

Food and Waterborne Outbreak Investigation Manual

2008

Infectious Disease Epidemiology Program
Bureau for Public Health – Division of Surveillance and Disease Control
West Virginia Department of Health and Human Resources

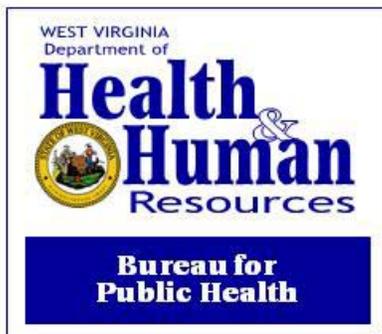


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ACKNOWLEDGEMENTS

Recognizing the importance of collaboration in foodborne outbreak investigations, an inter-disciplinary team, consisting of representatives from epidemiology, environmental health, and laboratorians, was created to produce this manual.

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Special acknowledgement is also given to the Wisconsin Division of Public Health's Foodborne and Waterborne Disease Outbreak Investigation Manual and the Kansas Department of Health and Environment's Foodborne Illness and Outbreak Investigation Manual. These manuals served as tremendous resources and examples for the development team.

INTRODUCTION

Foodborne and waterborne disease (enteric) outbreaks are of urgent public health importance and immediate reporting of these outbreaks or suspicion of an outbreak is mandated by West Virginia law (64CSR7) for physicians, laboratories and other health care providers. The rapid detection of outbreaks, determination of the cause of the outbreak, and implementation of control measures are all ways that health departments and food regulators provide protection to the public from foodborne illness.

A thorough and timely investigation of foodborne and waterborne outbreaks is essential for disease control and prevention. Several key factors need to be addressed to determine the most appropriate control measures. What is the extent of the illness and what population is being affected? When and where did the critical exposure take place? How was the disease transmitted? What is the etiologic agent?

In an effort to foster more standardized, thorough investigations of food and waterborne disease outbreaks throughout West Virginia, the Infectious Disease Epidemiology Program (IDEP) has developed this manual to serve as a guidance document for food and waterborne outbreak investigations. The manual is written primarily for infection control practitioners, sanitarians, and public health nurses who conduct outbreak investigations for the purpose of describing the fundamental concepts related to food and waterborne illnesses and outbreaks, and establishing guidelines for investigating these outbreaks in West Virginia.

This document is not intended to provide specific information for each causative agent, but to serve as a guide for initiating and conducting an outbreak investigation. For information specific to a particular disease see the WV Reportable Disease protocol manual.

Although the concepts are presented in a linear fashion in the manual, investigators should remember that outbreak investigation is not a linear process. Each investigation will take on its own direction and flow. However, these generalized steps will guide the investigator to a successful investigation.

Proper investigation of food and waterborne disease outbreaks require the effort of a team of individuals with different areas of expertise (epidemiology, environmental health, laboratory science, media communication, etc.). This manual is intended to provide a structure for coordinating the activities of the various agencies responsible for the investigation, prevention and control of food and waterborne disease in West Virginia.

This manual was created with the most current information available at the time of production (March 2008). The information used is subject to change and the manual will be updated as warranted.

List of agency abbreviations:

Abbreviation	Agency
BPH	Bureau for Public Health
CDC	Centers for Disease Control and Prevention
DSDC	Division of Surveillance and Disease Control
IDEP	Infectious Disease Epidemiology Program
LHD	Local Health Department
OEHS	Office of Environmental Health Services
OLS	Office of Laboratory Services
WVDA	West Virginia Department of Agriculture

RESOURCES

Infectious Disease Epidemiology Program

Division of Surveillance and Disease Control

WVDHHR – Bureau for Public Health

350 Capitol Street, Rm 125

Charleston, WV 25301

Ph: 304-558-5358 or 800-423-1271

www.wvdhhr.org/idep

West Virginia Office of Laboratory Services

167 Eleventh Avenue

South Charleston, WV 25303

Ph. 304-558-3530

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West Virginia Office of Laboratory Services

Environmental Chemistry Laboratory

4710 Chimney Drive Suite G

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**WV Bureau for Public Health
Office of Environmental Health Services
Public Health Sanitation Division**

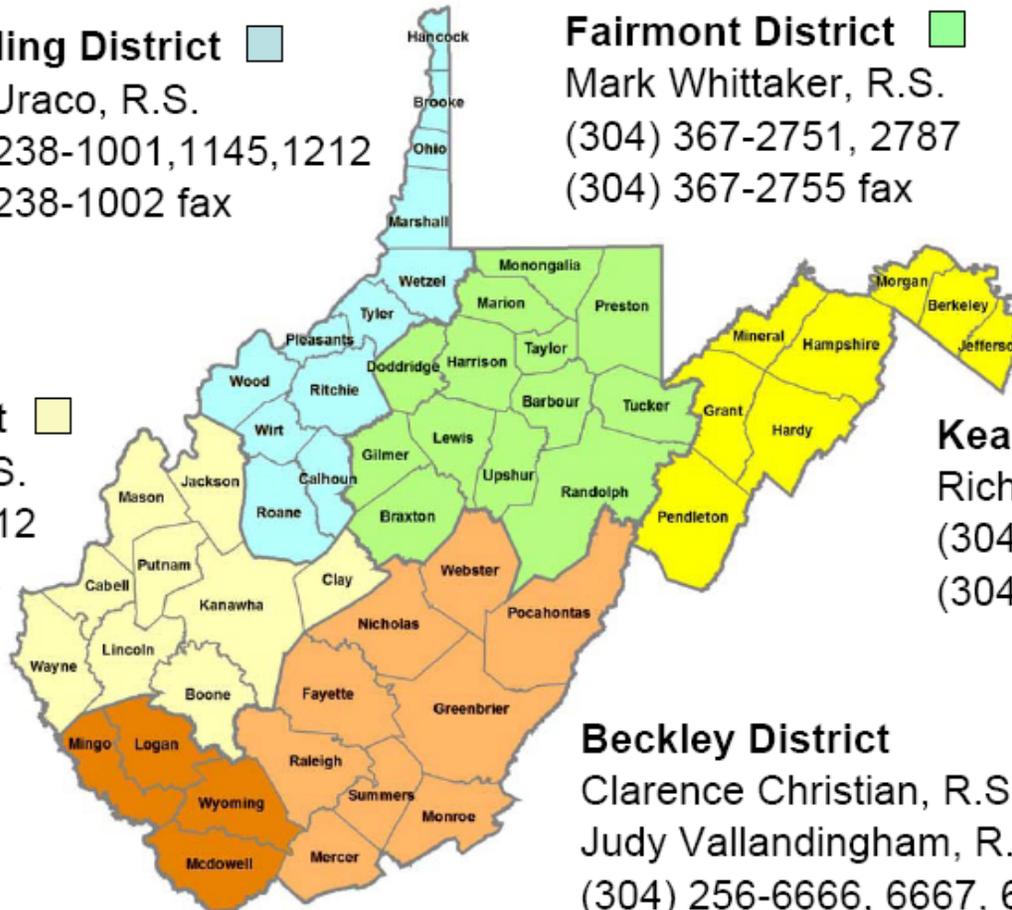
District Map with District Sanitarians

Wheeling District ■
Mark Uraco, R.S.
(304) 238-1001, 1145, 1212
(304) 238-1002 fax

Fairmont District ■
Mark Whittaker, R.S.
(304) 367-2751, 2787
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St. Albans District ■
Ryan Harbison, R.S.
(304) 722-0611, 0612
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Kearneysville District ■
Richard Wheeler, R.S.
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(304) 725-3108 fax



Beckley District ■
Clarence Christian, R.S. ■
Judy Vallandingham, R.S. ■
(304) 256-6666, 6667, 6668
(304) 256-6672 fax

REFERENCES

The following references are recommended for LHDs as guides in investigating foodborne outbreaks (FBO) and waterborne outbreaks (WBO) or other sporadic cases of infectious diseases.

FOODBORNE DISEASES AND OUTBREAKS

1. CDC. Diagnosis and Management of Foodborne Illnesses: A Primer for Physicians and Other Health Care Professionals. *MMWR* 2004;53(No. RR-4):1-33.
2. CDC. "Norwalk-like viruses:" Public health consequences and outbreak management. *MMWR* 2001;50(No. RR-9):1-17.
3. CDC. Surveillance of foodborne-disease outbreaks -- United States, 1998-2002. *MMWR* 2006;55(No.SS-10):1-66.
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WATERBORNE DISEASES AND OUTBREAKS

1. CDC. Surveillance for Waterborne Disease Outbreaks Associated with Recreational Water – United States, 2003-2004 and Surveillance of Waterborne Disease and Outbreaks Associated with Drinking Water and Water not Intended for Drinking – United States, 2003-2004. Surveillance Summaries, December 22, 2006. *MMWR* 2006;55(No. SS-12).
2. CDC. Cryptosporidiosis outbreaks associated with recreational water use – five states, 2006. *MMWR* 2007; 56(29):729-732
3. O'Reilly et al. A waterborne outbreak of gastroenteritis with multiple etiologies among resort island visitors and residents: Ohio, 2004. *Clinical Infectious Diseases* 2007; 44:506-512.
4. Rooney et al. A review of outbreaks of waterborne disease associated with ships: evidence for risk management. *Public Health Reports* 2004; 119:435-442.

Reference list of communicable disease information on the World Wide Web:

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

1. Centers for Disease Control and Prevention (CDC)

(Health and travelers health information, immunizations, health news releases, publications, training opportunities)

<http://www.cdc.gov>

2. West Virginia Infectious Disease Epidemiology Program

(Current information on disease reporting)

<http://www.wvdhhr.org>

3. Emerging Infectious Diseases Homepage

(Current scientific articles on emerging diseases)

<http://www.cdc.gov/ncidod/EID/eid.htm>

4. Fight Bac

(Consumer information site on food safety and food handling issues)

<http://www.fightbac.org>

5. “The Scrub Club”

(FDA consumer information site for kids on proper handwashing)

<http://www.scrubclub.org>

6. MEDLINE

(World’s most extensive collection of current published medical information, free Med-line searches)

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

7. National Food Safety Database

(Consumer information related to food safety)

<http://www.foodsafety.org>

8. U.S. Dept. of Agriculture (USDA)

(Current topics related to food issues)

<http://www.usda.gov/agency/fsis>

9. U.S. Environmental Protection Agency (EPA) - Beach Program

(Information on beach closings, swimming advisories, contacts for additional information on beach water quality)

<http://www.epa.gov/OST/beaches>

10. U.S. Environmental Protection Agency (EPA) - Microbiology Homepage

(Water-related issues, waterborne disease, regulations)

<http://www.epa.gov/microbes>

**FOODBORNE ILLNESS SURVEILLANCE
BACKGROUND**

Purpose

The primary purpose of surveillance is to monitor the incidence or prevalence of a disease that is placing the public health at risk. The routine and on-going collection of data according to a standard system of reporting allows for the evaluation of important health problems and prevention strategies. Surveillance data usually contains demographic information for each case, such as gender, age, location, occupation etc. (the Who, What, When and Where of the cases). The data gathered during outbreak investigations has often triggered more detailed epidemiological studies that have led to the design and implementation of prevention strategies for the particular disease.

There are two basic types of surveillance, passive and active. Passive surveillance occurs when local healthcare providers report cases regularly to the local health department based upon a published list of reportable infectious diseases. This system has the advantage of being simple and not too problematic to local healthcare providers, but may lead to incompleteness, late reporting, and under reporting of a disease. In contrast, active surveillance systems involve regular outreach to local healthcare providers and other reporters to stimulate reporting. Active systems lead to a more representative picture of disease, and assure more complete reporting of particular conditions. Since resources are often limited, active surveillance systems are often used for brief periods for discrete purposes, such as during an outbreak investigation where the pathogen involved has been identified.

The rationale for reporting foodborne illnesses began more than 50 years ago with the concern over high mortality and morbidity caused by typhoid fever and other diarrheal illnesses. It was recommended to healthcare providers that “enteric fevers” and other closely related illnesses be reported to state and local health authorities for investigation. The proposed purpose of reporting and investigation was to obtain information about the role of food, milk, and water in outbreaks of gastrointestinal illness. These reporting efforts led to the enactment of important public health measures that have decreased the incidence of foodborne illness. Furthermore, the reporting of suspected foodborne disease cases by healthcare providers and other reporters aids health officials in identifying foodborne disease outbreaks in the community. Reporting may also lead to identification of contaminated food products in a restaurant or market, correction of inadequate food preparation practices, and education of families about proper food handling in the home.

Information Collection

The collection of appropriate information is necessary for the existence of a functional surveillance program. Epidemiologists typically are interested in descriptive information gained during the investigation of a disease outbreak. This information focuses on

identifying and reporting both the pattern and frequency of health events in a population. There are three basic types of data that are necessary for describing the patterns of health and disease in human populations: person, place and time. Information collected should include patient demographics (name, age/date of birth, gender, race/ethnicity, occupation, etc.), place characteristics (location of residence, location of presumed exposure, country, state, county, city), and suspected time information (date and time of illness onset and recovery). Other important information that can aid in outbreak investigations are travel histories and other special event attendance, medical visits or hospitalizations, specific diagnosis, food items consumed, and knowledge of illness in others. All of this information can lead to the development of outbreak specific hypotheses and prevention/intervention measures.

The classification of a reported illness or cluster of illnesses is imperative in determining if a case occurred sporadically or as part of a disease outbreak. A sporadic case of illness is one that occurs at random and is not part of an identified outbreak, and there is no epidemiological information that links one case to any other reported cases. Sporadic cases of illnesses should be investigated appropriately to educate the general population and help to prevent an outbreak of disease. A foodborne disease outbreak is defined as two or more persons who experience illness after ingestion of a common food. Exceptions exist for the foodborne disease outbreak definition: one case of botulism, chemical poisoning, typhoid fever, or cholera is considered an outbreak and requires immediate follow up. To aid in the investigation process, the West Virginia Infectious Disease Epidemiology Program (IDEP) has provided a protocol directory at the following website: <http://www.wvdhhr.org/idep/a-z/a-z-wv-reportable-diseases.asp>. Please reference the IDEP website for up to date disease information and outbreak protocols.

