, 14-Urine, 15-Vomit, 16-Wound Swab, 17-Unknown</small>					
<small>** Specimen Subtype: 1-Bladder, 2-Brain, 3-Dura, 4-Hair, 5-Intestine, 6-Kidney, 7-Liver, 8-Lung, 9-Nails, 10-Skin, 11-Stomach, 12-Wound, 13-Other, 14-Unknown</small>					
<small>§ Tested for: 1-Bacteria, 2-Chemicals/Toxins, 3-Fungi, 4-Parasites, 5-Viruses</small>					
Report the confirmed and/or suspected etiological agent(s) in the table below.					
Clinical Specimen Row Number	Genus/ Chemical/ Toxin	Species	Serotype/ Serogroup/ Serovar	Genotype/ Subtype	
1					
2					
3					
4					
Clinical Specimen Row Number	Confirmed as Etiology?	Concentration (numerical value)	Unit	Specimen Type *	Specimen Subtype **
1	<input type="checkbox"/> Yes				
2	<input type="checkbox"/> Yes				
3	<input type="checkbox"/> Yes				
4	<input type="checkbox"/> Yes				
Clinical Specimen Row Number	Test Type §	Total # People Tested		Total # People Positive	
1					
2					
3					
4					
<small>* Specimen Type: 1-Autopsy Specimen (specify subtype), 2-Biopsy (specify), 3-Blood, 4-Bronchial Alveolar Lavage (BAL), 5-Cerebrospinal Fluid (CSF), 6-Conjunctiva/Eye Swab, 7-Ear Swab, 8-Endotracheal Aspirate, 9-Saliva, 10-Serum, 11-Skin Swab, 12-Sputum, 13-Stool, 14-Urine, 15-Vomit, 16-Wound Swab, 17-Unknown</small>					
<small>** Specimen Subtype: 1-Bladder, 2-Brain, 3-Dura, 4-Hair, 5-Intestine, 6-Kidney, 7-Liver, 8-Lung, 9-Nails, 10-Skin, 11-Stomach, 12-Wound, 13-Other, 14-Unknown</small>					
<small>§ Test Type: 1-Culture, 2-DNA or RNA Amplification/Detection (e.g., PCR, RT-PCR), 3-Microscopy (e.g., fluorescent, EM), 4-Serological/Immunological Test (e.g., EIA, ELISA), 5-Phage Typing, 6-Chemical Testing, 7-Tissue Culture Infectivity Assay</small>					
Isolates					
State Lab Isolate ID	Specimen Profile 1 (e.g., the PFGE, MLVA, or genotype sequence)		Specimen Profile 2 (e.g., the PFGE, MLVA, or genotyping method used)		

Rec Water-Treated						
Recreational Water – Treated Venue						
Recreational Water Vehicle Description						
Water Vehicle Number	Water Type <i>(e.g., spa/whirlpool/hot tub; pool- swimming pool; pool- waterpark)</i>	Water Subtype <i>(select indoor, outdoor, or unknown)</i>	Setting of Exposure <i>(e.g., club, requiring membership; hotel/motel/lodge/inn; waterpark)</i>			
1						
2						
3						
Water Vehicle Number <i>(reference the appropriate Water Vehicle Number)</i>	USUAL Water Treatment Provided at Venue <i>(e.g., no treatment; coagulation; disinfection; flocculation; filtration (pool); unknown)</i>	Venue Treatment Subtype <i>(disinfection or pool filtration: e.g., UV; chlorine dioxide; bag filter; cartridge filter; unknown)</i>	Chlorination Subtype <i>(chlorine disinfection only- e.g., gaseous; sodium hypochlorite; cyanurates /stabilized chlorine)</i>			
Water Vehicle Number <i>(reference the appropriate Water Vehicle Number)</i>	Fill Water Type <i>(e.g., public water supply; sea water; untreated ground or surface water; unknown)</i>	IF PUBLIC WATER WAS USED TO FILL, USUAL Water Treatment Provided for Fill Water Before Coming to the Venue <i>(e.g., no treatment; disinfection; filtration (treatment plant); unknown)</i>	IF PUBLIC WATER WAS USED TO FILL, Fill Water Treatment Subtype <i>(disinfection or filtration: e.g., UV; chlorine dioxide; bag filter; cartridge filter; unknown)</i>			
Recreational Water Quality						
Did the venue meet state or local recreational water quality regulations? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable						
If No, explain: _____						
Was there a pool operator on the payroll with state-approved training or certification? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown						
Laboratory Section - Recreational Water Samples from Treated Venues						
Was water from treated recreational water venues tested? <input type="checkbox"/> Yes <i>(specify in table below)</i> <input type="checkbox"/> No <input type="checkbox"/> Unknown						
Results	Sample	1	2	3	4	5
Source of Sample <i>(e.g., swimming pool, hot tub)</i>						
Additional Description <i>(e.g., time of day, backwash sample, etc.)</i>						
Date <i>(mm/dd/yyyy)</i>						
Volume Tested	Number					
	Unit					
Temperature	Number					
	Unit					
Residual/Free Disinfectant Level <i>(if total and combined disinfectant levels given, total + combined = free)</i>	Number					
	Unit					
Combined Disinfectant Level <i>(if total and free disinfectant levels given, total - free = combined)</i>	Number					
	Unit					
pH						

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Rec Water-Treated							
Microbiology or Chemical/Toxin Analysis (refer to the laboratory findings from the outbreak investigation)							
Sample Number	Genus/ Chemical/ Toxin	Species	Serotype/ Serogroup/ Serovar	Genotype/ Subtype	PFGE Pattern		
Sample Number	Test Results Positive?	Concentration (numerical value)	Unit	Test Type*	Test Method (reference: National Environmental Methods Index: http://www.nemi.gov)		
	<input type="checkbox"/> Yes						
	<input type="checkbox"/> Yes						
	<input type="checkbox"/> Yes						
* Test Type: 1-Culture, 2-DNA or RNA Amplification/Detection (e.g., PCR, RT-PCR), 3-Microscopy (e.g., fluorescent, EM), 4-Serological/Immunological Test (e.g., EIA, ELISA), 5-Phage Typing, 6-Chemical Testing, 7-Tissue Culture Infectivity Assay							
Factors Contributing to Recreational Water Contamination and/or Increased Exposure in Treated Venues							
Factors (check all that apply)**				Documented/ Observed***	Suspected***		
PEOPLE	Exceeded maximum bather load				<input type="checkbox"/>	<input type="checkbox"/>	
	Primary intended use of water is by diaper/toddler-aged children (e.g., kiddie pool)				<input type="checkbox"/>	<input type="checkbox"/>	
	Heavy use by child care center groups				<input type="checkbox"/>	<input type="checkbox"/>	
	Facal/vomitus accident				<input type="checkbox"/>	<input type="checkbox"/>	
FACILITY DESIGN	Patrons continued to swim when ill with diarrhea				<input type="checkbox"/>	<input type="checkbox"/>	
	Operator error				<input type="checkbox"/>	<input type="checkbox"/>	
	Intentional contamination (explain in remarks)				<input type="checkbox"/>	<input type="checkbox"/>	
	Combined pool filtration/recirculation systems led to cross-contamination				<input type="checkbox"/>	<input type="checkbox"/>	
	Hygiene facilities (e.g., toilets, diaper changing facilities) inadequate or distant				<input type="checkbox"/>	<input type="checkbox"/>	
	Some spray feature water bypasses filtration/treatment system and returns to feature unfiltered/untreated				<input type="checkbox"/>	<input type="checkbox"/>	
	No supplemental disinfection installed that would have inactivated pathogen (e.g., <i>Cryptosporidium</i>)				<input type="checkbox"/>	<input type="checkbox"/>	
	Water temperature $\geq 30^{\circ}\text{C}$ ($\geq 86^{\circ}\text{F}$)				<input type="checkbox"/>	<input type="checkbox"/>	
	Cross-connection with wastewater or non-potable water				<input type="checkbox"/>	<input type="checkbox"/>	
	Disinfectant control system malfunctioning, inadequate, or lacking (e.g., hand feed chemicals)				<input type="checkbox"/>	<input type="checkbox"/>	
MAINTENANCE	Incorrect settings on disinfectant control system				<input type="checkbox"/>	<input type="checkbox"/>	
	pH control system malfunctioning, inadequate, or lacking (e.g., hand feed chemicals)				<input type="checkbox"/>	<input type="checkbox"/>	
	Incorrect settings on pH control system				<input type="checkbox"/>	<input type="checkbox"/>	
	Filtration system malfunctioning or inadequate (e.g., low flow rate)				<input type="checkbox"/>	<input type="checkbox"/>	
	Supplemental disinfection system malfunctioning or inadequate (e.g., ultraviolet light, ozone)				<input type="checkbox"/>	<input type="checkbox"/>	
	Insufficient system checks so breakdown detection delayed				<input type="checkbox"/>	<input type="checkbox"/>	
	No preventive equipment maintenance programs to reduce breakdowns				<input type="checkbox"/>	<input type="checkbox"/>	
	Ventilation insufficient for indoor aquatic facilities				<input type="checkbox"/>	<input type="checkbox"/>	
	Chemical handling error (e.g., chemical hookup, improper mixing or application)				<input type="checkbox"/>	<input type="checkbox"/>	
	Maintenance chemicals not flushed from system before opening to swimmers				<input type="checkbox"/>	<input type="checkbox"/>	
	Recirculation pump off or restarted with swimmers in water				<input type="checkbox"/>	<input type="checkbox"/>	
	Low or zero water flow combined with continuous feed of chemicals resulted in excess chemicals in water				<input type="checkbox"/>	<input type="checkbox"/>	
	Extensive slime/biofilm formation				<input type="checkbox"/>	<input type="checkbox"/>	
	Recent construction				<input type="checkbox"/>	<input type="checkbox"/>	
	Cyanurate level excessive				<input type="checkbox"/>	<input type="checkbox"/>	
	Lack of draining/cleaning				<input type="checkbox"/>	<input type="checkbox"/>	
	POLICY AND MANAGEMENT	Stagnant water in spa piping was aerosolized				<input type="checkbox"/>	<input type="checkbox"/>
		No aquatic operators on payroll who have completed state/local training				<input type="checkbox"/>	<input type="checkbox"/>
Untrained/inadequately trained staff on duty				<input type="checkbox"/>	<input type="checkbox"/>		
Remote monitoring system replaces on-site water quality testing				<input type="checkbox"/>	<input type="checkbox"/>		
Unclear communication chain for reporting problems				<input type="checkbox"/>	<input type="checkbox"/>		
Inadequate water quality monitoring (e.g., inadequate test kit, inadequate testing frequency)				<input type="checkbox"/>	<input type="checkbox"/>		
Employee illness policies absent or not enforced				<input type="checkbox"/>	<input type="checkbox"/>		
No or inadequate policies on good chemical handling and storage practices				<input type="checkbox"/>	<input type="checkbox"/>		
No operator on duty at the time of incident				<input type="checkbox"/>	<input type="checkbox"/>		
Facility falls outside aquatic health code				<input type="checkbox"/>	<input type="checkbox"/>		
No shock/hyperchlorination policy				<input type="checkbox"/>	<input type="checkbox"/>		
Other, specify:				<input type="checkbox"/>	<input type="checkbox"/>		
Unknown				<input type="checkbox"/>	<input type="checkbox"/>		
** Only check off what was found during investigation.							
***The release of sewage does not have to occur at the property/venue/setting where the people were exposed. The sewage may have occurred at a distant site but still affected the property/venue/setting in question.							
Remarks							

