

FOODBORNE DISEASE OUTBREAKS

REPORTING INFORMATION

- **Class C:** Report by end of the next business day when an outbreak is suspected (see **Case Definition** below for the definition of a foodborne disease outbreak) unless the unexpected pattern of cases, suspect cases, deaths, or increased incidence of disease is of major public health concern pursuant to paragraph (A) of rule 3701-3-02 of the Administrative Code, then such reports shall be made according to paragraph (A) of this rule.
- Report to the local health department in whose jurisdiction the outbreak occurred. The local health department should then report to ODH, Outbreak Response and Bioterrorism Investigation Team (ORBIT) at 614-995-5599.
- Requires entry by LHD in CDC National Outbreak Reporting System (NORS) database: <https://wwwn.cdc.gov/nors/>.
- The [Enteric Case Report](#) can be useful in the investigation of foodborne disease outbreaks. It is not necessary to submit this form to ODH.
- There are several additional forms to be completed or available to assist with investigation depending on the organism(s) involved or suspected. Please see the complete list of forms in the section [Special Information](#) under **Public Health Management** below.

AGENT

Many different microbes and chemicals can be responsible for outbreaks.

More common

- *Staphylococcus aureus*
- *Clostridium perfringens*
- *Salmonella* sp.
- *Norovirus*
- *Bacillus cereus*
- *Shigella* sp.
- *E. coli* O157:H7

Less common

- Hepatitis A virus
- *Listeria monocytogenes*
- *Yersinia* sp.
- *Vibrio* sp.
- *Clostridium botulinum*
- *Campylobacter* sp.

Infectious Dose

Varies with agent, can be small or large. Infectious dose can be affected by the fat content of the food (i.e. a small number of organisms in a high fat food might result in illness).

CASE DEFINITION

Definition of a Foodborne Disease Outbreak:

The occurrence of 2 or more cases of a similar illness resulting from the ingestion of a common food.

Source: Surveillance for Foodborne Disease Outbreaks – United States, 1998-2002. *MMWR*; 55(SS10); 1-34. <http://cdc.gov/mmwr/preview/mmwrhtml/ss5510a1.htm>

Clinical Description

Symptoms of illness depend upon etiologic agent (see file named fdbrrtbl.doc).

Laboratory Criteria for Diagnosis

Depends on etiologic agent, see:

<http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5510a3.htm>

Case Classification

Probable: An outbreak which does not meet the agent-specific criteria but for which epidemiologic analysis indicates a foodborne disease outbreak did occur.

Confirmed: An outbreak which meets the agent-specific criteria.

Comment

The definition of an outbreak applies whether or not cases are in the same household. When cases are in the same household or have shared many meals or exposures, onset times should be closely evaluated to rule out person-to-person transmission. Also, a single case of suspected botulism or chemical food poisoning warrants investigation.

SIGNS AND SYMPTOMS

Vary greatly in type and severity, depending on the agent and dose (see [table](#) below). Foodborne disease produces predominantly gastrointestinal symptoms, including diarrhea, vomiting, abdominal cramps and nausea. Some diseases cause fever, malaise, anorexia and/or headache. Exceptions include hepatitis A, which causes liver dysfunction, and listeriosis, which can cause meningitis, in addition to gastrointestinal illness.

DIAGNOSIS

Depends on suspected agent(s). If illness is gastrointestinal and incubation period is at least 4 hours, a stool sample for bacterial evaluation is usually indicated. If ODH Laboratory (ODHL) will be handling the specimen(s), stool must be collected in C&S transport medium. If parasites are suspected (incubation of approximately one week), stool specimens should be collected for ova and parasite evaluation. If *Norovirus* is suspected (most incubations approximately 30 hours), a bulk stool sample should be collected (see "Viral Assay of Stool for *Norovirus*" and "Instructions for Collecting Bulk Stool Samples" below). Food samples can also be evaluated at ODHL. To make arrangements for testing, contact the ODH Outbreak Response and Bioterrorism Investigation Team (ORBIT) at 614-995-5599.

EPIDEMIOLOGY

Source

The source varies with the agent. The organisms contaminate food, either in the field, at the processing site (e.g. *Salmonella* from poultry, *E. coli* O157 from cattle), through cross-contamination or from persons preparing food (e.g. *Staphylococcus* from a food handler).

Occurrence

Worldwide. It is estimated that every year in the U.S., foodborne infections cause millions of illnesses and thousands of deaths.

Mode of Transmission

Ingestion of contaminated food.