Other resources that can be utilized to enhance surveillance activities include the West Virginia Electronic Disease Surveillance System (WVEDSS) and its associated investigation forms, laboratory reports, IDEP website disease protocols, and foodborne complaint forms. Systematic collection of data on individual foodborne illness complaints allows public health officials to look at these complaints for patterns or similarities. Periodic review of complaints can identify clusters of illness for further investigation to determine if they are related or possibly an outbreak. An example of a complaint form and instructions for use can be found within the appendices of this document (Appendix 9) and may be duplicated for inter-departmental use.

Communicable Disease Rule

Timely reporting of communicable diseases to public health authorities is an important part of public health surveillance. Prompt reporting permits rapid case investigation and early detection of outbreaks in a community and, if reported fast enough, can help to prevent further disease transmission.

In the state of West Virginia, a legislative rule (64CSR7, Reportable Diseases, Events and Conditions) mandates the reporting of certain diseases and conditions, unusual health

events, and clusters or outbreaks of diseases to the health department. It also establishes the responsibility of various individuals and facilities in controlling communicable diseases.

Reportable communicable diseases, categorized I through V, are distinguished by the timeliness in which they are to be reported to the local health departments or to the state health department. Priorities are placed on communicable diseases and conditions that are of the utmost importance to public health. This allows a more focused approach to investigations and resource allocation to the more potentially threatening public health conditions.

During case investigations of communicable diseases, state and local health department personnel and state and regional epidemiologists collect personally identifiable information relative to reportable diseases, as stated in the legislative rule 64CSR7. Although healthcare providers must report this information to the above mentioned parties, the HIPAA Privacy Rule, (45 CFR Parts 160 and 164), guarantees certain privacy rights to individuals. However, the HIPAA Privacy Rule provides that personally identifiable health information may be used and disclosed to a public health authority without the authorization of the subject of that information for public health activities and purposes that are authorized by law. For more details see www.wvdhhr.org/idep/PDFs/IDEP/HIPPA_Letter_11-05.pdf. Each of the key players in outbreak investigations has the crucial responsibility of maintaining confidentiality of the individuals involved in the outbreak. Personally identifiable information should **never** be released unless needed to properly conduct the outbreak investigation and protect the public's health. Extreme consideration should be taken to ensure that information is released only on a "need-to-know" basis.

Updates to the communicable disease rule and to the categorized list of reportable communicable diseases in the state of West Virginia will occur when the commissioner of the BPH deems necessary. The Commissioner may, by order filed with the Secretary of State, add or delete a disease or condition in any category. Because risks to the public's health change over time, priorities should be reviewed periodically. Reasons for these changes over time, and subsequent alterations to the communicable disease rule could include emerging diseases, advanced technology and its impact on surveillance systems, introduction of new vaccines and its impact on surveillance systems, and demographic changes in an area, which could include an increase in the number of immunocompromised people and an upsurge in diseases.

For more information about the Reportable Disease Rule (64CSR7) and other state public health legislation, please refer to the West Virginia Secretary of State website at www.wvsos.com/adlaw/index/INDEX3.htm#TITLE_64_.

ROLES AND RESPONSIBILITIES

Food worker

1. Maintain good personal hygiene, including frequent and proper hand washing practices.
2. Practice good food handling procedures.
3. Notify employers of illness, and exclude self from work when ill with gastrointestinal symptoms (e.g., abdominal cramping, vomiting, diarrhea, jaundice) or sore throat with fever, optimally for 48-72 hours following resolution of symptoms. This may also apply when the food worker has exposed skin lesions.
4. Fully cooperate with LHD during investigations of foodborne illness.

Person in charge (PIC) Food establishment

1. Train employees and management as to proper food handling practices and hand washing, and monitor and assess hand washing practices.
2. Exclude/restrict employees with apparent gastrointestinal illness, sore throat with fever, exposed skin lesions, or jaundice from work.
3. Promote practices and adopt policies that encourage employees to report illness and exclude themselves from work when ill.
4. Cooperate with LHDs during investigations of foodborne illness.
5. Provide adequate toilet and hand washing facilities for employees and ensure proper use.

Physicians, Health care providers

1. Report to LHD by telephone immediately upon recognition of a suspected FBO or WBO. The health care provider should consider contacting the LHD regarding any person with a communicable enteric disease that they know works as a food worker.
2. Cooperate with LHD in the investigation and control of an outbreak, including collecting specimens if requested.
3. Encourage patients to adhere to the prevention and control recommendations of the LHD.

Local health department

1. Conduct the initial investigation of a suspected outbreak. The investigation should be directed by the LHD in whose jurisdiction the outbreak originated.
2. Provide direction to food establishment operators regarding the application and removal of food employee exclusions and restrictions.
3. Immediately notify IDEP of any FBO or WBO outbreak. Notify district sanitarian as early as possible in the investigation.
4. Request assistance of the district sanitarian, regional epidemiologist, and/or IDEP, if needed, to control the spread of the outbreak.
5. Obtain human biological specimens, conduct interviews, create line lists (Appendix 2), record onset dates and times and other important epidemiologic data.
6. Provide education to food workers regarding proper food handling and personal hygiene.
7. Conduct or direct a complete environmental investigation of the facility or site of a suspected outbreak. Do a Hazard Analysis and Critical Control Points (HACCP) investigation for implicated food(s).
8. Collect food, water, and other specimens as needed.
9. Take official action to close permitted facilities and establishments if necessary and direct the implementation of other control measures as needed.
10. Assist with or develop a final outbreak report (Appendix 11) and forward a copy along with all supporting documentation (sanitarian reports, etc.) to IDEP.
11. Maintain an ongoing foodborne disease complaint file or log.

Regional Epidemiologist

1. Provide assistance in coordinating outbreak investigations and ensure the involvement of all appropriate local agencies.
2. Provide consultation and appropriate technical assistance to the LHD in epidemiologic investigation of disease outbreaks.
3. Notify IDEP of all investigations.
4. Assist the LHDs in completing outbreak investigations, initiating control measures, and submitting the report forms to IDEP.

District Public Health Sanitarian

1. Consult, participate and provide expertise in environmental investigations being conducted by LHDs when needed.
2. Inspect establishment and enforce rules pertaining to the regulation of state managed facilities.
3. Carry out roles assigned to LHD if the outbreak occurs in a state permitted and inspected facility.

4. Consult and participate (as needed) in investigations of FBO and WBOs not specifically involving permitted facilities or sites.
5. Ensure a copy of the food inspection report documenting results of investigation is forwarded to LHD, OEHS and IDEP.

Infectious Disease Epidemiology Program

1. Provide consultation and technical assistance to regional epidemiologists and LHD staff in the epidemiologic investigation of disease outbreaks.
2. Provide guidance on the epidemiologic investigation and control of a specific outbreak consistent with state and national objectives, current policy, and current medical and scientific literature, such as developing questionnaires, conducting data analysis, etc.
3. Determine whether a particular outbreak warrants further epidemiologic investigation (case-control or cohort study) and the nature and extent of additional epidemiologic or laboratory data required.
4. Report all FBO and WBO to the CDC using the appropriate reporting system.
5. Identify and arrange for additional staff and material resources if an outbreak exceeds the resource capacity of the LHD.
6. Provide advice on collection of food, water, or other specimens in coordination with OLS and/or OEHS.
7. Recommend and request implementation of control measures.
8. Maintain and distribute surveillance information and summary reports relating to FBOs and WBOs to LHDs, regional epidemiologists, physicians and other agencies.
9. Provide training materials instructive in the methods of FBO and WBO investigations.
10. Collaborate, inform, contact and liaison with federal, other states and WV agencies as needed. If warranted, request additional assistance from CDC in conducting further epidemiologic investigation of the outbreak (e.g., Epi-Aid).

Office of Environmental Health Services

1. Provide technical assistance, training and support to district offices and LHDs, when requested, regarding the investigation and follow-up of FBOs and WBOs related to permitted establishments.
2. Coordinate with LHD personnel to provide investigation services within their jurisdiction.
3. Monitor and evaluate the inspection and enforcement procedures and practices of regional offices and LHD environmental sanitation programs to promote uniform interpretation and application of rules relating to permitted establishments.

4. Maintain and update the OEHS Procedures Manual concerning food and waterborne disease complaints and suspected outbreaks.

Office of Laboratory Services

1. Provide consultation regarding proper collection, handling, and testing of clinical or environmental specimens.
2. Provide timely and accurate testing of clinical or environmental specimens for evidence of microorganisms.
3. Report laboratory test results to LHD and IDEP.
4. Forward specimens to CDC for more specific testing when indicated or requested by IDEP or CDC for surveillance purposes.

**INVESTIGATING FOODBORNE ILLNESS
OUTBREAKS**

Establishing the Existence of an Outbreak

The first step in an outbreak investigation is to confirm the existence of an outbreak. In West Virginia, a foodborne disease outbreak is defined as an incident in which two or more persons experience a similar illness **after ingestion of a common food, and epidemiologic analysis implicates the food as the source of the illness**. Exceptions include one case of botulism, *Salmonella typhi*, chemical poisoning and cholera. A positive laboratory confirmation of a disease-causing organism is not necessary to determine that a foodborne outbreak has occurred nor is a confirmed lab report needed to begin an investigation. All reports of possible foodborne illness in two or more persons with similar symptoms and a common exposure should be investigated to determine if an outbreak has occurred.

Verifying the Diagnosis

Review the patients' clinical findings/histories and laboratory results. To verify that clinical and laboratory findings are consistent, interviews with 8 to 10 ill persons need to be conducted to confirm that the symptoms were reported accurately and that the symptoms are compatible with the diagnosis. Compare symptoms reported by ill persons with Appendix 1, Disease Causing Agent Information. If patient histories are not consistent with each other or are not consistent with a known clinical syndrome, consult a clinical expert.

In general, laboratory specimens should be submitted for at least 8 to 10 ill persons. If a satisfactory case definition can be constructed, non-laboratory confirmed cases can be "diagnosed" using the case definition.

Construct a Working Case Definition

A case definition is a standard set of criteria for deciding whether an individual should be classified as having the health condition of interest. Each case definition is unique to the outbreak for which it is created, but all should include clinical criteria and restrictions by person, place, and time. The clinical criteria should be based on simple and objective measures, for example, fever, three or more loose bowel movements per day, etc.

In the beginning of an investigation, a case definition should be broad (i.e., sensitive) to capture every possible case. As you gather more information, you will refine your definition to make it more specific and eliminate those who are not true cases. It is very important that the exposure or risk factor you are interested in evaluating not be included in the case definition.

Find Cases Systematically and Record Information

In the event of a suspected outbreak it is imperative for you to begin active surveillance. This means you interview ill persons for names of others who may have similar symptoms. Contact health care providers, clinics, hospitals and labs for possible cases that have not been diagnosed or reported. If there is significant risk to the health of others who may have been exposed, you may find it necessary to use the media to find other cases.

To get complete and accurate data everyone interviewing cases needs to ask the same questions. You will need to create a questionnaire for your interviewers and provide guidance for consistent administration of the questionnaire amongst interviewers.

Categories of information you want to include on your questionnaire are:

- Identifying information (name, address, phone number)
- Demographic information (age, sex, education level, occupation)
- Clinical symptoms (signs and symptoms of the illness, date of onset, time of onset, length of illness, lab results)
- Exposure or risk factor information (what, where, and when the person ate)
- Source of information (contact information on interviewee and interviewer)

While finding cases and collecting data, construct a basic line listing. A line listing allows information about time, person, and place to be viewed quickly. A line listing should include the patient's name, age, gender, date and time of symptom onset, symptoms experienced, lab tests conducted to confirm suspect diagnosis and their results, and space for additional comments. An example line list form can be found in Appendix 2.

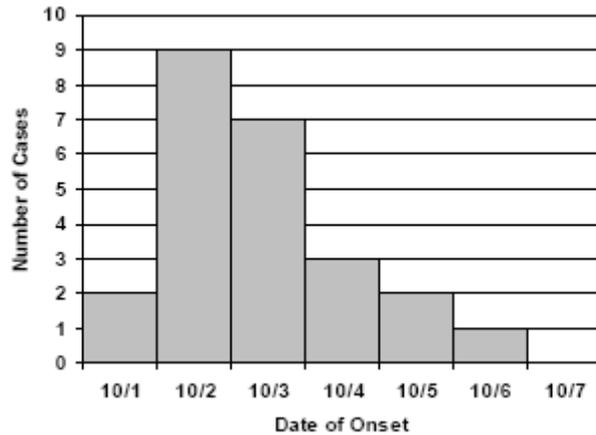
Perform Descriptive Epidemiology

Organize all information collected and results of tests conducted. Summarize data regarding the persons affected, place and time. Construct epidemic curves to detect the course of the outbreak and to determine if the illness originated from a single source or is ongoing. Review data to determine who is at risk (age, gender, occupation, grade, etc.) and where ill people live, work, etc. Define the geographic extent of the outbreak and the population at risk. **Consult an experienced epidemiologist to aid with these tasks.**

Epidemic Curves

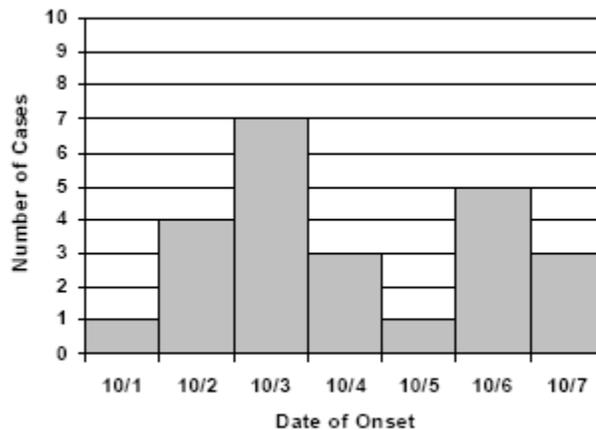
An epidemic curve (epi curve, for short) is a histogram, or chart, that provides a visual depiction of the outbreak and offers information related to time, the extent of the outbreak, the potential period of exposure, and the potential mode(s) of transmission. Most often, an epi curve plots time on the x-axis and the number of ill persons or cases on the y-axis. As a rule of thumb, the increments of time used on the x-axis should be roughly $\frac{1}{4}$ to $\frac{1}{3}$ of the incubation period, if the incubation period is known.