Rec Water-Untreated					
Recreational Water – Untreated Venue					
Recreational Water Vehicle Description					
Water Type <i>(e.g., canal; lake; river/stream; ocean)</i>	IF SPRING OR HOT SPRING, Water Subtype <i>(select indoor, outdoor or unknown)</i>	Setting of Exposure <i>(e.g., beach-public; camp/cabin/recreational area)</i>			
Recreational Water Quality					
Did the venue meet state or local recreational water quality regulations? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable					
If No, explain: _____					
Did the venue meet Environmental Protection Agency (EPA) recreational water quality standards?					
<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable					
If No, explain: _____					
Laboratory Section - Recreational Water Samples from Untreated Venues					
Was water from untreated recreational water venues tested? <input type="checkbox"/> Yes <i>(specify in table below)</i> <input type="checkbox"/> No <input type="checkbox"/> Unknown					
Results	1	2	3	4	5
Sample <i>(e.g., lake or stream)</i>					
Source of Sample <i>(e.g., lake or stream)</i>					
Additional Description <i>(e.g., specific location, time of day, etc.)</i>					
Date <i>(mm/dd/yyyy)</i>					
Volume Tested	Number				
	Unit				
Temperature	Number				
	Unit				
Water Quality Indicator					
Sample Number	Type <i>(e.g., fecal coliforms)</i>	Concentration <i>(numerical value)</i>		Unit	
Microbiology or Chemical/Toxin Analysis <i>(refer to the laboratory findings from the outbreak investigation)</i>					
Sample Number	Genus/ Chemical/ Toxin	Species	Serotype/ Serogroup/ Serovar	Genotype/ Subtype	PFGE Pattern
Sample Number	Test Results Positive?	Concentration <i>(numerical value)</i>	Unit	Test Type*	Test Method <i>(reference: National Environmental Methods Index: http://www.nemi.gov)</i>
	<input type="checkbox"/> Yes				
	<input type="checkbox"/> Yes				
	<input type="checkbox"/> Yes				
	<input type="checkbox"/> Yes				

* Test Type: 1-Culture, 2-DNA or RNA Amplification/Detection (e.g., PCR, RT-PCR), 3-Microscopy (e.g., fluorescent, EM), 4-Serological/immunological Test (e.g., EIA, ELISA), 5-Phage Typing, 6-Chemical Testing, 7-Tissue Culture Infectivity Assay

APPENDIX I

Rec Water-Untreated			
Factors Contributing to Recreational Water Contamination and/or Increased Exposure in Untreated Venues			
Factors (check all that apply)*	Documented/ Observed**	Suspected**	
PEOPLE	Exceeded maximum bather load	<input type="checkbox"/>	<input type="checkbox"/>
	Primary intended use of water is by diaper/toddler aged children (e.g., kiddie pool)	<input type="checkbox"/>	<input type="checkbox"/>
	Heavy use by child care center groups	<input type="checkbox"/>	<input type="checkbox"/>
	Fecal/vomitus accident	<input type="checkbox"/>	<input type="checkbox"/>
	Patrons continued to swim when ill with diarrhea	<input type="checkbox"/>	<input type="checkbox"/>
SWIM AREA DESIGN	Staff error	<input type="checkbox"/>	<input type="checkbox"/>
	Intentional contamination (explain in remarks)	<input type="checkbox"/>	<input type="checkbox"/>
	Hygiene facilities (e.g., toilets, diaper changing facilities) inadequate or distant	<input type="checkbox"/>	<input type="checkbox"/>
	Malfunctioning or inadequate on-site wastewater treatment system *** ≠	<input type="checkbox"/>	<input type="checkbox"/>
	Poor siting/design of on-site wastewater treatment system *** ≠	<input type="checkbox"/>	<input type="checkbox"/>
	Stagnant or poorly circulating water in swim area	<input type="checkbox"/>	<input type="checkbox"/>
	Heavy rainfall and runoff	<input type="checkbox"/>	<input type="checkbox"/>
	Sanitary sewer overflow (SSO) impact ***	<input type="checkbox"/>	<input type="checkbox"/>
	Combined sewer overflow (CSO) impact ***	<input type="checkbox"/>	<input type="checkbox"/>
	Domestic animal contamination (e.g., livestock, pets)	<input type="checkbox"/>	<input type="checkbox"/>
WATER QUALITY	Wildlife contamination - Birds	<input type="checkbox"/>	<input type="checkbox"/>
	Wildlife contamination - Mammals	<input type="checkbox"/>	<input type="checkbox"/>
	Wildlife contamination - Fish kill	<input type="checkbox"/>	<input type="checkbox"/>
	Wastewater treatment plant effluent flows past swim area	<input type="checkbox"/>	<input type="checkbox"/>
	Wastewater treatment plant malfunction ***	<input type="checkbox"/>	<input type="checkbox"/>
	Sewer line break ***	<input type="checkbox"/>	<input type="checkbox"/>
	Nearby biosolid/land application site (e.g., human or animal waste application)	<input type="checkbox"/>	<input type="checkbox"/>
	Contamination from agricultural chemical application (e.g., fertilizer, pesticides)	<input type="checkbox"/>	<input type="checkbox"/>
	Contamination from chemical pollution not related to agricultural application	<input type="checkbox"/>	<input type="checkbox"/>
	Water temperature ≥30°C (≥86°F)	<input type="checkbox"/>	<input type="checkbox"/>
	Seasonal variation in water quality (e.g., lake/reservoir turnover events)	<input type="checkbox"/>	<input type="checkbox"/>
	Inappropriate dumping of sewage into water body (e.g., from boat, RV)	<input type="checkbox"/>	<input type="checkbox"/>
POLICY AND MANAGEMENT	Algal bloom	<input type="checkbox"/>	<input type="checkbox"/>
	Dumping of ballast water	<input type="checkbox"/>	<input type="checkbox"/>
	Tidal wash (i.e., tide exchange or influence by inland water)	<input type="checkbox"/>	<input type="checkbox"/>
	No or inadequate monitoring of water quality	<input type="checkbox"/>	<input type="checkbox"/>
	No managers have completed state/local required training	<input type="checkbox"/>	<input type="checkbox"/>
	Untrained/inadequately trained staff on duty	<input type="checkbox"/>	<input type="checkbox"/>
	Unclear communication chain for reporting problems	<input type="checkbox"/>	<input type="checkbox"/>
	Employee illness policies absent or not enforced	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify:	<input type="checkbox"/>	<input type="checkbox"/>	
Unknown	<input type="checkbox"/>	<input type="checkbox"/>	

* Only check off what was found during investigation.

** "Documented/Observed" refers to information gathered through document reviews, direct observations, and/or interviews. "Suspected" refers to factors that probably occurred but for which no documentation (as defined previously) is available.

*** The release of sewage does not have to occur at the property/venue/setting where the people were exposed. The sewage may have occurred at a distant site but still affected the property/venue/setting in question.

≠ "On-site wastewater treatment system" refers to a system designed to treat and dispose of wastewater at the point of generation, generally on the property where the wastewater is generated (e.g., septic systems or other advanced on-site systems). However, contamination that originates from these systems can still occur off the property where treatment and disposal takes place due to migration of contaminants from malfunctioning systems or poor siting and design.

Remarks

Drinking Water						
Drinking Water Vehicle Description						
Water Type* <small>(e.g., commercially-bottled water, community water system, individual water system)</small>	Public Water System EPA ID Number**	Water Source <small>(select ground water, surface water or unknown)</small>	Water Source Description <small>(e.g., spring; well; lake)</small>	Setting of Exposure <small>(e.g., airport, mobile home park)</small>	USUAL Water Treatment Provided <small>(e.g., no treatment, disinfection, home filtration)</small>	Water Treatment Subtype <small>(disinfection or filtration: e.g., boiling; chlorine; rapid sand filter; reverse osmosis)</small>

*Water system definitions: Community and noncommunity water systems are public water systems that have ≥ 15 service connections or serve an average of ≥ 25 residents for ≥ 60 days/year. A community water system serves year-round residents of a community, subdivision, or mobile home park. A noncommunity water system serves an institution, industry, camp, park, hotel, or business and can be nontransient or transient. Nontransient systems serve ≥ 25 of the same persons for > 6 months of the year but not year-round (e.g., factories and schools), whereas transient systems provide water to places in which persons do not remain for long periods (e.g., restaurants, highway rest stations, and parks). Individual water systems are small systems not owned or operated by a water utility that have < 15 connections or serve < 25 persons.

** Number used for EPA reporting that uniquely identifies the water system within a specific state. The water system ID number can be found at <http://www.epa.gov/satewater/dwinfo/index.html> by first selecting a state and then selecting a county.