Period of Communicability

Foodborne intoxications cannot be transmitted person-to-person (e.g. *S. aureus*, *B. cereus*). Foodborne infections are communicable. The period of communicability and carrier state varies with the organism (see [table](#) below). For *Norovirus*, no carrier state has been documented; the period of communicability is believed to be from onset of symptoms to at least 48 hours after recovery. See disease-specific sections of this manual for additional information.

Incubation Period

Varies with agent (see [table](#) below).

Estimates of Foodborne Illness in the United States

<http://www.cdc.gov/foodborneburden/>

CDC Food Safety Website:

<http://www.cdc.gov/foodsafety/>

PUBLIC HEALTH MANAGEMENT

Foodborne disease outbreaks should be investigated to uncover the source of infection so that corrections can be instituted and further cases prevented. An excellent resource for conducting foodborne investigations is "Council to Improve Foodborne Outbreak Response (CIFOR) – Guidelines for Foodborne Disease Outbreak Response. Atlanta: Council of State and Territorial Epidemiologists, 2009." or "Procedures to Investigate Foodborne Illness: International Association for Food Protection." A set of current forms and general information on foodborne disease is available from ODH Outbreak Response and Bioterrorism Investigation Team (ORBIT). Please contact ORBIT at 614-995-5599 to report suspected outbreaks, for updates and for assistance in foodborne disease outbreak investigations.

Other useful telephone numbers:

- ODH, Bureau of Environmental Health, Food Safety Program: 614-466-1390
- ODH Laboratory: 614-466-2278 or 888-634-5227
- Ohio Department of Agriculture, Division of Food Safety: 614-728-6250
- USDA Hotline: 800-535-4555
- FDA, Regional Office, Cincinnati: 800-437-2382

Special Information

- [Microbiology form](#) - must accompany each C&S and bulk stool specimen submitted to ODHL.
- [STAT form](#) – may be requested for specimens going to CDC.
- [Food/Environmental Sample Collection Report](#) - must accompany each food specimen submitted to ODHL.
- [Outbreak Report for Suspected Viral Gastroenteritis](#) - to be submitted to ODH whenever there is a suspected *Norovirus* outbreak involving bulk stool collections (one per outbreak).
- [Foodborne Disease Report, Individual Case History](#) - useful for interviews, need not be submitted.
- [Food Histories](#) - useful for interviews, need not be submitted.
- [Food-related Alert/Complaint Record](#) - useful for recording information about suspected food exposures and complaints, need not be submitted.
- [Foodborne Illness Complaint Log](#) - useful for recording complaints, need not be submitted.

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COMMON FOODBORNE ILLNESSES

Disease/Causative Agent	Symptoms	Foods Often Implicated	Control Measures	Specimens for Lab Testing
*Salmonellosis <i>Salmonella</i> (all serotypes except <i>S. typhi</i>)	Onset: 6-72 hours (usually 12-36 hours) Abdominal pain, diarrhea, chills, fever, nausea, vomiting, malaise Duration: several days	Meat, poultry, eggs and egg products, other suspected foods	<ul style="list-style-type: none"> • Proper cooking temperatures of meat, poultry and eggs • Avoid cross-contamination • Hand washing before and after food preparation • Proper cooking of eggs and egg products 	Feces (Cary-Blair transport medium), suspect foods, environmental swabs
*Campylobacteriosis <i>Campylobacter jejuni</i> And other species	Onset: 1-10 days (usually 2-5 days) Abdominal pain, often severe bloody diarrhea with foul-smelling loose stools, headache, malaise, fever Duration: 1-7 days	Raw poultry, raw milk, raw beef and liver	<ul style="list-style-type: none"> • Avoid cross-contamination from raw poultry • Proper cooking of food from animal sources • Pasteurization of milk and milk products • Water chlorination 	Feces (Cary-Blair transport medium), suspect foods
*Shigellosis <i>S. sonnei</i> , <i>S. flexneri</i> , <i>S. dysenteriae</i> , <i>S. boydii</i>	Onset: 1-7 days (usually 1-3 days) Abdominal pain, fever, bloody, mucoid or purulent stools, tenesmus, pain on defecation Duration: 7-10 days	Moist mixed foods, salads, milk, beans, any food handled by infected food handlers	<ul style="list-style-type: none"> • Proper food handling • Careful handwashing is the single most effective control measure • Do not work if sick with diarrheal illness • Minimize hand contact with foods 	Feces (Cary-Blair transport medium), suspect foods
*Escherichia coli O157:H7	Onset: 10 hours-8 days Bloody diarrhea, vomiting, dehydration; hemolytic uremic syndrome Duration: 5-10 days	Generally beef or raw milk, produce contaminated by raw beef or animal waste	<ul style="list-style-type: none"> • Proper cooking and reheating of foods, especially red meats • Good personal hygiene, proper sewage disposal • Wash produce 	Feces (Cary-Blair transport medium), suspect foods
Listeriosis <i>Listeria monocytogenes</i>	Non-invasive illness: Onset: 9-30 hours Diarrhea, nausea, fever Duration: usually 1-3 days Invasive disease: Onset: 3-70 days Headache, stiff neck, confusion, loss of balance, convulsions, infection of newborn; stillbirth	Raw milk, soft cheeses, ready-to-eat meats, raw vegetables	<ul style="list-style-type: none"> • Pasteurization of milk • Proper heating of ready-to-eat meats • Washing vegetables • Avoidance of high risk foods by susceptible individuals 	Suspect foods Noninvasive illness: Feces ** Invasive disease: Blood, CSF, placenta