Common-source or point-source outbreaks occur when individuals are exposed to some source of infection at the same time. An example of a point-source foodborne disease outbreak is illness experienced by guests who attended and ate food served at the same wedding reception. Foodborne disease outbreaks are most often point-source outbreaks. An epi curve with a sharp upward slope and a gradual downward slope typically describes a point-source outbreak. See the example below.



If the epi-curve suggests a common source or point source outbreak, the investigation needs to focus on factors such as food history, water consumption, and group activities. Keeping the focus on things or places that could be the source of the common exposure between the cases.

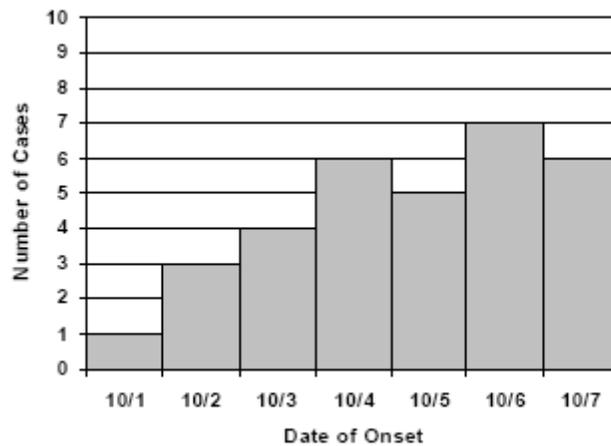
Propagated-source or person-to-person outbreaks occur when infection is spread from one person to another via the fecal-oral route. An example of a person-to-person outbreak is norovirus infections within a nursing home. Infection spreads from one resident to another due to poor handwashing and inadequate disinfection. Propagated outbreaks may last longer than common- or point-source outbreaks, and may lead to multiple waves of infection if secondary and tertiary cases occur. The classic propagated outbreak epi curve has a series of progressively taller peaks, each an incubation period apart. See below.



For person to person or propagated source outbreaks, the investigation needs to focus on transmission methods. Cases should be questioned about poor hygiene, diapering, food handling, and sexual practices. In these types of outbreaks a food history may not be relevant.

Continual-source outbreaks occur when a source remains contaminated and illness continues due to an ongoing exposure. An example of a continual-source outbreak is a community that continues to use water obtained from a contaminated well. The epi curve is characterized by a

gradual rise in the slope of the curve that often plateaus, or flattens out, and remains elevated until the source of infection is eliminated.



The epi-curve is an essential tool in an outbreak investigation and is crucial in determining the type of outbreak. Once the type of outbreak is identified, this guides the investigation steps and control measures that should be implemented.

Develop Hypotheses

A hypothesis is an educated guess about the cause of the outbreak and the factors that may have contributed to illness. Investigators develop possible hypotheses to guide the direction of the investigation and to initiate appropriate control measures. In most instances, investigators begin to formulate hypotheses during the initial phone call and continue to refine these hypotheses as more information becomes available.

The symptoms experienced, the incubation period, the recovery period, the food items served, the biological plausibility of pathogens, and the tools (line list, maps, charts, etc.) used to organize the outbreak information provide invaluable clues about the source and cause of illness. The sooner these hypotheses are developed, the sooner public health interventions may be implemented. Hypotheses may need to be revised during the outbreak investigation, as new information becomes available.

Implement Preventive and Control Measures

The priority during each investigation should be to implement effective control measures. Investigators should respond and implement appropriate public health action as early in the investigation as possible. Control measures should be targeted to interrupt the transmission of disease. Important control and prevention measures related to foodborne disease outbreaks may include, but should not be limited to, the following:

- Emphasizing good handwashing
- Removal of contaminated food

- Education of food service workers, managers, patients, or the public at large concerning adequate cooking, adequate holding temperatures, and how to avoid cross-contamination
- Exclusion and restriction of persons who are at high risk of spreading illness, including food handlers, day care attendees and providers, and persons involved with patient care
- Grouping ill individuals with dedicated staffing in their areas in residential facilities
- Thorough cleaning of contaminated areas
- Closing the food establishment, if implicated and necessary
- Protection of close contacts and exposed individuals through immunization and/or antibiotic treatment, if indicated based upon the suspected disease-causing agent.

Evaluate and Reconsider, Redefine and Re-evaluate Hypotheses as necessary

A hypothesis is accepted or rejected on the basis of the available data and appropriate statistical analysis. A more systematic study can be conducted as needed to improve the sensitivity and specificity of the findings, and assist in arriving at more definitive conclusions. An experienced epidemiologist needs to be consulted to aid with such activities.

Communicate Findings: The Outbreak Report

The final task of the investigation is to communicate the findings of the investigation. While oral briefings are usually given, it is imperative to provide a written report of the investigation and its findings. The written report formally presents recommendations as a blueprint for action, and also serves as a record of performance and documentation for potential legal issues. A written report generally follows the regular outline of a scientific report, and should include the following sections:

- INTRODUCTION**
- BACKGROUND**
- METHODS**
 - Epidemiologic
 - Environmental
 - Laboratory
- RESULTS**
 - Epidemiologic
 - Environmental
 - Laboratory and clinical
- DISCUSSION**
- RECOMMENDATIONS**
- ACKNOWLEDGMENTS**
- SUPPORTING DOCUMENTS**

It is the responsibility of the lead investigator to compose the written report, with assistance from those who helped gather the information. A final report should be issued within 60 days of notification of the outbreak. The completed written report should be disseminated to those who

participated in the investigation, local health authorities, and those who will be responsible for implementing the recommendations and prevention measures.

Further details regarding outbreak reports can be found in Appendix 11.

COLLECTION OF BIOLOGICAL, FOOD, AND WATER SAMPLES

Collecting Food Samples

OLS will perform testing on samples for the presence of disease-producing bacteria only on food implicated in an outbreak under investigation by public health officials. OLS must be notified in advance of any food specimens being sent for testing.

OLS tests food samples for the presence of *Salmonella* species, *Shigella* species, *Escherichia coli* O157:H7, *Listeria monocytogenes*, *Staphylococcus aureus*, and *Campylobacter jejuni*. *Vibrio* species and *Bacillus cereus* identification is available by special request and only after consultation with OLS.

Samples of all available food items from the implicated meal or event should be obtained. The person or persons collecting the food samples must contact OLS by telephone PRIOR to submitting the samples.

Use data such as complaint forms, interviews, attack rates, etc. to determine a suspect food. If no suspect food is left, sample similarly prepared food. Areas to look for suspect food include storage areas, garbage can or dumpster (post-incident contamination likely), other foods from the suspect meal, additional containers with same code or lot number, and food saved by sick patients.

Collection Instructions

1. Collect the food samples using aseptic (sterile) techniques as much as possible. Use sterile jars, containers, or plastic bags in which to place samples. Use sterile pre-wrapped utensils for sampling.
2. Provide a large enough sample, approximately ½ lb or 200ml (100-150 grams or 4-6 fluid ounces).
3. Collect frozen samples in pre-chilled containers and keep frozen.
4. Record temperature at which food is stored.
5. If sample is hot, cool it with ice or cold running water.
6. Do not fill containers to the brim.
7. Make sure all caps are tight to avoid leakage.
8. Label each sample container with a unique identifier.
9. Complete a “Food Laboratory Specimen Submission Form” form (Appendix 5), available at OLS website - www.wvdhhr.org/labservices/forms. Make sure the unique identifier from the container is also on the form.
10. Transport at < 40° F. for potentially hazardous foods (insulate with ice packs).
11. Record all samples sent
 - o ID number
 - o Date
 - o Time
 - o Type of sample
 - o Type of test
12. Mail tightly sealed sample(s) and all forms in insulated container to OLS, priority status. See “SHIPPING” on page 41 for information on shipment of specimens.

Collection of Water Samples

Municipal Water Systems

Sample collection and handling of potable waters

Most tap water in West Virginia is suitable for drinking and other home uses. There are, however, circumstances that can lead to contamination of water supplies, both public and private. Public water supplies are regularly tested by local municipalities for indicators of fecal pollution and toxic chemicals and must meet state and federal standards. Despite routine monitoring, problems can occur as demonstrated by various waterborne outbreaks.

When an outbreak occurs and is thought to be waterborne, the involved water system should be inspected. The following factors should be assessed: the source of the water, the method of water treatment, recent problems with the system, recent water testing results, any recent repairs or alternations of the distribution system, and any recent power or water pressure disruptions which might have resulted in contamination through cross contamination or back-siphonage.

The identification of etiologic agents responsible for WBOs is dependent on the timely recognition of outbreaks so that appropriate clinical and environmental samples can be collected. The surveillance systems, interests and expertise of LHDs, and available revenues and resources often affect this.

Another consideration in water sampling is timing. Samples should be collected, transported to the testing laboratory, and processed as quickly as possible after an outbreak occurs because the contamination may have been transient, and samples collected during later dates may not reflect the condition of the water when it was potentially contaminated.

The same procedures are used for collecting water samples from municipal water supplies and private wells. Sampling procedures are printed on the back of the EM-1 Water Bacteriological Report Form provided by the OLS Environmental Microbiology section. These same procedures should be followed with samples sent to one of the private laboratories “certified” to do bacteriological testing by the OLS. Water sample containers provided by OLS are the property of OLS and should not be used for samples sent to private labs. The Environmental Microbiology telephone number is (304) 558-3530 ext. 2711.

Collection of water samples for *Legionella*

Legionella spp. are ubiquitous in the environment, therefore testing should only be undertaken if there is epidemiologic evidence of a common source. OLS does not perform testing for *Legionella spp.* in water. If testing is indicated by the results of an epidemiological study, IDEP can consult CDC for appropriate testing recommendations.

Collection of water samples for chemical contamination

If an outbreak (or single case) is suspected to be chemically-induced, immediately contact the OLS Environmental Chemistry unit and IDEP. These offices should be contacted before collecting samples. It is imperative to discuss the case or investigation before collecting samples because the laboratory would need to know the type of chemical suspected in order to know what samples to collect, how to store the specimens, and how to ship the samples to the proper laboratory.

Private water systems

Wells

For those individuals with a private water system, usually a well, the responsibility for testing resides with the individuals who own the well site. Annual testing of wells is recommended, especially if the well is located near sources of potential contamination. Even if the water is currently safe, routine testing provides a water quality record if problems arise. Routine testing should include screening for coliform bacteria and E. coli.

Circumstances for which more frequent testing (both bacteriological and chemical) would be recommended include: a well located near septic fields, a dump, landfill, factory, underground storage tank, or a mining operation, intensive agriculture or livestock operations, or when a consumer of the water is pregnant. Natural disasters such as flooding may also necessitate water testing. If flooding occurs, bottled water or water brought to a “rolling boil” for one minute should be used until the well can be tested and, if necessary, disinfected. Consideration should be given to the fact that boiling water will concentrate nitrate levels if the water is to be consumed by pregnant women or infants.

Collection of potable water from wells

- a) Locate a sample tap near the well, preferably not a leaky or outside faucet. Remove any screens or aerators from the tap.
- b) Allow the water to run for several minutes. **Do not change the flow rate, do not shut the faucet off, and do not wipe or wash the faucet prior to sample collection.**
- c) Do not open the bottle until ready to collect the sample. Take care not to touch the top of the collection bottle or inside of the cap. Fill the bottle to within ½ inch of top.

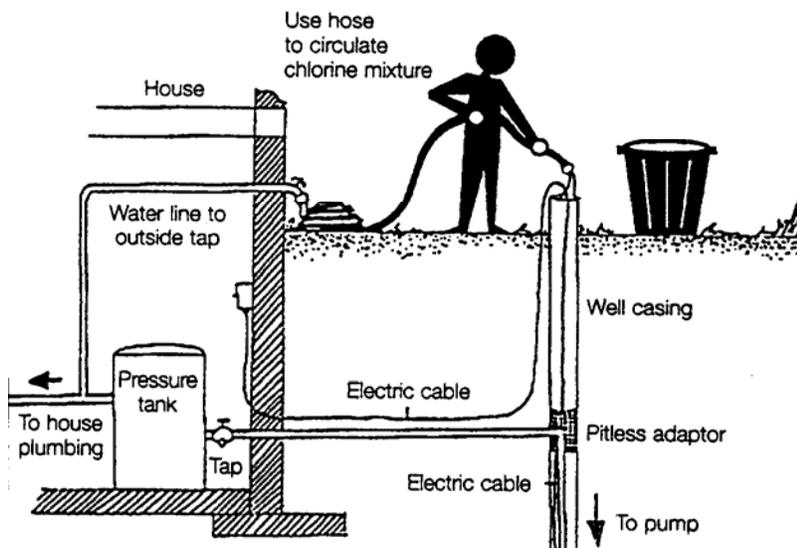
Possible sources of bacterial contamination of wells

- Not following sampling instructions properly.
- Insects getting into the well through non-vermin-proof cap or seal or a loose well cap.
- The well casing is not properly sealed into the rock formation.
- The well casing does not terminate at least 12 inches above the ground.
- The well terminates in a nonconforming pit, which may be subject to flooding or seepage from groundwater.