Drinking Water Quality
<p>Did the drinking water system have any monitoring violations in the 1 month prior to the outbreak?</p> <p style="text-align: right; margin-left: 400px;"><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable</p> <p>If Yes, explain: _____</p> <p>Did the drinking water system have any maximum contaminant level (MCL) violations in the 1 month prior to the outbreak?</p> <p style="text-align: right; margin-left: 400px;"><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable</p> <p>If Yes, explain: _____</p> <p>Did the drinking water system have any violations in the 12 months prior to the outbreak?***</p> <p style="text-align: right; margin-left: 400px;"><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/> Not applicable</p> <p>If Yes, explain: _____</p> <p style="font-size: x-small; margin-top: 5px;">***Sources of information about past violations can be obtained from utility records, consumer confidence reports (water quality reports), or violation records from state or local health departments</p>

Laboratory Section - Drinking Water					
Was drinking water tested?	<input type="checkbox"/> Yes (specify in table below) <input type="checkbox"/> No <input type="checkbox"/> Unknown				
Results					
Sample	1 2 3 4 5				
Source of Sample					
Additional Description <small>(e.g., kitchen faucet, well, reservoir)</small>					
Date <small>(mm/dd/yyyy)</small>					
Volume Tested	<table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <th style="width: 10%; background-color: #003366; color: white;">Number</th> <td> </td> </tr> <tr> <th style="background-color: #003366; color: white;">Unit</th> <td> </td> </tr> </table>	Number		Unit	
Number					
Unit					
Temperature	<table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <th style="width: 10%; background-color: #003366; color: white;">Number</th> <td> </td> </tr> <tr> <th style="background-color: #003366; color: white;">Unit</th> <td> </td> </tr> </table>	Number		Unit	
Number					
Unit					
Residual/Free Disinfectant Level <small>(if total and combined disinfectant levels given, total - combined = free)</small>	<table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <th style="width: 10%; background-color: #003366; color: white;">Number</th> <td> </td> </tr> <tr> <th style="background-color: #003366; color: white;">Unit</th> <td> </td> </tr> </table>	Number		Unit	
Number					
Unit					
pH					
Turbidity (NTU)					

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Drinking Water					
Water Quality Indicator					
Sample Number	Type (e.g., fecal coliforms)	Concentration (numerical value)		Unit	
Microbiology or Chemical/Toxin Analysis (refer to the laboratory findings from the outbreak investigation)					
Sample Number	Genus/ Chemical/ Toxin	Species	Serotype/ Serogroup/ Serovar	Genotype/ Subtype	PFGE Pattern
Sample Number	Test Results Positive?	Concentration (numerical value)	Unit	Test Type*	Test Method (reference: National Environmental Methods Index: http://www.nemi.gov)
	<input type="checkbox"/> Yes				
	<input type="checkbox"/> Yes				
	<input type="checkbox"/> Yes				
* Test Type: 1-Culture, 2-DNA or RNA Amplification/Detection (e.g., PCR, RT-PCR), 3-Microscopy (e.g., fluorescent, EM), 4-Serological/Immunological Test (e.g., EIA, ELISA), 5-Phage Typing, 6-Chemical Testing, 7-Tissue Culture Infectivity Assay					
Factors Contributing to Drinking Water Contamination and/or Increased Exposure to Contaminated Drinking Water					
Did a problem with the source water (i.e., ground water or surface water) contribute to the disease or outbreak? <input type="checkbox"/> Yes (specify in table below) <input type="checkbox"/> No <input type="checkbox"/> Unknown					
Source Water Factors (check all that apply)**			Documented/ Observed***	Suspected***	
Sanitary sewer overflow (SSO) ****	<input type="checkbox"/>	<input type="checkbox"/>			
Combined sewer overflow (CSO) ****	<input type="checkbox"/>	<input type="checkbox"/>			
Malfunctioning on-site wastewater treatment system **** ≠	<input type="checkbox"/>	<input type="checkbox"/>			
Sewage treatment plant malfunction ***	<input type="checkbox"/>	<input type="checkbox"/>			
Sewer line break ***	<input type="checkbox"/>	<input type="checkbox"/>			
Poor siting/design of on-site wastewater treatment system **** ≠	<input type="checkbox"/>	<input type="checkbox"/>			
Nearby biosolid/land application site (e.g., human or animal waste application)	<input type="checkbox"/>	<input type="checkbox"/>			
Contamination from agricultural chemical application (e.g., fertilizer, pesticides)	<input type="checkbox"/>	<input type="checkbox"/>			
Contamination from chemical pollution not related to agricultural application	<input type="checkbox"/>	<input type="checkbox"/>			
Contamination by a chemical that the current treatment methods were not designed to remove	<input type="checkbox"/>	<input type="checkbox"/>			
Domestic animal contamination (e.g., livestock, concentrated feeding operations, pets)	<input type="checkbox"/>	<input type="checkbox"/>			
Wildlife contamination - Birds	<input type="checkbox"/>	<input type="checkbox"/>			
Wildlife contamination - Mammals	<input type="checkbox"/>	<input type="checkbox"/>			
Wildlife contamination - Fish kill	<input type="checkbox"/>	<input type="checkbox"/>			
Flooding/heavy rains	<input type="checkbox"/>	<input type="checkbox"/>			
Algal bloom	<input type="checkbox"/>	<input type="checkbox"/>			
Seasonal variation in water quality (e.g., lake/reservoir turnover events, resort community with seasonal loading)	<input type="checkbox"/>	<input type="checkbox"/>			
Low water table (e.g., drought, over-pumping)	<input type="checkbox"/>	<input type="checkbox"/>			
Ground water under direct influence of surface water (e.g., shallow well)≠ ≠	<input type="checkbox"/>	<input type="checkbox"/>			
Contamination through limestone or fissured rock (e.g., karst)	<input type="checkbox"/>	<input type="checkbox"/>			
Contaminated recharge water	<input type="checkbox"/>	<input type="checkbox"/>			
Use of an alternate source of water by a water utility	<input type="checkbox"/>	<input type="checkbox"/>			
Mixing of raw water from different sources	<input type="checkbox"/>	<input type="checkbox"/>			
Improper construction or location of a well or spring	<input type="checkbox"/>	<input type="checkbox"/>			
Water system intake failure (e.g., cracked well casing, cracked intake pipe)	<input type="checkbox"/>	<input type="checkbox"/>			
Intentional contamination (explain in remarks)	<input type="checkbox"/>	<input type="checkbox"/>			
Other, specify:	<input type="checkbox"/>	<input type="checkbox"/>			
Unknown	<input type="checkbox"/>	<input type="checkbox"/>			
** Only check off what was found during investigation.					
*** "Documented/Observed" refers to information gathered through document reviews, direct observations, and/or interviews. "Suspected" refers to factors that probably occurred but for which no documentation (as defined previously) is available.					
**** The release of sewage does not have to occur on the property in which persons have become ill. The sewage release may have occurred at a distant site but still affected the property in question.					
≠ "On-site wastewater treatment system" refers to a system designed to treat and dispose of wastewater at the point of generation, generally on the property where the wastewater is generated (e.g., septic systems or other advanced on-site systems). However, contamination that originates from these systems can still occur off the property where treatment and disposal takes place due to migration of contaminants from malfunctioning systems or poor siting and design.					
≠ ≠ Any water beneath the surface of the ground with substantial occurrence of insects or other macroorganisms, algae, or large-diameter pathogens (e.g., <i>Giardia intestinalis</i> or <i>Cryptosporidium</i>), or substantial and relatively rapid shifts in water characteristics (e.g., turbidity, temperature, conductivity, or pH) that closely correlate with climatic or surface water conditions. Direct influence must be determined for individual sources in accordance with criteria established by the state.					