*Secondary cases may occur. ** Contact ODH-ORBIT 614-995-5599

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Disease/Causative Agent	Symptoms	Foods Often Implicated	Control Measures	Specimens for Lab Testing
*Hepatitis A Hepatitis A Virus	Onset: 15-50 days (usually 28-30 days) Fever, malaise, lassitude, anorexia, nausea, abdominal cramps, dark urine, jaundice Duration: few weeks to several months	Any food handled by infected food handlers; shellfish	<ul style="list-style-type: none"> Careful handwashing is the single most effective control measure Do not work when sick Close contacts of a case should obtain immune globulin Minimize hand contact with foods 	Serum for anti-HAV IgM
*Viral Gastroenteritis Norovirus Rotaviruses Other viruses	Onset: 5-72 hours Fever, malaise, nausea, vomiting, abdominal pain, diarrhea Duration: 1-2 days	Any food handled by infected food handlers; shellfish	<ul style="list-style-type: none"> Careful handwashing Avoid raw oysters, clams or other shellfish from polluted waters Proper food handling and storage Food handlers with diarrhea are excluded from work 	Bulk stool sample or vomitus Suspect foods (for fecal coliforms)
Perfringens Gastroenteritis <i>Clostridium perfringens</i>	Onset: 6-24 hours (usually 10-12 hours) Most cases have watery diarrhea with nausea, intestinal cramps, few cases have fever or vomiting Duration: 1 day or less	Cooked meat or poultry, gravy, stew, meat pies	<ul style="list-style-type: none"> Prompt refrigeration of foods Proper cooking and storage of foods, especially meat and meat gravies prepared in bulk quantities (Organisms destroyed by cooking but spores are generally heat resistant and able to withstand prolonged boiling) 	Bulk stool sample, suspect foods
Staphylococcal Intoxication <i>Staphylococcus aureus</i> Enterotoxin Toxins A-F	Onset: 30 minutes-7 hours (usually 2-4 hours) Sudden onset of nausea, vomiting, diarrhea, abdominal cramps, Dehydration Duration: 1-2 days	Cooked ham, meat, poultry, sauces and gravy, egg and dairy products	<ul style="list-style-type: none"> Prompt refrigeration of foods, sanitary food handling Food handlers with infected wounds or burns should not handle foods (Toxins are generally heat stable and not inactivated by reheating/cooking) 	Suspect foods <ul style="list-style-type: none"> If evident, swab purulent lesions or wounds of implicated food handlers
Bacillus cereus food poisoning <i>Bacillus cereus</i> 2 enterotoxins	Vomiting toxin: (heat stable) Onset: 1-6 hours Vomiting with some cases having diarrhea Diarrheal toxin: (heat labile) Onset: 6-16 hours Diarrhea, abdominal cramps Duration: 1 day or less	Boiled and fried rice, salads, high protein leftovers, custards, cereals, puddings, sauces, soups, meat	<ul style="list-style-type: none"> Prompt refrigeration, proper cooking and storage of foods (<i>B. cereus</i> spores are not killed during cooking and germinate when left unrefrigerated. Brief warming or flash frying will not destroy toxins) 	Suspect foods

*Secondary cases may occur.

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VIRAL ASSAY OF STOOL FOR NOROVIRUS (previously known as Norwalk virus)

Viral assay should be performed in any outbreak that has a "Norovirus profile", i.e., incubation period in the range of 5-72 hours (often clustering around 30 hours), usually with a high incidence of both diarrhea and vomiting. Duration is usually 24-48 hours, but can be longer.

Contact the ODH Outbreak Response & Bioterrorism Investigation program (ORBIT) at 614-995-5599 as early as possible in an outbreak investigation if you suspect a viral etiology.