- Contamination of new wells because the drill hole becomes contaminated through dirty tools, pipe and drilling water.
- Recent repairs or construction to the plumbing system may contaminate the system.
- Flooding or other natural disasters.

Disinfection of the well and water system

Well Disinfection



Wells may be disinfected once an inspection has determined that the water system is free from any continual contamination.

- Mix one gallon of household laundry bleach with 4 gallons of water.
- Remove the cap from the well and pour half of the bleach and water solution into the well.
- Rinse down the sides of the well casing with a garden hose for five to 10 minutes. The rinse water should be from a hose on the water system being disinfected. This procedure circulates the bleach through the water system to insure better disinfection.
- Turn on all the taps until you smell the bleach, then turn the taps off.
- Pour the remaining bleach and water solution into the well.

- f) Let the bleach remain in the system for at least 12 hours (preferably 24 hours).
- g) Pump all the bleach out of the water system by running the water through a garden hose to an area where the bleach will not damage lawns, shrubs, or septic systems. Pump until the bleach odor is no longer apparent.
- h) Once chlorine can no longer be detected in the water, contact the LHD to request a water sample from the well be taken for bacteriological analysis.
- i) It would be advisable to have an additional water sample taken one month after the initial sample to assure the well is maintaining safe, quality water.

Collection of water samples for chemical contamination

If an outbreak (or single case) is suspected to be chemically-induced, immediately contact the OLS Environmental Chemistry unit and IDEP. These offices should be contacted before collecting samples. It is imperative to discuss the case or investigation before collecting samples because the laboratory would need to know the type of chemical suspected in order to know what samples to collect, how to store the specimens, and how to ship the samples to the proper laboratory.

Recreational water

In addition to these procedures, swabs from skimmers, filters, and drains may also be used for investigations of outbreaks of *Pseudomonas folliculitis* outbreaks involving swimming pools or whirlpools.

Collection of Biological Specimens

It is important to start collection of stool specimens immediately after becoming aware of an outbreak. The optimum time of collection is during the acute onset of illness; preferably during the first 48 hours of illness. Encourage ill persons to submit specimens while they are still experiencing symptoms of illness. Aim to collect samples from 8-10 ill persons. In addition to collecting specimens from ill persons, it may be necessary to also collect specimens from well/asymptomatic persons.

OLS routinely tests stool specimens for the presence of *Salmonella* species, *Shigella* species, *Campylobacter jejuni*, and *Escherichia coli* O157:H7. *Vibrio* species, *Aeromonas hydrophilia*, *Staphylococcus aureus*, and *Bacillus cereus* testing is available upon special request and only after consultation with OLS. Stool specimens submitted for viral testing are only tested for the presence or absence of Norovirus RNA, and testing will only be performed after consultation with IDEP.

Bacterial Testing

- Obtain specimens PRIOR to antibiotic treatment, if possible. A repeat specimen may need to be obtained if the person was taking antibiotics when the initial culture was taken.
- Stool specimens should be collected in Cary-Blair or equivalent enteric bacteria transport media as per instructions in Appendix 3.
- Completely fill out the “Microbiology Laboratory Specimen Submission Form” (Appendix 6) available at OLS website - www.wvdhhr.org/labservices/forms.
- See “SHIPPING” on page 41 for information on shipment of stool specimens.

Viral Testing

- Stool specimens should be collected in screw-top, sterile containers as per instructions in Appendix 4.
- It is very important to refrigerate specimens immediately after collection and to keep them cool (not frozen) at all times.
- Completely fill out the “Microbiology Laboratory Specimen Submission Form” (Appendix 6) available at OLS website - www.wvdhhr.org/labservices/forms. Make sure to note the IDEP contact name in the space provided.
- See “SHIPPING” on page 41 for information on shipment of stool specimens.

Parasitic Testing

- Stool specimens should be collected in 10% formalin as per instructions in Appendix 3.
- Completely fill out the “Microbiology Laboratory Specimen Submission Form” (Appendix 6) available at OLS website - www.wvdhhr.org/labservices/forms.
- See “SHIPPING” on page 41 for information on shipment of stool specimens.

Rectal Swabs

IMPORTANT: Rectal swabs should only be collected by qualified medical personnel, such as a physician or nurse.

Stool specimens are preferred over rectal swab specimens. However, in the event that whole stool specimens cannot be obtained, OLS will accept rectal swabs for viral testing only (Norovirus). Bacterial recovery from rectal swabs is limited.

- Collect rectal swabs from ill persons who attended the same event or consumed the same meal.
- Insert swab(s) into sterile saline or sterile water prior to collection.
- Insert swab(s) approximately 1 inch to 1 ½ inch into the rectum of the patient.
- In order to obtain a representative sample, the rectal swab must be inserted beyond the anal sphincter muscle.
- Place rectal swab(s) into a tube containing sterile saline or sterile water and seal tightly to avoid leakage.

Only use Dacron (polyester) or cotton swabs. Calcium alginate is inhibitory to PCR testing.

Keep specimen refrigerated until shipment. See “SHIPPING” below for information on shipment of rectal swabs.

Shipping

Stool Specimens

- BACTERIAL - Stool specimens shipped to OLS for bacterial testing should be shipped at room temperature. It is not necessary to refrigerate Cary-Blair, C&S, or other enteric bacteriologic transport media unless shipment of specimen does not occur immediately. Refrigerate the stool specimens if unable to ship soon after collection.
- VIRAL – Stool specimens shipped to OLS for viral testing (Norovirus) must be shipped refrigerated, not frozen. It is also necessary that stool specimens be kept refrigerated until ready to ship.
- PARASITIC – Stool specimens shipped to OLS for parasite testing should be shipped at room temperature. It is not necessary to refrigerate 10% formalin.

All stool specimens shipped to OLS for testing should be shipped as Category B, Infectious Substances (UN3373). Please refer to Appendix 7 for more information on shipping regulations.

Food Specimens

Food specimens shipped to OLS for testing should be shipped refrigerated unless the specimen was originally frozen. If the specimen was originally frozen, the specimen should be shipped frozen.

There are no regulations on food specimens shipped to OLS for testing.

Rectal Swabs

Rectal swabs shipped to OLS for testing do not require special handling and are under no shipping regulations. Make sure that specimen is transported so that container does not break and will not leak. Specimens should be shipped with ice packs.

Reports

Stool Specimens Submitted for Bacteriological Testing

The submitter of the specimen will receive a report after all testing is complete detailing the patient information supplied with the specimen and a final identification, if any, of the bacterial isolate as well as any other pertinent results. If the final identification results in a bacteria listed in the WV Reportable Infectious Diseases list (WV Code 16-3-1; 64CSR7), the county health department of the county in which the patient resides will also receive a copy of the final report as well as the state level epidemiologist.

Stool Specimens Submitted for Viral Testing

The submitter of the specimen will receive a report after testing is complete. The report will contain the patient information supplied with the specimen along with a final result. The state level epidemiologist will also receive a copy of the final report as well as the county health department of the county in which the patient resides. The final result will indicate either “Norovirus RNA was detected by RT-PCR” or “Norovirus RNA was not detected by RT-PCR”. As per instructions in Appendix 4, the OLS does not test every stool specimen submitted for viral testing. In the event that a specimen does not get tested, the submitter will receive a report as follows:

“This specimen was submitted as part of an outbreak; however, it was not tested. “X” out of “Y” specimens submitted as part of this outbreak investigation tested positive for the presence of Norovirus. Due to these results, the submitter can assume that if the patient is epidemiologically linked to the outbreak, then the patient is part of the outbreak.”

Stool Specimens Submitted for Parasitic Testing

The submitter of the specimen will receive a report after all testing is complete detailing the patient information supplied with the specimen and a final identification, if any, of the parasite identified as well as any other pertinent results. If the final identification results in a parasite listed in the WV Reportable Infectious Diseases list (WV Code 16-3-1; 64CSR7), the county health department of the county in which the patient resides will also receive a copy of the final report as well as the state level epidemiologist.

Food Specimens Submitted for Bacteriological Testing

The submitter of the specimen will receive a report after all testing is complete detailing the food information supplied with the specimen and a final identification, if any, of the bacterial isolate as well as any other pertinent results. If the final identification results in a bacteria listed in the WV Reportable Infectious Diseases list (WV Code 16-3-1; 64CSR7), the county health department of the county in which the patient resides will also receive a copy of the final report as well as the state level epidemiologist.

ADDITIONAL INFORMATION

If after receiving a report, the submitter or county health department has any questions regarding the information contained on the report, they may contact the Office of Laboratory Services, Microbiology Section as follows:

167 11th Avenue
South Charleston, WV 25303
(304) 558-3530

Stool (bacterial and parasitic) and Food Testing – extension 2602 or 2610

Norovirus Testing – extension 2144 or 2301

ENVIRONMENTAL INVESTIGATION

Food Establishment Inspections

Food Establishments are Systems with four basic components:

- 1 – Input (food enters the system)
- 2 – Processes (food is prepared in the system)
- 3 – Output (the product that results from the process)
- 4 – Feedback (information that can be used to evaluate and monitor the system)

At any point, the system can be contaminated resulting in a potential foodborne disease or illness in humans.

Food Establishment inspections are conducted on a routine basis for regulatory purposes. These inspections focus on the *present* circumstances in the food establishment, compliance with the Food Code, and the probability of the food establishment system to produce a foodborne disease or illness.

Environmental Health personnel have the authority to seize, embargo and sample any implicated food at the time of the investigation. The embargo, or seizure of food, may take various forms depending on the type and degree of contamination. Seized or embargoed food may be held in locked facilities until tested and either released or removed. Removed food must be reprocessed under supervision by converting it to animal feed, disposing of it in a dumpster and pouring bleach over it, burying it, or otherwise destroying it. Most food processors will voluntarily recall their products if the food is suspect. A copy of the Official Notice of Embargo-Seizure form (SF-39) can be found in Appendix 10.

When there is a suspected foodborne disease outbreak associated with an establishment, an Environmental Risk Assessment of the establishment may need to be conducted. This determination to conduct such an Assessment is based on the number of suspect cases, the number of confirmed cases, and the possible links between cases and the food establishment. The Environmental Risk Assessment focuses on *past* events in attempting to determine:

- 1 – What happened,
- 2 – Why it happened, and
- 3 – What corrective measures can be taken.

An Environmental Risk Assessment includes the following steps:

- 1 – Prepare – Review known epidemiological and case information
- 2 – Interview – Gain information from the manager and food-service workers
- 3 – Observe – View practices of receiving, storage, preparation, and worker activities
- 4 – Collect Samples – Use proper sampling techniques and containers
- 5 – Record – Document findings
- 6 – Analyze – Utilize epidemiological investigation information and laboratory results to identify implicated foods and/or processes

- 7 – Correct – Implement corrective actions
- 8 – Summarize and report findings in writing

When suspected food items are implicated as the source of an FBO through the environmental risk assessment of the facility, a HACCP inspection should be conducted on the implicated item(s).

Conducting HACCP Inspection on Implicated Foods

What is HACCP? (Hazard Analysis Critical Control Point)

HACCP is a prevention based food safety system that reveals specific factors that contribute to food safety breakdowns. The system identifies and monitors specific foodborne hazards, and biological, chemical, or physical properties that can adversely affect the safety of the food product.

- Focus is on the food factors that cause foodborne illness.
- Purpose is **prevention** of hazards that cause illness or injury.

The hazard analysis serves as the basis for establishing critical control points (CCPs). CCPs identify those points in the process that must be controlled to ensure safety of the food.

Potential Hazards or Critical Control Points

- Receive
- Store
- Prepare
- Cook
- Hot holding
- Time alone as a Microbial Growth Barrier
- Cooling
- Reheating

Control Measures for Food Preparation

- Source of Ingredients
- Recipes
- Processing equipment
- Food storage
- Preparation from back door through the front door and beyond if necessary.
- Time in process and storage
- Expertise and attitudes of the people involved

Identify Violations and Initiate Correction

- Determine the disposition of any food that was produced when a deviation was occurring.
- Correct the cause of the deviation and ensure that the critical control point is under control.
- Maintain records of corrective actions.

Verification of Corrective Action

- Specific corrective action plans must be developed for each CCP.
- The actions must demonstrate that the CCP has been brought under control.
- Individuals who have an understanding of the operation, product, and HACCP plan must be assigned responsibility for taking corrective action.
- Corrective action procedures must be documented in the HACCP plan.

Rapid and appropriate actions are warranted if the disease under investigation has severe manifestations, (e.g., botulism), has a high probability of extensive spread of the agent (e.g., shigella), or puts highly susceptible persons (e.g., aged or infants), at risk. Until it is reprocessed, discarded, or proven safe, appropriate action must be taken (such as embargo) to prevent the distribution or the serving of any suspect food.

DISEASE CAUSING AGENT INFORMATION

Appendix 1
Disease Causing Agent

Criteria for confirmation of bacterial agents responsible for foodborne and waterborne illness.