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Drinking Water		
Factors Contributing to Drinking Water Contamination and/or Increased Exposure to Contaminated Drinking Water		
Did a problem with the water treatment prior to entry into a house or building contribute to the disease or outbreak? <input type="checkbox"/> Yes (specify in table below) <input type="checkbox"/> No <input type="checkbox"/> Unknown		
Treatment Factors (check all that apply)*	Documented/ Observed**	Suspected**
Change in treatment process (explain in remarks)	<input type="checkbox"/>	<input type="checkbox"/>
No disinfection	<input type="checkbox"/>	<input type="checkbox"/>
Temporary interruption of disinfection	<input type="checkbox"/>	<input type="checkbox"/>
Chronically inadequate disinfection	<input type="checkbox"/>	<input type="checkbox"/>
No filtration	<input type="checkbox"/>	<input type="checkbox"/>
Inadequate filtration	<input type="checkbox"/>	<input type="checkbox"/>
Deficiencies in other treatment processes	<input type="checkbox"/>	<input type="checkbox"/>
Corrosion in or leaching from pipes or storage tanks	<input type="checkbox"/>	<input type="checkbox"/>
Pipe/component failure or break (e.g., pipes, tanks, valves)	<input type="checkbox"/>	<input type="checkbox"/>
Contamination during construction or repair of pipes/components	<input type="checkbox"/>	<input type="checkbox"/>
Construction or repair of pipes/components without evidence of contamination	<input type="checkbox"/>	<input type="checkbox"/>
Operator error	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify:	<input type="checkbox"/>	<input type="checkbox"/>
Unknown	<input type="checkbox"/>	<input type="checkbox"/>
Did a problem with the distribution system contribute to the disease or outbreak? <input type="checkbox"/> Yes (specify in table below) <input type="checkbox"/> No <input type="checkbox"/> Unknown (NOTE: For a community water system, the distribution system refers to the pipes and storage infrastructure under the jurisdiction of the water utility prior to the water meter (or property line if the system is not metered). For noncommunity and nonpublic water systems, the distribution system refers to the pipes and storage infrastructure prior to entry into a building or house)		
Distribution and Storage Factors (check all that apply)*	Documented/ Observed**	Suspected**
Cross-connection of potable and nonpotable water pipes resulting in backflow	<input type="checkbox"/>	<input type="checkbox"/>
Low pressure or change in water pressure in the distribution system	<input type="checkbox"/>	<input type="checkbox"/>
Change in water flow direction in the distribution system	<input type="checkbox"/>	<input type="checkbox"/>
Mixing of treated water from different sources	<input type="checkbox"/>	<input type="checkbox"/>
Pipe/component failure or break (e.g., pipes, tanks, valves)	<input type="checkbox"/>	<input type="checkbox"/>
Corrosion in or leaching from pipes or storage tanks	<input type="checkbox"/>	<input type="checkbox"/>
Contamination of mains during construction or repair	<input type="checkbox"/>	<input type="checkbox"/>
Construction or repair of mains without evidence of contamination	<input type="checkbox"/>	<input type="checkbox"/>
Scheduled flushing of the distribution system	<input type="checkbox"/>	<input type="checkbox"/>
Contamination of storage facility	<input type="checkbox"/>	<input type="checkbox"/>
Aging water distribution components (e.g., pipes, tanks, valves)	<input type="checkbox"/>	<input type="checkbox"/>
Water temperature $\geq 30^{\circ}\text{C}$ ($\geq 86^{\circ}\text{F}$)	<input type="checkbox"/>	<input type="checkbox"/>
Intentional contamination (explain in remarks)	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify:	<input type="checkbox"/>	<input type="checkbox"/>
Unknown	<input type="checkbox"/>	<input type="checkbox"/>
Did a problem occur after the water meter or outside the jurisdiction of a water utility that contributed to the disease or outbreak? (e.g., in a service line leading to a house/building, in the plumbing inside a house/building, during shipping/hauling, during storage other than in the distribution system, at the point of use, involving commercially-bottled water) <input type="checkbox"/> Yes (specify in table below) <input type="checkbox"/> No <input type="checkbox"/> Unknown		
Factors Not Under the Jurisdiction of a Water Utility or Factors at the Point of Use (check all that apply)*	Documented/ Observed**	Suspected**
Legionella species in water system	<input type="checkbox"/>	<input type="checkbox"/>
Cross-connection of potable and nonpotable water pipes resulting in backflow	<input type="checkbox"/>	<input type="checkbox"/>
Lack of backflow prevention in plumbing	<input type="checkbox"/>	<input type="checkbox"/>
Low pressure or change in water pressure in the plumbing	<input type="checkbox"/>	<input type="checkbox"/>
Change in water flow direction in the plumbing	<input type="checkbox"/>	<input type="checkbox"/>
Corrosion in or leaching from pipes or storage tanks	<input type="checkbox"/>	<input type="checkbox"/>
Pipe/component failure or break (e.g., pipes, tanks, valves)	<input type="checkbox"/>	<input type="checkbox"/>
Aging plumbing components (e.g., pipes, tanks, valves)	<input type="checkbox"/>	<input type="checkbox"/>
Contamination of plumbing during construction or repair	<input type="checkbox"/>	<input type="checkbox"/>
Construction or repair of plumbing without evidence of contamination	<input type="checkbox"/>	<input type="checkbox"/>
Deficiency in building/home-specific water treatment after the water meter or property line	<input type="checkbox"/>	<input type="checkbox"/>
Deficiency or contamination of equipment/devices using or distributing water	<input type="checkbox"/>	<input type="checkbox"/>
Contamination during commercial bottling	<input type="checkbox"/>	<input type="checkbox"/>
Contamination during shipping, hauling, or storage	<input type="checkbox"/>	<input type="checkbox"/>
Contamination at point of use – Tap	<input type="checkbox"/>	<input type="checkbox"/>
Contamination at point of use – Hose	<input type="checkbox"/>	<input type="checkbox"/>
Contamination at point of use – Commercially-bottled water	<input type="checkbox"/>	<input type="checkbox"/>
Contamination at point of use – Container, bottle, or pitcher	<input type="checkbox"/>	<input type="checkbox"/>
Contamination at point of use – Unknown	<input type="checkbox"/>	<input type="checkbox"/>
Water temperature $\geq 30^{\circ}\text{C}$ ($\geq 86^{\circ}\text{F}$)	<input type="checkbox"/>	<input type="checkbox"/>
Intentional contamination (explain in remarks)	<input type="checkbox"/>	<input type="checkbox"/>
Other, specify:	<input type="checkbox"/>	<input type="checkbox"/>
Unknown	<input type="checkbox"/>	<input type="checkbox"/>
* Only check off what was found during investigation. ** "Documented/Observed" refers to information gathered through document reviews, direct observations, and/or interviews. "Suspected" refers to factors that probably occurred but for which no documentation (as defined previously) is available.		

APPENDIX I

	Drinking Water
Remarks	

APPENDIX I

WNID/WUI					
Microbiology or Chemical/Toxin Analysis (refer to the laboratory findings from the outbreak investigation)					
Sample Number	Genus/ Chemical/ Toxin	Species	Serotype/ Serogroup/ Serovar	Genotype/ Subtype	PFGE Pattern
Sample Number	Test Results Positive?	Concentration (numerical value)	Unit	Test Type*	Test Method (reference: National Environmental Methods Index: http://www.nemi.gov)
	<input type="checkbox"/> Yes				
	<input type="checkbox"/> Yes				
	<input type="checkbox"/> Yes				
	<input type="checkbox"/> Yes				
* Test Type: 1-Culture, 2-DNA or RNA Amplification/Detection (e.g., PCR, RT-PCR), 3-Microscopy (e.g., fluorescent, EM), 4-Serological/Immunological Test (e.g., EIA, ELISA), 5-Phage Typing, 6-Chemical Testing, 7-Tissue Culture Infectivity Assay					
Factors Contributing to Contamination and/or Increased Exposure to Contaminated Water					
Factors (check all that apply)*			Documented/ Observed**	Suspected**	
Cooling tower/evaporative condenser – shutdown for >3 days without draining to waste			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling tower/evaporative condenser – lack of a maintenance program			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling tower/evaporative condenser – lack of a qualified water quality specialist			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling tower/evaporative condenser – presence of scale or corrosion			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling tower/evaporative condenser – presence of dirt, organic matter, or other debris in the cold water basin			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling tower/evaporative condenser – absence of drift eliminators			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling tower/evaporative condenser – presence of damaged drift eliminators			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling tower/evaporative condenser – history of recent repairs to the device			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling tower/evaporative condenser – siting of device near building air intakes			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling tower/evaporative condenser – siting of device near windows that can be opened			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling tower/evaporative condenser – siting of device in immediate area of kitchen exhaust fans, live plants, truck bays, or other sources of organic matter			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling tower/evaporative condenser – construction on the premises of the device within 6 months before the index case			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling tower/evaporative condenser – construction within 100 meters of the premises of the device within 6 months before the index case			<input type="checkbox"/>	<input type="checkbox"/>	
Ornamental fountain – presence of submerged lighting			<input type="checkbox"/>	<input type="checkbox"/>	
Ornamental fountain – lack of a written cleaning and maintenance program			<input type="checkbox"/>	<input type="checkbox"/>	
Ornamental fountain – presence of dirt, organic matter, or other debris in the water basin			<input type="checkbox"/>	<input type="checkbox"/>	
Broken/damaged sewer pipe			<input type="checkbox"/>	<input type="checkbox"/>	
Recycling of water			<input type="checkbox"/>	<input type="checkbox"/>	
Water temperature $\geq 30^{\circ}\text{C}$ ($\geq 86^{\circ}\text{F}$)			<input type="checkbox"/>	<input type="checkbox"/>	
Other, specify:			<input type="checkbox"/>	<input type="checkbox"/>	
Unknown			<input type="checkbox"/>	<input type="checkbox"/>	
* Only check off what was found during investigation.					
** "Documented/Observed" refers to information gathered through document reviews, direct observations, and/or interviews. "Suspected" refers to factors that probably occurred but for which no documentation (as defined previously) is available.					
Remarks					
Epidemic and laboratory assistance for the investigation of a waterborne disease outbreak is available upon request by the State Health Department to the Centers for Disease Control and Prevention. Please enter this report into the National Outbreak Reporting System (NORS). State/Local investigation reports and questionnaires can also be attached to the report in the electronic system. Communications and requests for epidemic and laboratory assistance may be directed to: Waterborne Disease and Outbreak Surveillance Coordinator, Division of Parasitic Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases, Coordinating Center for Infectious Diseases, CDC 4770 Buford Highway, NE, MS F-22, Atlanta, GA, 30341-3724 or (770) 488-7775.					
Public reporting burden of this collection of information is estimated to average 20 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC, Project Clearance Officer, 1600 Clifton Road, MS D-24, Atlanta, GA, 30333, ATTN: PRA (5026-0004) e-DO NOT MAIL, CASE REPORTS TO THIS ADDRESS.					

Appendix J

ACRONYMS AND AGENCY ABBREVIATIONS

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ACRONYMS AND AGENCY ABBREVIATIONS

Acronyms and Agency Abbreviations

CCDM	Control of Communicable Disease Manual
CHFS	Cabinet for Health and Family Services
EFORS	Electronic Foodborne Outbreak Reporting System
ERRT	Epi Rapid Response Team
ESF-8	Emergency Support Function-8 (Health and Medical)
FDA	United States Food and Drug Administration
FERN	Food Emergency Response Network
GIS	Geographic Information Systems
HACCP	Hazard Analysis and Critical Control Point
KAR	Kentucky Administrative Regulations
KDPH	Kentucky Department for Public Health
KRS	Kentucky Revised Statutes
KYEPHRS	Kentucky Electronic Public Health Record System
LHD	Local Health Department
NORS	National Outbreak Reporting System
PFGE	Pulsed Field Gel Electrophoresis
RDDR	Kentucky Reportable Disease Desk Reference
USDA	United States Department of Agriculture

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Appendix K

DEFINITION OF TERMS

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2 x 2 Table: A cross-tabulation of data such that subcategories of one characteristic are indicated horizontally (in rows) and subcategories of another characteristic are indicated vertically (in columns). Tests of association between characteristics in the columns and rows can be readily applied. Also known as a contingency table.

	ill	not ill
Exposed	a	b
Not Exposed	c	d

Attack rate: A type of cumulative incidence rate which expresses the occurrence of a disease among a specific population at risk observed for a limited period of time, often due to a very specific exposure.

Carrier: A person or animal that harbors a specific infectious agent, is asymptomatic, and is a potential source of infection for man or animals.

Case: a person who meets a defined case definition at a specific point of time.

Case-control study: A type of observational analytic study. Enrollment into the study is based on presence ("case") or absence ("control") of disease. Characteristics such as previous exposures are then compared between cases and controls.

Case definition: A set of criteria used for investigative purposes to decide whether a person has a particular disease or whether a person is to be included in a "case" category by specifying clinical and laboratory criteria and by specifying limitations on time, place and person.

Case finding: The process of identifying all possible cases; this typically uses a broad case definition and occurs early in the investigation. Later in the investigation, case finding might be performed to assess the extent of the outbreak.

Chain of custody: a record that establishes the complete chronological disposition of an entity of concern (e.g., laboratory specimen document).

Cluster: Aggregation of relatively uncommon events or diseases in space and/or time in amounts believe or perceived to be greater than could be expected by chance.

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Cohort study: A type of observational analytic study. Enrollment in the study is based on exposure characteristics or membership in a group. Disease, death or other health-related outcomes are then ascertained and compared.

Common source outbreak: An outbreak that results from a group of persons being exposed to an infectious agent or toxin from a single source.

Confirmed case: A person who has a positive laboratory result of the disease or agent that is associated with an outbreak.

Contact: Exposure to a source of an infection, or a person so exposed.

Controls: Subject with whom comparison is made in a case-control study or other type of epidemiologic study. Selection of appropriate controls is crucial to the validity of epidemiologic studies.

Control food sample: A portion of food that was prepared in similar manner but not involved in the outbreak.

Epidemic: The occurrence of more cases of disease than expected in a given area or among a specific group of people during a particular period of time.

Epidemic curve (Epi curve): A histogram plotting the distribution of cases by time of onset. Epi curves help characterize an outbreak and give clues about the source of the outbreak (e.g., point source vs. on-going outbreaks).

Epidemiology: The study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems.

Foodborne outbreak: A foodborne outbreak is the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food or different food in a common place.

High-risk group: A group in the community with an elevated risk for a particular disease.

Host: A person or other living organism that can be infected by an infectious agent under natural conditions.

Host factors: An intrinsic factor (e.g., age, sex, race, behaviors) which influences an individual's exposure, susceptibility, or response to a causative agent.

Incidence rate: The measure of frequency of new cases of a particular disease in a population during a specified period of time.

Incubation period: The period of time between exposure to an infectious agent and the onset of signs and symptoms of disease.

Index case: The first case among a number of similar cases that are epidemiologically related.

Line listing: A table listing case names, age, sex, onset time, residence, symptoms, employment, etc. which facilitates comparisons of many characteristics for possible similarities or associations.

Morbidity: Any departure from a state of physiological or psychological well being.

Original food sample: The actual sample portion of the food consumed at the time of the outbreak.

Onset: The time the first clinical signs or symptoms begin to occur.

Outbreak: Same as epidemic. Often the preferred word as it may avoid the sensationalism associated with the word epidemic.

PFGE: Pulsed-field gel electrophoresis – a molecular method that allows for the specific classification of pathogens by “fingerprinting” the DNA from the pathogen; this method generates visually observable patterns which can be digitized and then compared with other pathogens of the same genus and species.

Point source outbreak: Outbreak due to exposure of a group of persons to an infectious agent common to the individuals in the group.

Prevalence: The number or proportion of cases or events or conditions in a given population.

Prevalence rate: The measure of frequency of all current cases of a particular disease, regardless of the time of onset, within a particular population either at a specified instant or during a specified period of time.

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Probable case: A case that has typical clinical features of the particular disease under investigation without laboratory confirmation.

PulseNet: The National Molecular Subtyping Network for Foodborne Disease Surveillance; a network of laboratories throughout the U.S. that perform testing on foodborne pathogens using standard PFGE methods and compare results via images on a computer network.

Questionnaire: Predetermined set of questions used to collect data.

Recreational water: Waters used for swimming, whirlpools, hot tubs, spas and water parks; it may also include naturally occurring fresh and marine surface waters.

Reservoir: The habitat or organism in which an infectious agent normally lives, grows and multiplies.

Serotype: Subdivision of a species or subspecies distinguishable from other strains therein on the basis of antigenic character.

Surveillance: The detection of health problems through the appropriate collection of data, followed by its collation, analysis, interpretation, and dissemination.

Susceptible: A person lacking sufficient resistance to a particular disease agent to prevent disease if or when exposed.

Suspect case: A person who is associated with an outbreak with signs and symptoms of disease but no confirmed laboratory results.

Vehicle: An inanimate intermediary in the indirect transmission of an agent that carries the agent from a reservoir to a susceptible host.

Virulence: The degree of pathogenicity of an infectious agent.

Waterborne outbreak: Two or more people experience a similar illness after the ingestion of drinking water or after exposure to water used for recreational purposes.

Zoonosis: An infection or an infectious disease transmissible under natural conditions between animals and man.

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Appendix L

KENTUCKY REPORTABLE DISEASE STATUTES AND REGULATIONS

- 1) 902 KAR 2:020. Disease Surveillance.
- 2) KRS 211.180. Functions of Cabinet in Regulation of Certain Health Matters – Inspection Fees - Hearing.
- 3) KRS 214.010. Physicians and Heads of Families to Report Diseases to Local Board of Health.
- 4) KRS 214.020. Cabinet to Adopt Regulations and Take Other Action to Prevent Spread of Disease.
- 5) HIPPA – Disclosures for Public Health Activities

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REPORTABLE DISEASE STATUTES AND REGULATIONS

1) 902 KAR 2:020. Disease surveillance.

RELATES TO: KRS 211.180(1), 214.010, 214.645, 333.130

STATUTORY AUTHORITY: KRS 194A.050, 211.090(3), EO 2004-726

NECESSITY, FUNCTION, AND CONFORMITY: EO 2004-726, effective July 9, 2004, reorganized the Cabinet for Health and Family Services and placed the Department for Public Health under the Cabinet for Health and Family Services. KRS 211.180 requires the cabinet to implement a statewide program for the detection, prevention, and control of communicable diseases, chronic and degenerative diseases, dental diseases and abnormalities, occupational diseases and health hazards peculiar to industry, home accidents and health hazards, animal diseases which are transmissible to man, and other diseases and health hazards that may be controlled. KRS 214.010 requires every physician and every head of family to notify the local health department of the existence of diseases and conditions of public health importance, known to him or her. This administrative regulation establishes notification standards and specifies the diseases requiring urgent, priority, or routine notification, in order to facilitate rapid public health action to control diseases, and to permit an accurate assessment of the health status of the Commonwealth.

Section 1. Notification Standards. (1) A health professional licensed under KRS Chapters 311 through 314, and a health facility licensed under KRS Chapter 216B, shall give notification pursuant to subsection (3) of this section, if:

(a) The health professional makes a probable diagnosis of a disease specified in Section 2, 3, or 4 of this administrative regulation; and

(b) The diagnosis is supported by:

1. "Case Definitions for Infectious Conditions under Public Health Surveillance"; or
2. A reasonable belief that the disease is present.

(2)(a) A single report by a hospital of a condition diagnosed by a test result from the hospital laboratory shall constitute notification on behalf of the hospital and its laboratory.

(b) A hospital may designate an individual to report on behalf of the hospital's laboratory and the hospital's clinical facilities.

(3) The notification shall be given to the:

- (a) Local health department serving the jurisdiction in which the patient resides; or
- (b) Department for Public Health.

(4) The reporting professional shall furnish the:

- (a) Name, birthdate, address, county of residence, and telephone number of the patient; and
- (b) Clinical, epidemiologic, and laboratory information pertinent to the disease.

(5) Upon the confirmation of a laboratory test result which indicates infection with an agent associated with one (1) or more of the diseases or conditions specified in Section 2, 3, or 4 of this administrative regulation, the director of a clinical laboratory licensed under KRS Chapter 333 shall:

(a) Report the result to the:

1. Local health department serving the jurisdiction in which the patient resides; or
2. Department for Public Health; and

(b) Report the patient's name, birthdate, address, and county of residence; and

Section 2. Diseases Requiring Urgent Notification. (1) Notification pursuant to Section 1(3) of this administrative regulation of the following diseases shall be made within twenty-four (24) hours:

- (a) Anthrax;
- (b) Botulism;
- (c) Brucellosis;
- (d) Campylobacteriosis;

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- (e) Cryptosporidiosis;
- (f) Cholera;
- (g) Diphtheria;
- (h) Escherichia coli O157:H7;
- (i) Escherichia coli, shiga toxin positive;
- (j) Encephalitis, California group;
- (k) Encephalitis, Eastern equine;
- (l) Encephalitis, St. Louis;
- (m) Encephalitis, Venezuelan equine;
- (n) Encephalitis, Western;
- (o) Encephalitis, West Nile Virus;
- (p) Hansen's Disease;
- (q) Hantavirus infection;
- (r) Hemophilus influenzae invasive disease;
- (s) Hepatitis A;
- (t) Listeriosis;
- (u) Measles;
- (v) Meningococcal infections;
- (w) Pertussis;
- (x) Plague;
- (y) Poliomyelitis;
- (z) Psittacosis;
- (aa) Q fever;
- (bb) Rabies, animal;
- (cc) Rabies, human;
- (dd) Rubella;
- (ee) Rubella syndrome, congenital;
- (ff) Salmonellosis;
- (gg) Shigellosis;
- (hh) Syphilis, primary, secondary, early latent or congenital;
- (ii) Tetanus;
- (jj) Tularemia;
- (kk) Typhoid fever;
- (ll) Vibrio parahaemolyticus;
- (mm) Vibrio vulnificus;
- (nn) Yellow fever.

(2) Weekend or evening urgent notification.