Etiologic Agent	Incubation Period Average (Range)	Clinical Syndrome	Characteristic Foods
<i>Bacillus cereus</i>	A. Vomiting type 2-4 hours (1-6 hours) B. Diarrheal type 12 hours (4-16 hours)	A. Vomiting, nausea, occasional diarrhea (Heat-stable enterotoxin) B. Diarrhea (watery), abdominal cramps (Heat-labile enterotoxin)	A. Boiled or fried rice B. Custards, sauces, meat loaf, cereal products, refried beans, dried potatoes
<i>Campylobacter jejuni</i>	2-5 days (1-10 days)	Abdominal cramps (often severe), diarrhea, bloody diarrhea, fever, headache	Poultry, unpasteurized milk, water, raw clams
<i>Clostridium botulinum</i>	12-48 hours (2 hours -8 days)	Acute bilateral cranial nerve impairment and descending weakness or paralysis; usually preceded by blurred or double vision, difficulty swallowing, dry mouth, vomiting and constipation	Canned low-acid foods, smoked fish, cooked potatoes, marine mammals
<i>Clostridium perfringens</i>	10-12 hours (6-24 hours)	Diarrhea (watery), colic, nausea and gas (Vomiting and fever are uncommon and symptoms usually resolve within 24 hours).	Inadequately heated or reheated meats, meat pies, stews, gravy, sauces, refried beans
<i>Escherichia coli</i> (Enteroinvasive or Enterotoxigenic)	10-12 hours (Heat-stable toxin) 10-12 hours (Heat-labile toxin)	Profuse watery diarrhea without blood or mucus, abdominal cramping, vomiting, low-grade fever and dehydration	A. Uncooked vegetables, salads, water
<i>E. coli</i> 0157:H7 (Enterohemorrhagic)	48-96 hours (up to 10 days)	Bloody or non-bloody diarrhea, severe abdominal cramps and occasional vomiting; fever infrequent	B. Undercooked ground beef and beef, raw milk, soft cheese, water
<i>Salmonella</i> spp. (Non-typhoid)	18-36 hours (12-72 hours)	Acute enterocolitis, diarrhea, fever, nausea, abdominal cramps, headache, occasional vomiting.	Poultry, egg products, meat, unpasteurized milk
<i>Salmonella</i> Typhi	3 days - 3 months (1-3 weeks)	Insidious onset of fever, headache, malaise, constipation or diarrhea, anorexia	Fecally contaminated foods such as shellfish, raw fruits, and water
<i>Shigella</i>	24-72 hours (12-96 hours)	Diarrhea, fever, nausea, vomiting, tenesmus, severe abdominal cramping	Fecally contaminated foods such as salads, cut fruit and water
<i>Staphylococcus aureus</i>	2-4 hours (1-8 hours)	Sudden onset of severe abdominal cramps, nausea, vomiting, diarrhea, chills, headache, weakness, dizziness	Ham, meat & poultry, cream filled pastries, custard, high protein leftover foods
<i>Vibrio cholerae</i> 01 or 0139	24-72 hours (few hours - 5 days)	Sudden onset of profuse watery diarrhea, rapid dehydration, vomiting	Raw fish or shellfish, crustacea, water, fecally contaminated foods
<i>Vibrio cholerae</i> non-01		Watery diarrhea, vomiting	
<i>Vibrio parahaemolyticus</i>	12-24 hours (4-96 hours)	Watery diarrhea, abdominal cramps, nausea, vomiting, fever, headache	Marine fish, shellfish, crustacea (raw or contaminated)
<i>Vibrio vulnificus</i>	24-48 hours	Fever, nausea, abdominal cramps and muscle aches; often leads to septicemia in immunocompromised persons	raw oysters

Appendix 1
Disease Causing Agent

Criteria for confirmation of bacterial agents responsible for foodborne and waterborne illness.

Etiologic Agent	Laboratory and Epidemiologic Criteria for Confirmation	Specimen	Type of Container
<i>Bacillus cereus</i>	Isolation of 10^6 <i>B. cereus</i> /gm of implicated food, OR Isolation of <i>B. cereus</i> from stool of ill person.	5-50 g stool	Cary-Blair
<i>Campylobacter jejuni</i>	Isolation of <i>C. jejuni</i> from implicated food, OR Isolation of <i>C. jejuni</i> from stool or blood of ill person.	15 ml stool	Cary-Blair
<i>Clostridium botulinum</i>	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 stool	sterile, leak-proof container
<i>Clostridium perfringens</i>	Isolation of $>10^5$ <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	Cary-Blair
<i>Escherichia coli</i> (Enteroinvasive or Enterotoxigenic)	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, OR	15 ml stool	Cary-Blair
<i>E. coli</i> 0157:H7 (Enterohemorrhagic)	Demonstration of <i>E. coli</i> isolates from stools that are enterotoxigenic or enterohemorrhagic.		
<i>Salmonella</i> spp. (Non-typhoid)	Isolation of <i>Salmonella</i> from implicated food or water, OR Isolation of <i>Salmonella</i> from stool from ill persons.	15 ml stool	Cary-Blair
<i>Salmonella</i> Typhi	Isolation of <i>S. typhi</i> from blood, stool or other clinical specimens.	15 ml stool	Cary-Blair
<i>Shigella</i>	Isolation of <i>Shigella</i> from implicated food, OR Isolation of <i>Shigella</i> from stool of ill persons.	15 ml stool	Cary-Blair
<i>Staphylococcus aureus</i>	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	5-50 g stool	Cary-Blair
<i>Vibrio cholerae</i> 01 or 0139	Isolation of toxigenic <i>V. cholerae</i> 01 or 0139 from implicated food, OR Isolation of <i>V. cholerae</i> 01 or 0139 from stool or vomitus of ill persons, OR Significant rise (fourfold) in vibriocidal antibodies.	15 ml stool	Cary-Blair
<i>Vibrio cholerae</i> non-01	Isolation of <i>V. cholerae</i> non-01 from stool of ill person. Isolation of <i>V. cholerae</i> non-01 from implicated food is supportive evidence.		
<i>Vibrio parahaemolyticus</i>	Isolation of 10^5 /g <i>V. parahaemolyticus</i> from implicated food (usually seafood), OR Isolation of <i>V. parahaemolyticus</i> from stool of ill persons.	15 ml stool	Cary-Blair
<i>Vibrio vulnificus</i>	Isolation of <i>V. vulnificus</i> from blood of ill persons.	Blood	Sterile Container

Criteria for confirmation of viral agents responsible for foodborne and waterborne illness.

Etiologic Agent	Incubation Period Average (Range)	Clinical Syndrome	Characteristic Foods
Hepatitis A virus	28-30 days (15-50 days)	Acute febrile illness with anorexia, fever, abdominal discomfort, nausea, jaundice	Fecally contaminated cold foods or water, raw shellfish
Norovirus	30-36 hours (10-96 hours)	Nausea, vomiting (often projectile), diarrhea, abdominal cramps, muscle aches, headaches, low-grade fever	Fecally contaminated cold foods or water, oysters or clams, frostings

Criteria for confirmation of parasitic agents responsible for foodborne and waterborne illness.

Etiologic Agent	Incubation Period Average (Range)	Clinical Syndrome	Characteristic Foods
<i>Cyclospora cayetanensis</i>	7 days (1-11 days)	Fatigue, protracted watery diarrhea, often relapsing	Fecally contaminated fruits, produce or water
<i>Cryptosporidium parvum</i>	7 days (2-12 days)	Profuse watery diarrhea, abdominal cramps, nausea, low-grade fever, anorexia, vomiting	Fecally contaminated fruits, produce or water
<i>Entamoeba histolytica</i>	2-4 weeks (few weeks - several months)	Illness of varying severity ranging from mild chronic diarrhea to fulminant dysentery	Fecally contaminated fruits, produce or water
<i>Giardia lamblia</i>	7-10 days (2-25 days)	Diarrhea, abdominal cramps, bloating, weight loss, malabsorption; infected persons may be asymptomatic	Fecally contaminated fruits, produce or water
<i>Trichinella spiralis</i>	8-15 days (5-45 days)	Initially diarrhea, nausea, vomiting, abdominal discomfort, muscle aches, edema of the eyelids; variable symptoms depending on the number of larvae ingested	Undercooked pork or bear meat

Criteria for confirmation of viral agents responsible for foodborne and waterborne illness.

Etiologic Agent	Laboratory and Epidemiologic Criteria for Confirmation	Specimen	Type of Container
Hepatitis A virus	Positive anti-HAV IgM test, OR Liver function tests compatible with hepatitis in persons who ate the implicated food.	3 ml serum or 7ml vacutainer, no additives	
Norovirus	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).	15 ml stool	sterile, leak-proof container

Criteria for confirmation of parasitic agents responsible for foodborne and waterborne illness.

Etiologic Agent	Laboratory and Epidemiologic Criteria for Confirmation	Specimen	Type of Container
<i>Cyclospora cayatanensus</i>	Demonstration of <i>C. cayatanensus</i> in stool of two or more ill persons.	10-15 ml stool	10% formalin
<i>Cryptosporidium parvum</i>	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)).	10-15 ml stool	10% formalin
<i>Entamoeba histolytica</i>	Isolation of <i>E. histolytica</i> from stool of ill persons, OR Demonstration of <i>E. histolytica</i> trophozoites in tissue biopsy, culture or histopathology	10-15 ml stool	10% formalin
<i>Giardia lamblia</i>	Isolation of <i>G. lamblia</i> cysts from implicated food or water, OR Isolation of <i>G. lamblia</i> from stool of ill persons, OR Demonstration of <i>G. lamblia</i> trophozoites in duodenal fluid or small bowel biopsy, OR Demonstration of <i>G. lamblia</i> antigen by specific immunodiagnostic test (e.g., direct fluorescent antigen (DFA)).	10-15 ml stool	10% formalin
<i>Trichinella spiralis</i>	Detection of <i>T. spiralis</i> from muscle biopsy from ill person, OR Fourfold change or positive serologic test, OR Demonstration of <i>T. spiralis</i> in implicated food, OR Associated cases are confirmed if patient ate epidemiologically linked meal and is clinically compatible.	Tissue or serum	Sterile container

Criteria for confirmation of other agents responsible for foodborne and waterborne illness.

Etiologic Agent	Incubation Period Average (Range)	Clinical Syndrome	Characteristic Foods
Heavy metals (antimony, cadmium, copper, iron, tin, zinc)	Usually < 1 hour (5 minutes - 8 hours)	Compatible clinical syndrome - usually gastroenteritis with metallic taste	High acid foods/beverages stored or prepared in containers coated, lined, or contaminated with the offending metal
Scombroid fish poisoning	Usually < 1 hour (1 minute - 3 hours)	Flushing, headache, dizziness, burning of mouth and throat, upper and lower gastrointestinal symptoms, urticaria and generalized pruritis	Temperature abused fish (especially tuna, mahi-mahi, mackerel, bluefish, escolar)
Ciguatoxin	2-8 hours (1-48 hours)	Gastrointestinal symptoms followed by neurologic manifestations, including pricking or burning sensation of lips, tongue or extremities, reversal of hot/cold sensations	Fish (especially snapper, grouper, amberjack)
Paralytic shellfish poisoning (PSP)	30 minutes - 3 hours	First symptoms include tingling and numbness of lips and mouth, spreading to adjoining parts of face; symptoms vary depending on type, amount and retention of toxins in the body	Shellfish
Mushroom poisoning	6-24 hours (1-24 hours)	Initially nausea, vomiting, watery diarrhea which may progress to liver failure and death	Mushrooms (usually of the genus <i>Amanita</i>)
Monosodium glutamate poisoning	Usually < 1 hour (3 minutes - 2 hours)	Burning sensation in chest, neck, abdomen or extremities, sensations of lightness and pressure over face, or heavy feeling in the chest	Food containing large amounts of MSG (usually >1.5g)

Criteria for confirmation of other agents responsible for foodborne and waterborne illness.

Etiologic Agent	Laboratory and Epidemiologic Criteria for Confirmation	Specimen	Type of Container
Heavy metals (antimony, cadmium, copper, iron, tin, zinc)	Demonstration of high concentrations of metallic ion in implicated food or beverage (e.g., >400 ppm for tin).	*	*
Scombroid fish poisoning	Demonstration of elevated histamine levels (>50mg/100g) in implicated fish, cheese, or other food, OR Clinical syndrome in persons known to have eaten fish of Order <i>Scombroidei</i> or types of fish previously associated with scombroid poisoning (e.g., mahi-mahi, tuna, bluefish).	*	*
Ciguatoxin	Demonstration of ciguatoxin in implicated fish, OR Clinical syndrome in persons who have eaten a type of fish previously associated with ciguatera poisoning (e.g., amberjack, snapper, grouper).	*	*
Paralytic shellfish poisoning (PSP)	Detection of toxin in implicated mollusks, OR Detection of large numbers of shellfish poisoning-associated species of dinoflagellates in water from which implicated mollusks were gathered.	*	*
Mushroom poisoning	Demonstration of toxic chemical in implicated mushrooms, OR Epidemiologically implicated mushrooms identified as toxic.	*	*
Monosodium glutamate poisoning	History of ingesting implicated foods containing large amounts of MSG (usually >1.5g).	*	*

* If an outbreak involves any of the agents listed on these tables, immediately contact the OLS and IDEP to receive instructions as to which specimens to collect, how to transport these specimens.

STOOL COLLECTION INSTRUCTIONS For Enteric Bacteriology and Ova/Parasite Exams

- ❑ Obtain clean newspaper, plastic wrap (as shown below) or wide-mouthed container. Collect the stool specimen as shown below.



1. Lift the toilet seat. Cover the toilet bowl with a large sheet of newspaper or plastic wrap. Make a depression in the material with your hand to allow for collection. (If using wide-mouthed container, hold so that stool goes directly into container and does not come into contact with water or urine.)
2. Lower the toilet seat and sit to pass specimen onto newspaper or plastic wrap.

- ❑ An appropriate (i.e. bloody, slimy, watery) area of stool should be selected and sampled with the collection spoon provided in the cap of the container. Sufficient stool is added to each container to bring the liquid level up to the “fill to here” line (approximately 1 gram). **DO NOT REMOVE THE LIQUID INSIDE THE COLLECTION VIAL.**
- ❑ **DO NOT TAKE STOOL FROM TOILET BOWL.** Stool samples cannot be tested if mixed with water or urine.
- ❑ After collecting stool specimen, dispose of newspaper or plastic wrap.
- ❑ Agitate each specimen with the spoon along the sides of the container, tighten the cap and shake firmly to insure that the specimen is adequately mixed. When mixing is completed the solution should appear homogeneous.
- ❑ Fill in the information on the attached label and complete the laboratory requisition form.
- ❑ Send the specimen vial(s) to the address below:
WVDHHR/BPH/Office of Laboratory Services
Microbiology Department
167 11th Avenue
South Charleston, WV 25303

COLLECTION AND TRANSPORT GUIDELINES FOR SUSPECT NOROVIRUS OUTBREAK SPECIMENS

Noroviruses are one of the leading causes of gastroenteritis in the United States. The OLS now offers RT-PCR testing for the identification of these viruses. Below are guidelines for the collection and transport of specimens.

COLLECTION

OLS can only accept stool specimens for Norovirus testing. Ideally, specimens should be obtained during the acute phase of illness (i.e., within 48–72 hours after onset) while the stools are still liquid or semisolid because the level of viral excretion is greatest then. Specimens should be collected in a clean, preferably sterile container. Urine cups with screw top lids are appropriate. OLS offers collection vials to providers if necessary. After stool has been placed in container, place container in zippered plastic bag, preferably with absorbent material. The specimen containing bags should be refrigerated immediately after collection and mailed within two weeks.

NUMBER OF SPECIMENS

It is recommended that at least 3 symptomatic persons be tested for the presence of Norovirus during outbreak investigations. The OLS will not test individual patients. For large outbreaks, please only send one in four (25%) specimens from affected individuals to be tested, but no more than 10 specimens per outbreak.

TRANSPORT

At this time, OLS does not offer transport containers. Stool specimen containers should be sent to OLS on refrigerant packs. It is very important to keep the stool cold at all times, but not frozen. Please use insulated mailing containers to ensure that temperatures are maintained. Packages should be mailed via overnight delivery. Make sure all current shipping regulations are followed.

DISCLAIMER

RESEARCH PROCEDURE - The results of this test are obtained by the Office of Laboratory Services with research procedures or research reagents. These results must not be used for diagnosis, treatment, or in the assessment of a patient's health. The kits used for this test are not FDA approved.

REFERENCE

CDC, Morbidity and Mortality Weekly Report - June 1, 2001 / Vol. 50 / No. RR-9

Appendix 5 Food Sample Submission Form



OFFICE OF LABORATORY SERVICES
 Andrea M. Labik, Sc.D. / Director
 167 11th Avenue
 South Charleston, WV 25303
 PH: (304) 558-3530
 FX: (304) 558-2006 or 6210

PLACE BARCODE HERE
OLS USE ONLY

FOOD LABORATORY SPECIMEN SUBMISSION FORM

PATIENT INFORMATION
(if applicable)

<i>PATIENT #1</i>		
LAST NAME	FIRST NAME	MI
DATE OF BIRTH	SS# (last 4 only, optional)	
COUNTY OF RESIDENCE	SEX <input type="checkbox"/> Female <input type="checkbox"/> Male	
STREET ADDRESS		
CITY	STATE	ZIP

<i>PATIENT #2</i>		
LAST NAME	FIRST NAME	MI
DATE OF BIRTH	SS# (last 4 only, optional)	
COUNTY OF RESIDENCE	SEX <input type="checkbox"/> Female <input type="checkbox"/> Male	
STREET ADDRESS		
CITY	STATE	ZIP

NOTE: PLEASE USE BACK OF THIS FORM FOR PATIENT INFORMATION IF MORE THAN 2 PERSONS ARE INVOLVED.

SUBMITTER INFORMATION

SUBMITTER NAME		
STREET ADDRESS		
CITY	STATE	ZIP
COUNTY		
ATTENTION TO:		
PHONE NO.		
FAX NO.		

OLS USE ONLY	ACC:
<input type="checkbox"/> UNSAT	DE:
Reason/ID:	CKD:

DATE OF COLLECTION:	
TEST REQUESTED:	
<input type="checkbox"/> Routine Food Testing*	<input type="checkbox"/> Other ID
<input type="checkbox"/> Food Filth	Specify:
*Includes testing for: <i>Salmonella</i> spp., <i>Shigella</i> spp., <i>Escherichia coli</i> O157:H7, <i>S. aureus</i> , <i>C. jejuni</i> , and <i>L. monocytogenes</i> .	

ROUTINE FOOD SAMPLE INFORMATION:	
Name of Investigator	
Phone # of Investigator	
Specimen Description	
Manufacturer	
Lot Number	
Date & Time Served	
Date & Time of First Symptoms	
Number of persons consuming food	
Number of ill persons	
Suspected Organism(s)	

FOOD FILTH SAMPLE INFORMATION	
Name of Investigator	
Phone # of Investigator	
Specimen Description	
Manufacturer	
Where Purchased or Collected	
Reason for Examination	

FAILURE TO COMPLETE THIS FORM IN ITS ENTIRETY MAY RESULT IN DELAYED TEST RESULTS

Rev. 07/2007

Appendix 6 Patient Specimen Submission Form



OFFICE OF LABORATORY SERVICES
 Andrea M. Labik, Sc.D. / Director
 167 11th Avenue
 South Charleston, WV 25303
 PH: (304) 558-3530
 FX: (304) 558-2006 or 6210

PLACE BARCODE HERE

OLS USE ONLY

MICROBIOLOGY LABORATORY SPECIMEN SUBMISSION FORM

PATIENT INFORMATION

PATIENT ID (Chart #, etc.)		
LAST NAME	FIRST NAME	MI
DATE OF BIRTH	SS# (last 4 only, optional)	
COUNTY OF RESIDENCE	SEX <input type="checkbox"/> Female <input type="checkbox"/> Male	
STREET ADDRESS		
CITY	STATE	ZIP
PATIENT PHONE NO. (optional)		

DATE OF COLLECTION:	
SITE/SOURCE OF SPECIMEN:	
<input type="checkbox"/> Blood	<input type="checkbox"/> Sputum
<input type="checkbox"/> Cellulose tape mount	<input type="checkbox"/> Sputum, induced
<input type="checkbox"/> CSF	<input type="checkbox"/> Stool
<input type="checkbox"/> Nasopharyngeal	<input type="checkbox"/> Stool, bloody
<input type="checkbox"/> Rectal	<input type="checkbox"/> Throat
<input type="checkbox"/> Serum	<input type="checkbox"/> Urethra
<input type="checkbox"/> Serum, acute	<input type="checkbox"/> Urine
<input type="checkbox"/> Serum, convalescent	
<input type="checkbox"/> Wound (location: _____)	
<input type="checkbox"/> Bronchial (specify: _____)	
<input type="checkbox"/> Tissue (specify: _____)	
<input type="checkbox"/> Fluid (specify: _____)	
<input type="checkbox"/> Other (specify: _____)	

SUBMITTER INFORMATION

SUBMITTER NAME		
STREET ADDRESS		
CITY	STATE	ZIP
COUNTY		
ATTENTION TO:		
PHONE NO.		
FAX NO.		

TEST(S) REQUESTED:	
BACTERIOLOGY	MYCOBACTERIOLOGY
<input type="checkbox"/> General/Referred Culture	<input type="checkbox"/> Culture/Smear c
<input type="checkbox"/> Pertussis culture	<input type="checkbox"/> TB ID/Confirmation R
<input type="checkbox"/> Enteric (stool in Cary-Blair)	<input type="checkbox"/> MOTT Identification R
<input type="checkbox"/> Gonorrhea culture	Suspected Organism:
<input type="checkbox"/> Gonorrhea smear	Patient taking TB drugs? <input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Unknown bacteriology ID	Date growth appeared:
Suspected Organism:	Refrigerated? <input type="checkbox"/> Yes <input type="checkbox"/> No

MANDATORY ARBOVIRUS INFORMATION
Date of Symptom Onset:
Clinical Symptoms:
[CSF Information] Total WBC: Total Protein:

VIROLOGY ISOLATION	PARASITOLOGY
<input type="checkbox"/> Respiratory virus panel <small>(inc. culture for Influenza, Adenovirus, Parainfluenza, and RSV)</small>	<input type="checkbox"/> O&P, 10% formalin
<input type="checkbox"/> Influenza A subtyping	<input type="checkbox"/> O&P, PVA
ARBOVIRUS	<input type="checkbox"/> O&P, other (inc. pinworm)
<input type="checkbox"/> Arbovirus antibody, human	MOLECULAR
Comments:	<input type="checkbox"/> Norovirus RT-PCR
	ONLY AFTER IDEP CONSULTATION EPI CONTACT NAME:

MANDATORY VIROLOGY ISOLATION INFORMATION
Travel History (Date/Location):
Date of Symptom Onset:
Animal Contact ? <input type="checkbox"/> Yes <input type="checkbox"/> No Avian Contact ? <input type="checkbox"/> Yes <input type="checkbox"/> No
Received current vaccine? <input type="checkbox"/> Yes <input type="checkbox"/> No
Vaccine Location: Within last 3 weeks? <input type="checkbox"/> Yes <input type="checkbox"/> No

OLS USE ONLY	<input type="checkbox"/> SATISFACTORY	ACC:
<input type="checkbox"/> UNSAT Reason/ID:		DE:
<input type="checkbox"/> UNRELIABLE Reason/ID:		CKD:

FAILURE TO COMPLETE THIS FORM IN ITS ENTIRETY MAY RESULT IN DELAYED TEST RESULTS

Rev. 07/2007

SHIPPING AND PACKAGING INFORMATION

USPS

Division 6.2 Infectious Substances - 39CFR Part 777

The US Postal Service has revised its mailing standards and packaging requirements for Division 6.2 infectious substances based on the World Health Organization's criteria. These changes were effective November 1, 2006. The Office of Laboratory Services is making the required changes to comply with the regulations. The following information is the pertinent parts of the new rule that will affect shipping specimens to OLS:

1. The shipping name "Diagnostic Specimen" is being replaced by "Biological Substance Category B."
2. The OUTER shipping container must bear the name "Biological Substance Category B" and marked with the identification number "UN3373". These labels are available at the local post office, free of charge.
3. Packaging of Category B Infectious Substances
 - ▶ Primary receptacle – must be leak proof or sift proof and surrounded by absorbent material.
 - ▶ Secondary container – must be leak proof or sift proof and marked with the international biohazard symbol.

NOTE: The USPS is no longer categorizing Infectious Substances by "Risk Group" 1, 2, 3, or 4. Current classification is Category A (non-mailable) or Category B. A copy of this new rule can be accessed at the following URL address:

<http://a257.g.akamaitech.net/7/257/2422/01jan20061800/edocket.access.gpo.gov/2006/E6-18062.htm>

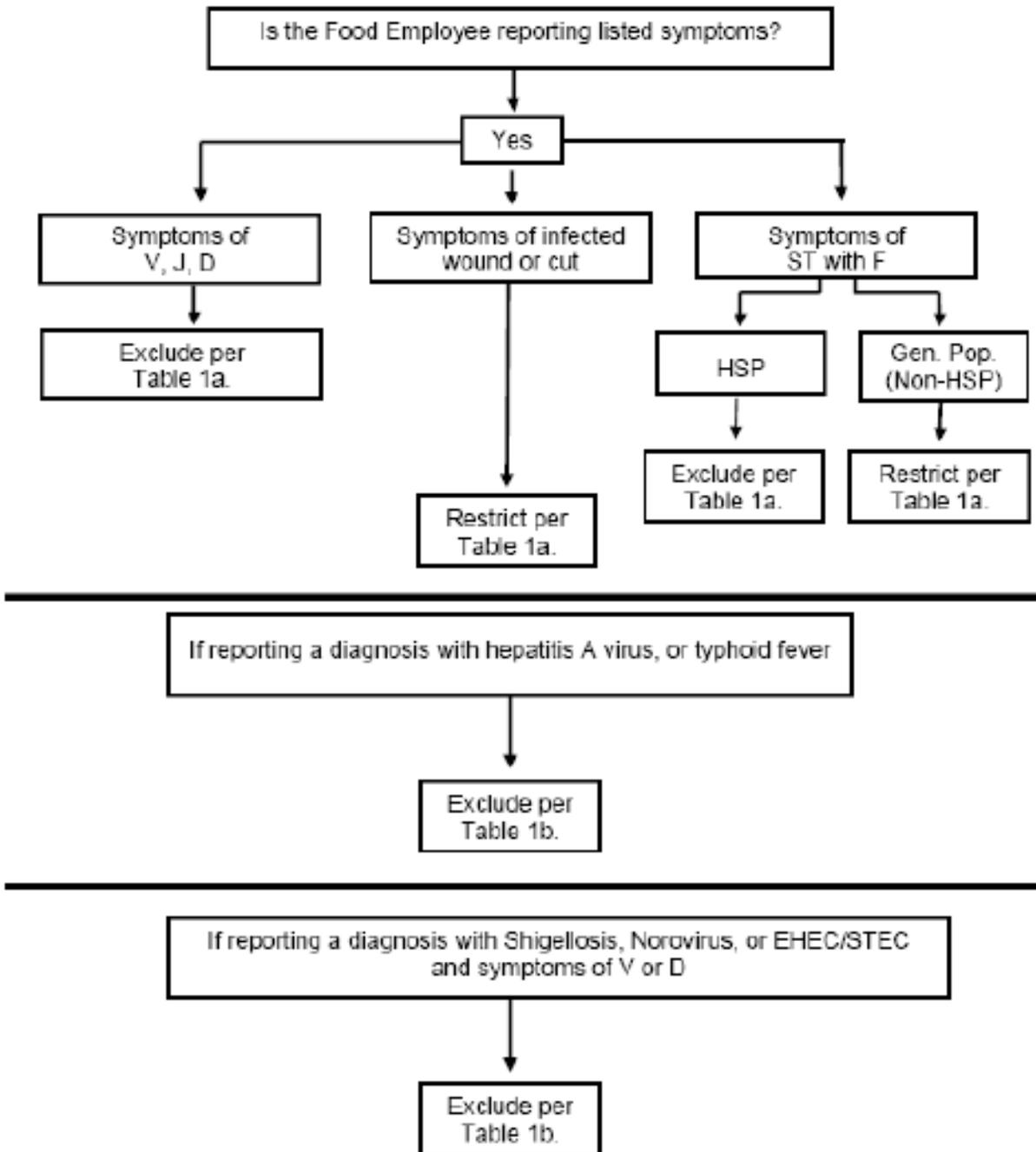
FedEx

Packages shipped by FedEx are regulated by the International Air Transport Authority (IATA) and the International Civil Aviation Organization (ICAO). Stool specimens and food specimens are considered "Category B, Infectious Substances" and are to be packaged according to Package Instruction 650.