(a) If health department personnel cannot be contacted directly, notification shall be made by electronic submission or by telephone to an emergency number provided by the local health department or the Department for Public Health.

(b) For the protection of patient confidentiality, this notification shall include:

1. The name of the condition being reported; and

2. A telephone number that can be used by the department to contact the reporting professional.

(3) Upon receipt of a report for a disease specified in subsection (1) of this section, the local health department shall:

(a) Immediately notify the Department for Public Health; and

(b) Assist the department in carrying out a public health response as instructed.

Section 3. Diseases Requiring Priority Notification. (1) Notification pursuant to Section 1(3) of this administrative regulation of the following diseases shall be made within one (1) business day:

(a) Group A streptococcal infection, invasive;

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- (b) Hepatitis B, acute;
- (c) Hepatitis B infection in a pregnant woman or a child born in or after 1992;
- (d) Mumps;
- (e) Toxic shock syndrome;
- (f) Tuberculosis.

(2) Upon receipt of a report for a disease or condition specified in subsection (1) of this section, a local health department:

(a) Shall investigate the report and carry out public health measures appropriate to the disease or condition;

(b) Shall notify the Department for Public Health of the case, in writing, within five (5) business days; and

(c) May seek assistance from the Department for Public Health.

Section 4. Diseases Requiring Routine Notification. (1) Notification pursuant to Section 1(3) of this administrative regulation of the following diseases shall be made within five (5) business days:

- (a) Chancroid;
- (b) Chlamydia trachomatis infection;
- (c) Ehrlichiosis;
- (d) Gonorrhea;
- (e) Granuloma inguinale;
- (f) Hepatitis C, acute;
- (g) Histoplasmosis;
- (h) Lead poisoning;
- (i) Legionellosis;
- (j) Lyme Disease;
- (k) Lymphogranuloma venereum;
- (l) Malaria;
- (m) Rabies postexposure prophylaxis;
- (n) Rocky Mountain Spotted Fever;
- (o) Streptococcus pneumoniae, drug-resistant invasive disease;
- (p) Syphilis, other than primary, secondary, early latent or congenital; and
- (q) Toxoplasmosis.

(2) Upon receipt of a report for a disease or condition specified in subsection (1) of this section, a local health department shall:

(a) Make a record of the report;

(b) Answer inquiries or render assistance regarding the report if requested by the reporting entity; and

(c) Forward the report to the Department for Public Health within three (3) business days.

Section 5. Outbreaks or Unusual Public Health Occurrences. (1) If, in the judgment of a health professional licensed under KRS Chapters 311 through 314, or a health facility licensed under KRS Chapter 216B, an unexpected pattern of cases, suspected cases, or deaths which may indicate a newly-recognized infectious agent, an outbreak, epidemic, related public health hazard or an act of bioterrorism, such as smallpox, appears, a report shall be made immediately by telephone to the:

(a) Local health department where the professional is practicing or where the facility is located; or

(b) Department for Public Health.

(2) An instance of suspected staphylococcal or other foodborne intoxication or an instance of salmonellosis or other foodborne or waterborne infection shall be reported within one (1) business day, and shall include all known information about the persons affected.

(3) The local health department:

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- (a) Shall investigate the outbreak or occurrence;
- (b) Shall carry out public health measures appropriate to the disease or condition involved;
- (c) Shall make medical and environmental recommendations appropriate to prevent future similar outbreaks or occurrences; and
- (d) May seek assistance from the Department for Public Health.

Section 6. Laboratory Surveillance. (1)(a) In addition to the reports required by Sections 1 through 4 of this administrative regulation, laboratory results shall be reported weekly for influenza virus isolates.

(b) The report shall include the:

- 1. Name, birthdate, address, and county of residence of the person with the disease; and
- 2. Specific laboratory information pertinent to the result.

(c) The format of the report shall be an alphabetical listing of each person for whom a report is submitted.

(2) Upon request by the Department for Public Health, a clinical laboratory within a hospital licensed under KRS Chapter 216B, or a laboratory licensed under KRS Chapter 333, shall report:

(a) The numbers of isolates and information regarding the antimicrobial resistance patterns of the isolates;

(b) At intervals agreed upon between the laboratory and the department, not less frequently than three (3) months, for the following:

- 1. Staphylococcus aureus;
- 2. Enterococcus species; or
- 3. Other organism specified in a request that includes a justification of the public health importance of the organism.

Section 7. Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) Surveillance. (1) Physicians and Medical Laboratories shall report:

(a)1. A positive test result for HIV infection including a result from:

- a. Elisa;
 - b. Western Blot;
 - c. PCR;
 - d. HIV antigen; or
 - e. HIV culture;
2. CD4+ assay including absolute CD4+ cell counts and CD4+%;
3. HIV detectable Viral Load Assay; and
4. A positive serologic test result for HIV infection; or

(b) A diagnosis of AIDS that meets the definition of AIDS established within the Centers for Disease Control and Prevention (CDC) guidelines and reported in the:

- 1. "Adult HIV/AIDS Confidential Case Report Form," or
- 2. "Pediatric HIV/AIDS Confidential Case Report Form."

(2) An HIV infection or AIDS diagnosis shall be reported within five (5) business days and, if possible, on the "Adult HIV/AIDS Confidential Case Report form" or the "Pediatric HIV/AIDS Confidential Case Report form."

(a) A report for a resident of Jefferson, Henry, Oldham, Bullitt, Shelby, Spencer, and Trimble Counties shall be submitted to the HIV/AIDS Surveillance Program of the Louisville-Metro Health Department.

(b) A report for a resident of the remaining Kentucky counties shall be submitted to the HIV/AIDS Surveillance Program of the Kentucky Department for Public Health, or as directed by the HIV/AIDS project coordinator.

(3) A report for a person with HIV infection without a diagnosis of AIDS shall include the following information:

- (a) The patient's full name;
- (b) Date of birth, using the format MMDDYY;

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- (c) Gender;
- (d) Race;
- (e) Risk factor, as identified by CDC;
- (f) County of residence;
- (g) Name of facility submitting report;
- (h) Date and type of HIV test performed;
- (i) Results of CD4+ cell counts and CD4+ %;
- (j) Results of viral load testing;
- (k) PCR, HIV culture, HIV antigen, if performed;
- (l) Results of TB testing, if available; and
- (m) HIV status of the person's partner, spouse or children.

(4) Reports of AIDS cases shall include the information in subsections (1) through (3) of this section; and

- (a) The patient's complete address;
- (b) Opportunistic infections diagnosed; and
- (c) Date of onset of illness.

(5) (a) Reports of AIDS shall be made whether or not the patient has been previously reported as having HIV infection.

(b) If the patient has not been previously reported as having HIV infection, the AIDS report shall also serve as the report of HIV infection.

Section 8. Reporting of Communicable Diseases in Animals. (1) Upon arriving at a probable diagnosis in an animal of a condition known to be communicable to humans, a veterinarian licensed under the provisions of KRS Chapter 321 shall report the occurrence within one (1) business day to:

- (a) The local health department in which the animal is located; or
- (b) If the local health department cannot be reached, the Department for Public Health.

(2) Upon the confirmation of a laboratory test result which indicates infection of an animal with an agent associated with a condition known to be communicable to humans, the director of a clinical laboratory licensed under KRS Chapter 333 shall, within one (1) business day, report the result to the:

- (a) Local health department serving the jurisdiction in which the animal is located; or
- (b) Department for Public Health.

(3) The local health department:

(a) Shall investigate the report and carry out public measures for the control of communicable diseases appropriate to the condition;

(b) Shall notify the Department for Public Health of the occurrence, in writing, within five (5) business days; and

(c) May seek assistance from the Department for Public Health.

Section 9. Asbestosis, Coal Worker's Pneumoconiosis, and Silicosis. (1) A reporting provider shall submit the following information relating to a person diagnosed with asbestosis, coal worker's pneumoconiosis, or silicosis:

- (a) Name;
- (b) Address;
- (c) Birthdate; and
- (d) County of residence.

(2) A reporting provider shall submit the required information to the department within three (3) months following the diagnosis.

Section 10. Incorporation by Reference. (1) The following material is incorporated by reference:

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(a) "Case Definitions for Infectious Conditions under Public Health Surveillance, MMWR, May 2, 1997, Volume 46, Number RR-10", published by the Epidemiology Program Office, Centers for Disease Control and Prevention, Public Health Service, U.S. Department of Health and Human Services, Atlanta, Georgia;

(b) "Adult HIV/AIDS Confidential Case Report (CDC 50.42A, Revised January, 2003)"; and

(c) "Pediatric HIV/AIDS Confidential Case Report form (CDC 50.42B, Revised January, 2003)"; and

(d) "Control of Communicable Diseases Manual 17th Edition, An Official Report of the American Public Health Association, American Public Health Association, Washington, D.C., 2000".

(2) This material may be inspected, copied, or obtained, subject to applicable copyright law, at the Department for Public Health, 275 East Main Street, Frankfort, Kentucky 40621, Monday through Friday, 8 a.m. to 4:30 p.m. (CDS-2; 1 Ky.R. 187; eff. 12-11-74; Am. 2 Ky.R. 464; eff. 4-14-76; 11 Ky.R. 1518; 1786; eff. 6-4-85; 16 Ky.R. 663; 1185; eff. 11-29-89; 21 Ky.R. 128; eff. 8-17-94; 23 Ky.R. 3119; 3597; 4131; eff. 6-16-97; 27 Ky.R. 1099; 1489; eff. 12-21-2000; 29 Ky.R. 812; 1273; eff. 10-16-02; 31 Ky.R. 873; eff. 1-4-05.)

2) 211.180 Functions of cabinet in the regulation of certain health matters -- Inspection fees -- Hearing.