3/2008 SF-7D

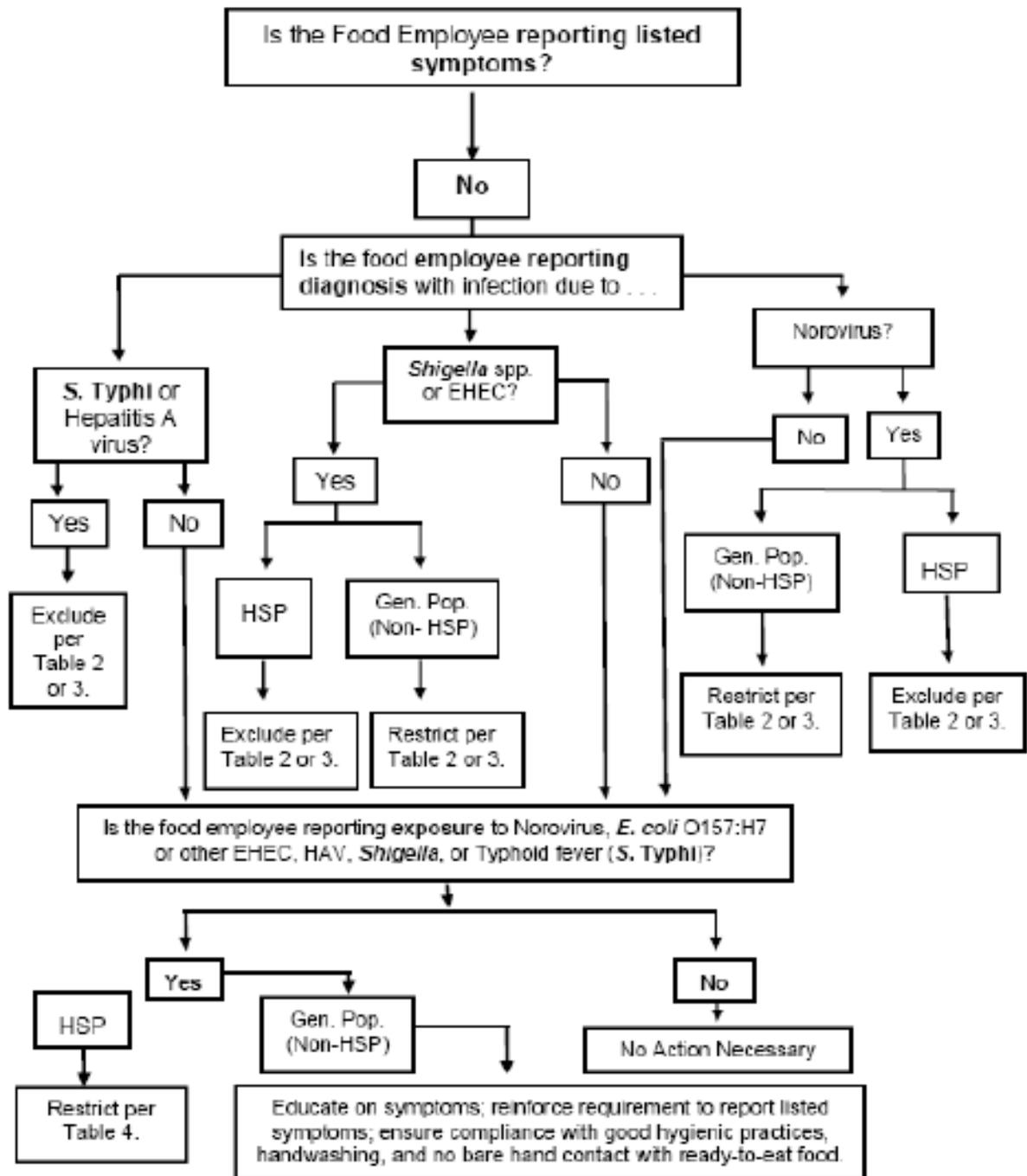
West Virginia Department of Health and Human Resources

When to Exclude or Restrict a Food Employee Who Reports a Symptom and When to Exclude a Food Employee Who Reports a Diagnosis with Symptoms Under the Food Code
2-201.11 / 2-201.12 Decision Tree 1



Key:
Listed Symptoms for Reporting: (V) Vomiting; (J) Jaundice; (D) Diarrhea; (ST with F) Sore Throat with Fever; (HSP) Highly Susceptible Population; (Gen. Pop.) General Population

When to Exclude or Restrict a Food Employee Who is Asymptomatic and Reports a Listed Diagnosis and When to Restrict a Food Employee Who Reports a Listed Exposure
Under the Food Code
2-201.11 / 2-201.12 Decision Tree 2



Key:
(HSP) Highly Susceptible Population; (Gen. Pop.) General Population

Summary of Requirements for Symptomatic Food Employees
2-201.12 Table 1a

Food employees and conditional employees shall report symptoms immediately to the person in charge				
The person in charge shall prohibit a conditional employee that reports a listed symptom from becoming a food employee until meeting the criteria listed in section 2-201.13 of the Food Code, for reinstatement of a symptomatic food employee.				
Symptom	EXCLUSION/ OR RESTRICTION		Removing symptomatic food employees from exclusion or restriction	RA Approval Needed to Return to Work?
	Facilities serving a HSP	Facilities not serving a HSP		
Vomiting	EXCLUDE 2-201.12(A)(1)	EXCLUDE 2-201.12(A)(1)	When the excluded food employee has been asymptomatic for at least 24 hours or provides medical documentation 2-201.13(A)(1). Exceptions: If diagnosed with Norovirus, <i>Shigella</i> spp., <i>E. coli</i> O157:H7 or other EHEC, HAV, or typhoid fever (<i>S. Typhi</i>) (see Tables 1b & 2).	No if not diagnosed
Diarrhea	EXCLUDE 2-201.12(A)(1)	EXCLUDE 2-201.12(A)(1)	When the excluded food employee has been asymptomatic for at least 24 hours or provides medical documentation 2-201.13(A). Exceptions: If Diagnosed with Norovirus, <i>E. coli</i> O157:H7 or other EHEC, HAV, or <i>S. Typhi</i> (see Tables 1b & 2).	No if not diagnosed
Jaundice	EXCLUDE 2-201.12(B)(1) if the onset occurred within the last 7 days	EXCLUDE 2-201.12(B)(1) if the onset occurred within the last 7 days	When approval is obtained from the RA 2-201.13 (B), and: <ul style="list-style-type: none"> • Food employee has been jaundiced for more than 7 calendar days 2-201.13(B)(1), or • Provides medical documentation 2-201.13(B)(3). 	Yes
Sore Throat with Fever	EXCLUDE 2-201.12(G)(1)	RESTRICT 2-201.12(G)(2)	When food employee provides written medical documentation 201.13(G) (1)-(3).	No
Infected wound or pustular boil	RESTRICT 2-201.12(H)	RESTRICT 2-201.12(H)	When the infected wound or boil is properly covered 2-201.13(H)(1)-(3).	No

Key for Tables 1, 2, and 3:

RA = Regulatory Authority

EHEC = Enterohemorrhagic, or Shiga toxin-producing *Escherichia coli*

HAV = Hepatitis A virus

HSP = Highly Susceptible Population

Summary of Requirements for Diagnosed, Symptomatic Food Employees
2-201.12 Table 1b

<p>Food employees and conditional employees shall report a listed diagnosis with symptoms immediately to the person in charge. The person in charge shall notify the RA when a food employee is jaundiced or reports a listed diagnosis</p>			
<p>The person in charge shall prohibit a conditional employee that reports a listed diagnosis with symptoms from becoming a food employee until meeting the criteria listed in section 2-201.13 of the Food Code, for reinstatement of a diagnosed, symptomatic food employee.</p>			
Diagnosis	EXCLUSION Facilities Serving HSP or not Serving HSP	Removing diagnosed, symptomatic food employees from exclusion	RA Approval Needed to Return to Work?
Hepatitis A virus	EXCLUDE if within 14 days of any symptom, or within 7 days of jaundice 2-201.12(B)(2)	When approval is obtained from the RA 2-201.13(B), and: <ul style="list-style-type: none"> The food employee has been jaundiced for more than 7 calendar days 2-201.13(B)(1), or The anicteric food employee has had symptoms or more than 14 days 2-201.13(B)(2), or The food employee provides medical documentation 2-201.13(B)(3) (also see Table 2). 	Yes
Typhoid Fever (<i>S. Typhi</i>)	EXCLUDE 2-201.12(C)	When approval is obtained from the RA 2-201.13(C)(1), and: <ul style="list-style-type: none"> Food employee provides medical documentation, that states the food employee is free of a <i>S. Typhi</i> infection 2-201.13(C)(2) (also see Table 2). 	Yes
<i>E. coli</i> O157:H7 or other EHEC/ STEC	EXCLUDE Based on vomiting or diarrhea symptoms, under 2-201.12(A)(2)	<ol style="list-style-type: none"> <u>Serving Non-HSP facility:</u> 2-201.13(A)(4)(a): May only work on a restricted basis 24 hours after symptoms resolve and remains restricted until meeting the requirements listed below: <u>Serving HSP facility:</u> 2-201.13(A)(4)(b): Remains excluded until meeting the requirements listed below: <ul style="list-style-type: none"> Approval is obtained from RA 2-201.13(F), and Medically cleared 2-201.13(F)(1), or More than 7 calendar days have passed since the food employee became asymptomatic 2-201.13(F)(2) (also see Table 2). 	Yes to return to HSP or to return unrestricted; Not required to work on a restricted basis in a non-HSP facility
Norovirus	EXCLUDE Based on vomiting or diarrhea symptoms, under 2-201.12(A)(2)	<ol style="list-style-type: none"> <u>Serving Non-HSP facility:</u> 2-201.13(A)(2)(a): May only work on a restricted basis 24 hours after symptoms resolve and remains restricted until meeting the requirements listed below: <u>Serving HSP facility:</u> 2-201.13(A)(2)(b): Remains excluded until meeting the requirements listed below: <ul style="list-style-type: none"> Approval is obtained from RA 2-201.13(D), and Medically cleared 2-201.13(D)(1), or More than 48 hours have passed since the food employee became asymptomatic 2-201.13(D)(2) (also see Table 2). 	Yes to return to HSP or to return unrestricted; Not required to work on a restricted basis in a non-HSP facility
<i>Shigella</i> spp.	EXCLUDE Based on vomiting or diarrhea symptoms, under 2-201.12(A)(2)	<ol style="list-style-type: none"> <u>Serving Non-HSP facility:</u> 2-201.13(A)(3)(a): May only work on a restricted basis 24 hours after symptoms resolve and remains restricted until meeting the requirements listed below: <u>Serving HSP facility:</u> 2-201.13(A)(3)(b): Remains excluded until meeting the requirements listed below: <ul style="list-style-type: none"> Approval is obtained from RA 2-201.13(E), and Medically cleared 2-201.13(E)(1), or More than 7 calendar days have passed since the food employee became asymptomatic 2-201.13(E)(2) (also see Table 2). 	Yes to return to HSP or to return unrestricted; Not required to work on a restricted basis in a non-HSP facility

Summary of Requirements for Diagnosed Food Employees with Resolved Symptoms
2-201.12 Table 2

Food employees and conditional employees shall report a listed diagnosis immediately to the person in charge. The person in charge shall notify the RA when a food employee reports a listed diagnosis.				
The person in charge shall prohibit a conditional employee that reports a listed diagnosis from becoming a food employee until meeting the criteria listed in section 2-201.13 of the Food Code, for reinstatement of a diagnosed food employee.				
Pathogen Diagnosis	Facilities Serving HSP	Facilities Not Serving HSP	Removing Diagnosed Food Employees with Resolved Symptoms from Exclusion or Restriction	RA Approval Required to Return to Work
Typhoid fever (S. Typhi) including previous illness with S. Typhi (see 2-201.11 (A)(3))	EXCLUDE 2-201.12(C)	EXCLUDE 2-201.12(C)	When approval is obtained from the RA 2-201.13(C)(1), and: <ul style="list-style-type: none"> Food employee provides medical documentation, that states the food employee is free of a S. Typhi infection 2-201.13(C)(2) (also see Table 1b). 	Yes
<i>Shigella</i> spp.	EXCLUDE 2-201.12(E)(1)	RESTRICT 2-201.12(E)(2)	<ol style="list-style-type: none"> <u>Serving Non-HSP facility:</u> 2-201.13(A)(3)(a): May only work on a restricted basis 24 hours after symptoms resolve, and remains restricted until meeting the requirements listed below: <u>Serving HSP facility:</u> 2-201.13(A)(3)(b): Remains excluded until meeting the requirements listed below: <ul style="list-style-type: none"> Approval is obtained from the RA 2-201.13(E), and: Medically cleared 2-201.13(E)(1), or More than 7 calendar days have passed since the food employee became asymptomatic 2-201.13(E)(3)(a) (also see Table 1b). 	Yes to return to HSP or to return unrestricted; Not required to work on a restricted basis in a non-HSP facility
Norovirus	EXCLUDE 2-201.12(D)(1)	RESTRICT 2-201.12(D)(2)	<ol style="list-style-type: none"> <u>Serving Non-HSP facility:</u> 2-201.13(A)(2)(a): May only work on a restricted basis 24 hours after symptoms resolve and remains restricted until meeting the requirements listed below: <u>Serving HSP facility:</u> 2-201.13(A)(2)(b): Remains excluded until meeting the requirements listed below: <ul style="list-style-type: none"> Approval is obtained from the RA 2-201.13(D), and: Medically cleared 2-201.13(D)(1), or More than 48 hours have passed since the food employee became asymptomatic 2-201.13(D)(2) (also see Table 1b). 	Yes to return to HSP or to return unrestricted; Not required to work on a restricted basis in a non-HSP facility