(1) The cabinet shall enforce the administrative regulations promulgated by the secretary of the Cabinet for Health and Family Services for the regulation and control of the matters set out below and shall formulate, promote, establish, and execute policies, plans, and programs relating to all matters of public health, including but not limited to the following matters:

(a) Detection, prevention, and control of communicable diseases, chronic and degenerative diseases, dental diseases and abnormalities, occupational diseases and health hazards peculiar to industry, home accidents and health hazards, animal diseases which are transmissible to man, and other diseases and health hazards that may be controlled;

(b) The adoption of regulations specifying the information required in and a minimum time period for reporting a sexually transmitted disease. In adopting the regulations the cabinet shall consider the need for information, protection for the privacy and confidentiality of the patient, and the practical ability of persons and laboratories to report in a reasonable fashion. The cabinet shall require reporting of physician-diagnosed cases of acquired immunodeficiency syndrome based upon diagnostic criteria from the Centers for Disease Control and Prevention of the United States Public Health Service. No later than October 1, 2004, the cabinet shall require reporting of cases of human immunodeficiency virus infection by reporting of the name and other relevant data as requested by the Centers for Disease Control and Prevention and as further specified in KRS 214.645. Nothing in this section shall be construed to prohibit the cabinet from identifying infected patients when and if an effective cure for human immunodeficiency virus infection or any immunosuppression caused by human immunodeficiency virus is found or a treatment which would render a person noninfectious is found, for the purposes of offering or making the cure or treatment known to the patient;

(c) The control of insects, rodents, and other vectors of disease; the safe handling of food and food products; the safety of cosmetics; the control of narcotics, barbiturates, and other drugs as provided by law; the sanitation of schools,

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- industrial establishments, and other public and semipublic buildings; the sanitation of state and county fairs and other similar public gatherings; the sanitation of public and semipublic recreational areas; the sanitation of public rest rooms, trailer courts, hotels, tourist courts, and other establishments furnishing public sleeping accommodations; the review, approval, or disapproval of plans for construction, modification, or extension of equipment related to food-handling in food-handling establishments; the licensure of hospitals; and the control of such other factors, not assigned by law to another agency, as may be necessary to insure a safe and sanitary environment;
- (d) The construction, installation, and alteration of any on-site sewage disposal system, except for a system with a surface discharge;
 - (e) Protection and improvement of the health of expectant mothers, infants, preschool, and school-age children;
 - (f) The practice of midwifery, including the issuance of permits to and supervision of women who practice midwifery; and
 - (g) Protection and improvement of the health of the people through better nutrition.
- (2) The secretary shall have authority to establish by regulation a schedule of reasonable fees, not to exceed twenty dollars (\$20) per inspector hour plus travel costs pursuant to state regulations for travel reimbursement, to cover the costs of inspections of manufacturers, retailers, and distributors of consumer products as defined in the Federal Consumer Product Safety Act, 15 U.S.C. secs. 2051 et seq.; 86 Stat. 1207 et seq. or amendments thereto, and of youth camps for the purpose of determining compliance with the provisions of this section and the regulations adopted by the secretary pursuant thereto. Fees collected by the secretary shall be deposited in the State Treasury and credited to a revolving fund account for the purpose of carrying out the provisions of this section. The balance of the account shall lapse to the general fund at the end of each biennium.
- (3) Any administrative hearing conducted under authority of this section shall be conducted in accordance with KRS Chapter 13B.

Effective: June 20, 2005

History: Amended 2005 Ky. Acts ch. 99, sec. 345, effective June 20, 2005. -- Amended 2004 Ky. Acts ch. 102, sec. 1, effective July 13, 2004. -- Amended 2000 Ky. Acts ch. 432, sec. 2, effective July 14, 2000. -- Amended 1998 Ky. Acts ch. 426, sec. 289, effective July 15, 1998. -- Amended 1996 Ky. Acts ch. 318, sec. 104, effective July 15, 1996. -- Amended 1990 Ky. Acts ch. 443, sec. 44, effective July 13, 1990. -- Amended 1982 Ky. Acts ch. 247, sec. 9, effective July 15, 1982; and ch. 392, sec. 5, effective July 15, 1982. -- Amended 1978 Ky. Acts ch. 117, sec. 18, effective February 28, 1980. -- Amended 1976 Ky. Acts ch. 299, sec. 42. -- Amended 1974 Ky. Acts ch. 74, Art. VI, sec. 107(17). -- Amended 1972 (1st Extra. Sess.) Ky. Acts ch. 3, sec. 29. -- Created 1954 Ky. Acts ch. 157, sec. 12, effective June 17, 1954.

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3) KRS 214.010 Physicians and heads of families to report diseases to local board of health.

Every physician shall report all diseases designated by regulation of the Cabinet for Health and Family Services as reportable which are under his special treatment to the local board of health of his county, and every head of a family shall report any of said diseases, when known by him to exist in his family, to the local board or to some member thereof in accordance with the regulations of the Cabinet for Health and Family Services.

Effective: June 20, 2005

History: Amended 2005 Ky. Acts ch 99, sec. 446, effective June 20, 2005 – Amended 1998 Ky. Acts ch. 426, sec. 393, effective July 15, 1998. – Amended 1974 Ky. Acts 74, Art. VI, sec. 107(1) and (3). – Amended 1968 Ky. Acts ch. 87, sec. 5. – Recodified 1942 Ky. Acts ch. 208, sec. 1, effective October 1, 1942, from KY. Stat. sec. 2055.

4) KRS 214.020 Cabinet to adopt regulations and take other action to prevent spread of disease.

When the Cabinet for Health and Family Services believes that there is a probability that any infectious or contagious disease will invade this state, it shall take such action and adopt and enforce such rules and regulation as it deems efficient in preventing the introduction or spread of such infectious or contagious disease or diseases within this state, and to accomplish these objects shall establish and strictly maintain quarantine and isolation at such places as it deems proper.

Effective: June 20, 2005

History: Amended 2005 Ky. Acts ch 99, sec. 447, effective June 20, 2005 – Amended 1998 Ky. Acts ch. 426, sec. 394, effective July 15, 1998. – Amended 1974 Ky. Acts 74, Art. VI, sec. 107(1). – Amended 1968 Ky. Acts ch. 87, sec. 6. – Recodified 1942 Ky. Acts ch. 208, sec. 1, effective October 1, 1942, from Ky. Stat. sec. 2049, 2056.

5) HIPAA – Disclosures for Public Health Activities

Downloaded from the Department for Health and Human Services Office
for Civil Rights Website

<http://www.hhs.gov/ocr/privacy/hipaa/understanding/coveredentities/publichealth.html>

OCR HIPAA Privacy
December 3, 2002
Revised April 3, 2003

DISCLOSURES FOR PUBLIC HEALTH ACTIVITIES

[45 CFR 164.512(b)]

Background

The HIPAA Privacy Rule recognizes the legitimate need for public health authorities and others responsible for ensuring public health and safety to have access to protected health information to carry out their public health mission. The Rule also recognizes that public health reports made by covered entities are an important means of identifying threats to the health and safety of the public at large, as well as individuals. Accordingly, the Rule permits covered entities to disclose protected health information without authorization for specified public health purposes.

How the Rule Works

General Public Health Activities. The Privacy Rule permits covered entities to disclose protected health information, without authorization, to public health authorities who are legally authorized to receive such reports for the purpose of preventing or controlling disease, injury, or disability. This would include, for example, the reporting of a disease or injury; reporting vital events, such as births or deaths; and conducting public health surveillance, investigations, or interventions. See 45 CFR 164.512(b)(1)(i). Also, covered entities may, at the direction of a public health authority, disclose protected health information to a foreign government agency that is acting in collaboration with a public health authority. See 45 CFR 164.512(b)(1)(i). Covered entities who are also a public health authority may use, as well as disclose, protected health information for these public health purposes. See 45 CFR 164.512(b)(2).

A “public health authority” is an agency or authority of the United States government, a State, a territory, a political subdivision of a State or territory, or Indian tribe that is responsible for public health matters as part of its official mandate, as well as a person or entity acting under a grant of authority from, or under a contract with, a public health agency. See 45 CFR 164.501. Examples of a public health authority include State and local health departments, the Food and Drug Administration (FDA), the Centers for Disease Control and Prevention, and the Occupational Safety and Health Administration (OSHA).

Generally, covered entities are required reasonably to limit the protected health information disclosed for public health purposes to the minimum amount necessary to accomplish the public health purpose. However, covered entities are not required to make a minimum necessary determination for public health disclosures that are made pursuant to an individual’s authorization, or for disclosures that are required by other law. See 45 CFR 164.502(b). For disclosures to a public health authority, covered entities may reasonably rely on

a minimum necessary determination made by the public health authority in requesting the protected health information. See 45 CFR 164.514(d)(3)(iii)(A). For routine and recurring public health disclosures, covered entities may develop standard protocols, as part of their minimum necessary policies and procedures, that address the types and amount of protected health information that may be disclosed for such purposes. See 45 CFR 164.514(d)(3)(i).

Other Public Health Activities. The Privacy Rule recognizes the important role that persons or entities other than public health authorities play in certain essential public health activities. Accordingly, the Rule permits covered entities to disclose protected health information, without authorization, to such persons or entities for the public health activities discussed below.

- Child abuse or neglect. Covered entities may disclose protected health information to report known or suspected child abuse or neglect, if the report is made to a public health authority or other appropriate government authority that is authorized by law to receive such reports. For instance, the social services department of a local government might have legal authority to receive reports of child abuse or neglect, in which case, the Privacy Rule would permit a covered entity to report such cases to that authority without obtaining individual authorization. Likewise, a covered entity could report such cases to the police department when the police department is authorized by law to receive such reports. See 45 CFR 164.512(b)(1)(ii). See also 45 CFR 512(c) for information regarding disclosures about adult victims of abuse, neglect, or domestic violence.
- Quality, safety or effectiveness of a product or activity regulated by the FDA. Covered entities may disclose protected health information to a person subject to FDA jurisdiction, for public health purposes related to the quality, safety or effectiveness of an FDA-regulated product or activity for which that person has responsibility. Examples of purposes or activities for which such disclosures may be made include, but are not limited to:
 - ▶ Collecting or reporting adverse events (including similar reports regarding food and dietary supplements), product defects or problems (including problems regarding use or labeling), or biological product deviations;
 - ▶ Tracking FDA-regulated products;
 - ▶ Enabling product recalls, repairs, replacement or lookback (which includes locating and notifying individuals who received recalled or withdrawn products or products that are the subject of lookback); and
 - ▶ Conducting post-marketing surveillance.

REPORTABLE DISEASE STATUTES AND REGULATIONS

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See 45 CFR 164.512(b)(1)(iii). The “person” subject to the jurisdiction of the FDA does not have to be a specific individual. Rather, it can be an individual or an entity, such as a partnership, corporation, or association. Covered entities may identify the party or parties responsible for an FDA-regulated product from the product label, from written material that accompanies the product (known as labeling), or from sources of labeling, such as the Physician’s Desk Reference.

- Persons at risk of contracting or spreading a disease. A covered entity may disclose protected health information to a person who is at risk of contracting or spreading a disease or condition if other law authorizes the covered entity to notify such individuals as necessary to carry out public health interventions or investigations. For example, a covered health care provider may disclose protected health information as needed to notify a person that (s)he has been exposed to a communicable disease if the covered entity is legally authorized to do so to prevent or control the spread of the disease. See 45 CFR 164.512(b)(1)(iv).
- Workplace medical surveillance. A covered health care provider who provides a health care service to an individual at the request of the individual’s employer, or provides the service in the capacity of a member of the employer’s workforce, may disclose the individual’s protected health information to the employer for the purposes of workplace medical surveillance or the evaluation of work-related illness and injuries to the extent the employer needs that information to comply with OSHA, the Mine Safety and Health Administration (MSHA), or the requirements of State laws having a similar purpose. The information disclosed must be limited to the provider’s findings regarding such medical surveillance or work-related illness or injury. The covered health care provider must provide the individual with written notice that the information will be disclosed to his or her employer (or the notice may be posted at the worksite if that is where the service is provided). See 45 CFR 164.512(b)(1)(v).

Frequently Asked Questions

To see Privacy Rule FAQs, click the desired link below:

[FAQs on Public Health Uses and Disclosures](#)

[FAQs on ALL Privacy Rule Topics](#)

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(You can also go to http://answers.hhs.gov/cgi-bin/hhs.cfg/php/enduser/std_alp.php, then select "Privacy of Health Information/HIPAA" from the Category drop down list and click the Search button.)

Appendix M

REFERENCES AND WEBSITES

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Reference Books and Journal Articles

- Heymann DL, ed. *Control of Communicable Diseases Manual*. 19th ed. Washington, DC: American Public Health Association, 2008.
- Pickering LK, ed. *Red Book: 2006 Report of the Committee on Infectious Diseases*. 27th ed. Elk Grove Village, IL. American Academy of Pediatrics; 2006.
- Kentucky Department for Public Health, *Kentucky Reportable Disease Desk Reference*, 2006. <http://www.chfs.ky.gov/dph/diseases/>
- Kentucky Department for Public Health, *Registered Sanitarian Field Handbook*, 2004. <http://www.chfs.ky.gov/dph/sanitaricians.htm>
- Council to Improve Foodborne Outbreak Response (CIFOR). *Guidelines for Foodborne Disease Outbreak Response*. Atlanta: Council of State and Territorial Epidemiologists, 2009. <http://www.cste.org/dnn/ProgramsandActivities/InfectiousDiseases/CIFORGuidelines/tabid/207/Default.aspx>
- Gregg, MB, ed. *Field Epidemiology*. 2nd ed. New York, NY: Oxford University Press, 2002.
- Centers for Disease Control and Prevention (CDC). Diagnosis and Management of Foodborne Illnesses: A Primer for Physicians and Other Health Care Professionals. *MMWR* 2004;53(No. RR-4):1-33.
- CDC. "Updated Norovirus Outbreak Management and Disease Prevention Guidelines:" *MMWR* 2011;60(No. RR-3):1-15.
- CDC. Surveillance for Foodborne Disease Outbreaks -- United States, 2007. *MMWR* 2010;59(31):973-979.
- Bryan, F.L. et al., Procedures to Investigate Foodborne Illness, Fourth Edition. *Iowa: International Association of Milk, Food, and Environmental Sanitarians, (IAMFES) Iowa*, 1988.

APPENDIX M

- Food and Drug Administration (FDA). Employee Health and Personal Hygiene Handbook
<http://www.fda.gov/Food/FoodSafety/RetailFoodProtection/IndustryandRegulatoryAssistanceandTrainingResources/ucm113827.htm>
- Surveillance for Waterborne Disease and Outbreaks Associated with Recreational Water Use and Other Aquatic Facility Associated Health Events. *MMWR* 2008;57(SS-9); 1-38.
- Surveillance for Waterborne Disease and Outbreaks Associated with Drinking Water and Water not Intended for Drinking. *MMWR* 2008; 57(SS-9); 39-69.
- Cryptosporidiosis Surveillance – United States, 2003-2005. *MMWR* 2007; 56(SS-7); 1-10.
- Giardiasis Surveillance – United States, 2003-2005. *MMWR* 2007; 56(SS-7);11-18.

Reference List of Infectious Disease Information on the Internet

Note: Care should be used when referencing materials from the Internet because of misinformation may be present from any number of unofficial or independent sites. The web sites listed below are from state and federal government sources.

- **Kentucky Department for Public Health (KDPH), Division of Epidemiology and Health Planning - Reportable Disease Website**

Includes information on reportable diseases as well as the Reportable Disease Desk Reference

<http://www.chfs.ky.gov/dph/diseases/>

Annual Reportable Disease Report

<http://www.chfs.ky.gov/dph/epi/reportablediseases.htm>

REFERENCES AND WEBSITES

- **KDPH Epidemiology Rapid Response Team**
Information on Epi Rapid Response Team Membership and Training
<http://www.chfs.ky.gov/dph/epi/Epi>
- **KDPH Division of Public Health Protection and Safety**
Information on responding to a foodborne or waterborne outbreak and the Registered Sanitarians Handbook
<http://www.chfs.ky.gov/dph/sanitarians.htm>
- **KDPH Division of Laboratory Services**
Information on responding to a foodborne or waterborne outbreak and lab forms for download
www.chfs.ky.gov/dph/info/lab
- **Centers for Disease Control and Prevention (CDC) – OutbreakNet Site**
Information on responding to a foodborne or waterborne outbreak
<http://www.cdc.gov/foodborneoutbreaks/index.htm>
- **National Outbreak Reporting System (NORS) Training**
Training on how to enter data into the NORS system
<http://www.cdc.gov/healthywater/statistics/wbdoss/nors/training.html>
- **Centers for Disease Control and Prevention (CDC) – Constructing an Epidemic Curve**
Information from the Coordinating Office on Global Health on how to construct an epidemic curve
http://www.cdc.gov/globalhealth/fetp/modules/MiniModules/Epidemic_Curve/page01.htm
- **University of North Carolina Center for Public Health Preparedness – *FOCUS on Field Epidemiology***
Newsletters that include information on how to conduct an outbreak investigation
<http://cphp.sph.unc.edu/focus/issuelist.htm>

Instructions on how to construct an epidemic curve in Excel
http://cphp.sph.unc.edu/focus/vol1/issue5/1-5EpiCurves_flash.pdf

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- **Massachusetts Department for Public Health, Foodborne Illness Investigations and Control Reference Manual**

Reference manual for investigating foodborne outbreaks. Chapters 3 and 4 of the Kentucky Manual were adapted from the Massachusetts Manual.

http://www.mass.gov/?pageID=eohhs2modulechunk&L=4&L0=Home&L1=Provider&L2=Guidance+for+Businesses&L3=Food+Safety&sid=Eeohhs2&b=terminalcontent&f=dph_environmental_foodsafety_g_reference_manual&csid=Eeohhs2
- **Wisconsin Division of Public Health, Foodborne and Waterborne Disease Outbreak Investigation Manual**

Reference manual for investigating foodborne and waterborne outbreaks. The overall outline of the Kentucky Manual was adapted from the Wisconsin Manual.

<http://www.dhs.wisconsin.gov/communicable/resources/pdffiles/FDWTRBorneMAN.pdf>
- **Emerging Infectious Diseases Homepage**

Current scientific articles on emerging diseases

<http://www.cdc.gov/ncidod/eid/index.htm>
- **National Food Safety Website**

Consumer information related to food safety including recalls

<http://www.foodsafety.gov>
- **U.S. Dept. of Agriculture (USDA)**

Current topics related to food issues

<http://www.usda.gov/agency/fsis>
- **U.S. Environmental Protection Agency (EPA) - Microbiology Homepage**

Water-related issues, waterborne disease, regulations

<http://www.epa.gov/microbes>
- **U.S. Environmental Protection Agency (EPA)-Office of Ground Water and Drinking Water**

Consumer site for current ground water and drinking water information, publications and regulations

<http://water.epa.gov/drink/>

REFERENCES AND WEBSITES

- **U.S. Food & Drug Administration (FDA) - FDA News and Publications**

Press releases, publications and issues related to current food issues

<http://www.fda.gov/opacom/hpnews.html>

- **US. Food & Drug Administration (FDA) – FDA News and Publications
Bad Bug Book**

Listing of foodborne and waterborne pathogens and the incubation period, duration and symptoms of illness. Go to Epidemiology Summary Table Appendix for a summary table of pathogens by symptom description and incubation period.

<http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/default.htm>

- **Food Emergency Response Network (FERN)**

A network of food testing laboratories at the local, state, and federal levels for response to emergencies involving biological, chemical, or radiological contamination of food.

<http://www.fernlab.org/index.cfm>

- **U.S. Food & Drug Administration (FDA) – FDA Oral Culture Learner Project, Educational Materials for Food Employees**

Website includes posters and storyboards designed to promote employee health and proper food handling techniques. The posters, designed to print on standard 8.5' x 11' paper cover three critical principles in safe food handling: 1)Using gloves or utensils to handle ready to eat foods, 2)Not working when ill, 3)proper hand washing.

<http://www.fda.gov/Food/FoodSafety/RetailFoodProtection/IndustryandRegulatoryAssistanceandTrainingResources/ucm212661.htm>

- **MEDLINE**

Extensive collection of current published medical information, free Med-line searches

<http://www.nlm.nih.gov>