Summary of Requirements for Diagnosed Food Employees with Resolved Symptoms
2-201.12 Table 2 (continued)

Pathogen Diagnosis	Facilities Serving HSP	Facilities Not Serving HSP	Removing Diagnosed Food Employees with Resolved Symptoms from Exclusion or Restriction	RA Approval Required to Return to Work
<i>E. coli</i> O157:H7 or other EHEC/ STEC	EXCLUDE 2-201.12(F)(1)	RESTRICT 2-201.12(F)(2)	<ol style="list-style-type: none"> 1. <u>Serving Non-HSP facility:</u> 2-201.13(A)(4)(a): May only work on a restricted basis 24 hours after symptoms resolve and remains restricted until meeting the requirements listed below: 2. <u>Serving HSP facility:</u> 2-201.13(A)(4)(b): Remains excluded until meeting the requirements listed below: <ul style="list-style-type: none"> • Approval is obtained from the RA 2-201.13(F), and: • Medically cleared 2-201.13(F)(1), or • More than 7 calendar days have passed since the food employee became asymptomatic 2-201.13(F)(2). 	Yes to return to HSP or to return unrestricted; Not required to work on a restricted basis in a non-HSP facility
Hepatitis A virus	EXCLUDE if within 14 days of any symptom, or within 7 days of jaundice 2-201.12(B)(2)	EXCLUDE if within 14 days of any symptom, or within 7 days of jaundice 2-201.12(B)(2)	When approval is obtained from the RA 2-201.13(B), and: <ul style="list-style-type: none"> • The food employee has been jaundiced for more than 7 calendar days 2-201.13(B)(1), or • the anicteric food employee has had symptoms for more than 14 days 2-201.13(B)(2), or • The food employee provides medical documentation 2-201.13(B)(3) (see also Table 1b). 	Yes

Summary of Requirements for Diagnosed Food Employees
Who Never Develop Gastrointestinal Symptoms
2-201.12 Table 3

Food employees and conditional employees shall report a listed diagnosis immediately to the person in charge. The person in charge shall notify the RA when a food employee reports a listed diagnosis.				
The person in charge shall prohibit a conditional employee that reports a listed diagnosis from becoming a food employee until meeting the criteria listed in section 2-201.13 of the Food Code, for reinstatement of a diagnosed food employee.				
Pathogen Diagnosis	Facilities Serving HSP	Facilities Not Serving HSP	Removing Diagnosed Food Employees Who Never Develop Gastrointestinal Symptoms from Exclusion or Restriction	RA Approval Required to Return to Work
Typhoid Fever (S. Typhi) including previous illness with S. Typhi (see 2-201.11 (A)(3))	EXCLUDE 2-201.12(C)	EXCLUDE 2-201.12(C)	When approval is obtained from the RA 2-201.13(C)(1), and: Food employee provides medical documentation, specifying that the food employee is free of a S. Typhi infection 2-201.13(C)(2).	Yes
Shigella spp.	EXCLUDE 2-201.12(E)(1)	RESTRICT 2-201.12(E)(2)	Remains excluded or restricted until approval is obtained from the RA, and: <ul style="list-style-type: none"> • Medically cleared 2-201.13(E)(1), or • More than 7 calendar days have passed since the food employee was last diagnosed 2-201.13(E)(3). 	Yes to return to HSP or to return unrestricted; Not required to work on a restricted basis in a non-HSP facility
Norovirus	EXCLUDE 2-201.12(D)(1)	RESTRICT 2-201.12(D)(2)	Remains excluded or restricted until approval is obtained from the RA 2-201.13(D), and <ul style="list-style-type: none"> • Medically cleared 2-201.13(D)(1), or • More than 48 hours have passed since the food employee was diagnosed 2-201.13(D)(3). 	Yes to return to HSP or to return unrestricted; Not required to work on a restricted basis in a non-HSP facility
E. coli O157:H7 or other EHEC/ STEC	EXCLUDE 2-201.12(F)(1)	RESTRICT 2-201.12(F)(2)	Remains excluded or restricted until approval is obtained from the RA 2-201.13(F), and: <ul style="list-style-type: none"> • Medically cleared 2-201.13(F)(1), or • More than 7 calendar days have passed since the food employee was diagnosed 2-201.13(F)(3). 	Yes to return to HSP or to return unrestricted; Not required to work on a restricted basis in a non-HSP facility
Hepatitis A virus	EXCLUDE 2-201.12(B)(3)	EXCLUDE 2-201.12(B)(3)	When approval is obtained from the RA 2-201.13(B), and <ul style="list-style-type: none"> • The anicteric food employee has had symptoms for more than 14 days 2-201.13(B)(2), or • The food employee provides medical documentation 2-201.13(B)(3). 	Yes

FOODBORNE ILLNESS COMPLAINTS

The clerk or receptionist who takes the initial call should collect the information on the Food Illness Complaint Form and then forward that complaint to the appropriate sanitarian or nurse depending on local policy.

A record of the complaints received should be kept and monitored on a routine basis. The following information should be listed from each complaint:

- Complaint number
- Name of Complainant
- Phone number
- Type of complaint

This information can be kept in basic ledger format, either in paper or an excel spreadsheet. The ledger should be monitored at a minimum of once a week by the sanitarian or nurse who handles enteric disease investigations to look for similarities between complaints. This routine monitoring will allow for quicker detection of associated cases or potential outbreaks.

Once the sanitarian or nurse receives the complaint form, he or she must decide the appropriate actions for the complaint. If the case is a sporadic case of a reportable enteric disease (i.e. Salmonella, Campylobacter, etc.) the follow up investigation should be carried out using the WVEDSS Foodborne Disease Report.

If it is determined that the complaint represents a suspected foodborne outbreak, the sanitarian or nurse should report the suspected outbreak to the IDEP and an epidemiologic investigation must be completed. Please consult IDEP or an experienced epidemiologist for assistance and guidance with this process.

COMPLAINT FORM

County: _____
Complaint #: _____

FOOD ILLNESS COMPLAINT FORM

Date Reported: ___/___/___ Received by: _____

Complainant Name: _____

Phone Numbers: W: (____)____-____ H: (____)____-____ Cell: (____)____-____

Address: _____

Reason for call: _____
(restaurant, wedding party, nursing home, catered event, etc.)

Section to be completed by Nurse or Sanitarian following up on complaint

Investigated by: _____ Date Investigation Initiated: _____

Total Number of people: _____ Number ill: _____ Number not ill: _____

Predominant symptoms: _____

Earliest onset of illness: Date: ___/___/___ Time: ____:____. M.
Latest onset of illness: Date: ___/___/___ Time: ____:____. M.

Did you go to a doctor or emergency room: Y/N Name of MD or facility: _____

Were clinical specimens collected (blood, stool)? Y/N If yes, by whom: _____

Information from MD/ER: _____

Do you know of any others who became ill: _____

Public Health Action Taken and Disposition*: _____

Was this a foodborne outbreak: ___ Yes ___ No ___ Can't tell
If yes, why: _____

* Such as: inspections done, "no further reports received and closed", food samples collected, reported to IDEP, formal epi investigation underway, etc.



SF-39
Rev. 12/05

West Virginia Department of Health & Human Resources
Health Department

OFFICIAL NOTICE OF EMBARGO – SEIZURE

Establishment Where Seized: _____ Address: _____

Owner, Operator, Agent: _____

Telephone Number: _____ Permit Number: _____

_____, you are hereby notified that effective at _____ on this
the _____ day of _____, 20____, that product embargo-seizure action has been
taken as described herein.

SEIZURE NOTICE: The following material(s) is (are) suspected of being in violation of Chapter 16, Article 7, Pure Food and Drugs, Public Health Laws of West Virginia. The seized material identified below is not to be removed from the premises, sold, or used until released by written order from the State Director of Health, or by order of a court of competent jurisdiction.

LOCATION OF MATERIAL

<u>QUANTITY</u>	<u>IDENTITY OF FOODSTUFFS OR MATERIAL(S)</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Seizure order given to _____ of said establishment on this the _____
(owner, operator, manager, agent)

day of _____, 20____.

SAMPLE(S) COLLECTED: YES No

If sample(s) collected, attach copy of Food Filth Analysis Form or other applicable laboratory forms.

SANITARIAN

FINAL REPORT

The **Introduction** should include who reported the outbreak, when the outbreak was reported, what steps were taken to confirm that an outbreak had occurred, and what entities were involved with initiating the outbreak investigation.

The **Background** includes what the circumstances were surrounding the outbreak, where the outbreak occurred and information on the facility, if one was involved, demographics of the affected group, number of persons exposed, number of persons ill, severity of the illness, and the clinical picture presented by the ill persons.

The **Methods** section should include epidemiologic, environmental, and laboratory and/or clinical information.

Epidemiologic information includes the case definition for the outbreak, as well as tools used to collect the information. These tools might include the line listing, epi curve, maps, chart reviews, communications with health care providers, and questionnaire, if one was administered. If an analytical study was conducted, the type, statistical analysis, and hypothesis tested should also be reported.

Environmental information should include the physical layout of the outbreak area, what type of environmental investigation was undertaken, whether a Hazard Analysis Critical Control Points investigation was performed, and whether any tracebacks of foods occurred.

Laboratory and clinical methods information should include documentation of what samples were collected for testing, what tests were requested, and where the testing was performed.

The **Results** section should also include information from the epidemiological, environmental, and laboratory and/or clinical investigations.

Epidemiological results should include the total number of persons interviewed, total number exposed to the causative agent, demographic information expressed as numbers and percent (age, sex, etc.), number and percentage of ill and non-ill, number and percentage of each symptom, number of samples collected, number and percentage of positive results, number and percentage of persons hospitalized, number and percentage of medical visits due to illness, the range and median of the incubation period, the range and the median of the recovery period, overall and food-specific attack rates, the relative risk or odds ratio, and any other results relating to the epidemiology of the outbreak.

Environmental results should include the results of investigations and inspections, including any HACCP assessment completed, results of food tracebacks if done, and a listing of potential environmental factors that may have contributed to the outbreak.

Laboratory and/or clinical results should include the results of any human specimens or food samples tested.

The **Discussion** section interprets all of the information gathered during the outbreak investigation, what can be concluded from the information gathered, what, if any, results support the hypotheses generated, and any other interesting or important outcomes or findings.

Recommendations are given to others undertaking outbreak investigation based upon what was learned from the investigation process in this outbreak. This section includes information on what was learned from investigating the outbreak, whether prevention and control measures undertaken were successful, and what measures may prevent future occurrences.

The **Acknowledgment** section recognizes all who took part in assisting with the outbreak investigation.

Supporting Documentation, including copies of the questionnaire or survey tools, tables, epi curves, maps, line listing and inspection reports should be placed at the end of the written report, perhaps as appendices to the rest of the report.

Definitions of terms

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

	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-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.

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

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 case with a laboratory-identified etiology.

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.

eFORS: Acronym for electronic foodborne outbreak reporting system. System state health departments use to report foodborne outbreaks to CDC.

Enteric: refers to something related to the intestine.

Etiology: the cause of a disease or abnormal condition.

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 (same as outbreak).

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. person to person 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 (FBO): A FBO is the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food. One case of botulism or chemical intoxication is required to constitute a FBO.

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 list: 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.

Mortality: Death

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.

Potentially Hazardous Food: A food that requires time/temperature control for safety to limit pathogenic microorganism growth or toxin information.

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.

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

Propagated outbreak: Outbreak that spreads from person to person rather than from a common source.

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.

Serogroup: Collection of serotypes

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.

Passive : surveillance in which data are sent to the health agency without prompting

Active: surveillance in which the health agency solicits reports.

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

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

Virulence: The ability of an infectious agent to cause severe disease, measured as the proportion of persons with the disease who become severely ill or die.

Waterborne outbreak (WBO): Two criteria required: (1) two or more people experience a similar illness after the ingestion of drinking water or after exposure to water used for recreational purposes, and (2) epidemiologic evidence must implicate water as the probable source of the illness.

Note: Outbreaks caused by contamination of water or ice at the point of use (e.g., contaminated water containers) should be reported as FBOs.

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

When an Outbreak is Reported

Notify your Regional Epidemiologist, District Sanitarian and IDEP immediately.

Step 1: Identify potential investigation team members and prepare for fieldwork.

Identify a lead investigator. Organize your supplies and resources. Review your outbreak kit for needed forms, sample containers, and supplies.

Step 2: Establish the existence of an outbreak

Are there more cases than expected?

Interview physicians that diagnosed the cases.

Step 3: Verify the diagnosis

Review clinical findings and laboratory results. Talk to patients with the disease. Do they know anyone else with the disease?

Step 4: Establish case definition and search for additional cases

Base your case definition on established case definitions. Your case definition may and should change as you acquire more information.

Step 5: Conduct descriptive epidemiological studies

Organize the data by:

Time- when did they become ill? Construct an epidemic curve

Place- where?

Person- what do they all have in common?

Step 7: Develop hypotheses.

Review the data thus far. What are the implications of your findings?

Talk to about 8-10 case-patients in depth. Use open-ended interviewing techniques.

Step 8: Evaluate hypotheses.

If the source of infection is obvious, e.g., in a situation where there is clear person-to-person transmission, no formal hypothesis testing is necessary.

If the source of infection is not obvious, a cohort or case-control study is frequently necessary to test hypotheses. Contact IDEP for assistance.

Step 9: Implement control and prevention measures.

In most outbreak investigations, your primary goal will be prevention and control, and these measures should be implemented at the earliest possible time.

Step 10: Communicate your findings.

Communication should take two forms

An oral report and a written report.

Forward a copy of the report to IDEP ASAP.