Specimen Collection

ODH Lab can test bulk stool for Norovirus. Fresh stool should be collected into a clean, dry container. It should not come in contact with urine. It needs to be kept at refrigerator temperature. DO NOT FREEZE.

Number of stools to submit:

- Please submit 2-5 bulk stools (one from each of 2-5 ill people) per outbreak.
- If more than 5 bulks are submitted, the lab will select the best samples to run.
- A minimum of 2 and a maximum of 5 bulk stools will be tested, per outbreak. (Single stools will not be tested.) Please try to submit 5 bulk stools whenever possible.
- Stools from secondary cases are acceptable for testing.
- Do not submit bulk stool from well people. That is, do not submit bulk stool from people who have not had gastro-intestinal symptoms.

Timing of stools:

- Acute, diarrheal stool is ideal.
- It is still worth requesting the bulk stool if it can be collected within 7 days of the end of the diarrhea.

Amount of stool in each sample:

- Approximately 3-4 tablespoons of stool are needed.

Shipping and handling:

- The stool should be placed in a urine specimen cup with a secure screw-on lid. Label with person's name and date of collection. Place the urine cup in a ziplock bag.
- Keep the bulk stool at refrigerator temperature at all times. Do not freeze.
- Bulk stools should be shipped on frozen freeze packs in a styrofoam-lined cardboard shipping box. Cary Blair can be shipped in the same box with bulk stools.
- Ship overnight to: Attention: Specimen Receiving; ODH Lab; Building 22; 8995 E. Main Street; Reynoldsburg, OH 43068
- Do not ship on Fridays or the day before a holiday.

The bulk stool kit:

ODH Lab does not provide urine cups. You may be able to obtain urine cups from a local hospital or lab or from WIC, STD or family planning clinics. It may be helpful to supply plastic gloves, and disposable plastic spoons along with the urine cups, to help the patient collect the sample.

Also:

- In addition to the bulk stool sample, collect a stool sample in Cary Blair media to culture for bacterial pathogens.
- Vomitus can be submitted for viral assay. Submit 3-4 tablespoons in a urine cup and keep refrigerated, like a bulk stool. (Stool is preferable to vomitus.)
- Please note that improper collection containers or gross contamination of the outside of the container may result in the lab rejecting the sample.
- There is currently no routine laboratory method for detecting virus particles in food. The assay currently used requires a large number of virus particles for detection, and there are generally very few present on food. However, it is important to rule out bacterial pathogens (e.g. Salmonella, Shigella, E. coli O157) on the food. The food can also be tested for fecal coliforms as a marker for fecal (and viral) contamination. This can be performed at ODH Lab.

Accompanying Forms

For each bulk stool sample: the standard ODH Microbiology form should be completed. If both a bulk and a Cary Blair are being submitted (same collection date, same patient), only one Micro form is needed.

Prevention and Control:

See the CDC website for control recommendations:

<http://www.cdc.gov/norovirus/index.html>

EPA approved list of Norovirus disinfectants:

http://www.epa.gov/oppad001/list_g_norovirus.pdf

In summary:

1. To evaluate an outbreak for bacterial and viral agents, collect the standard Cary Blair specimens (for bacteria) and 3-4 tablespoons of bulk stool in a urine specimen cup for Norovirus.
2. Submit 2-5 bulk stool specimens. Acute diarrheal stool is best.
3. Keep the stool at refrigerator temperature until submitted to the laboratory.
4. Call ORBIT, ODH at 614-995-5599 to make arrangements for testing.

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INSTRUCTIONS FOR COLLECTING BULK STOOL SAMPLES

1. Collect stool onto a newspaper or into a clean container, such as a specimen cup or a clean plastic tub.
2. Using a plastic spoon or tongue depressor, put about 4 tablespoons of stool in the specimen container.
3. Put lid on the specimen container and label container with patient's name.
4. Put the specimen container in a zip lock plastic bag.
5. Keep the specimen container with the stool sample cool, either in a refrigerator or on a freeze pack in a cooler. **DO NOT FREEZE.**
6. Contact the Health Department at _____ to make arrangements for pick-up or delivery of both stool samples.

THIS SAMPLE IS COLLECTED IN ADDITION TO STOOL COLLECTION IN THE C&S MEDIUM.

**INSTRUCTIONS FOR
COLLECTING STOOL SAMPLES
USING C&S MEDIUM**

Directions:

1. Make sure the patient information section on the side of the vial is completed.
2. Pass the stool into a clean, dry, container such as a margarine tub, wide mouth jar, milk carton with the top cut off, or if available a bedpan.
3. Use the collection spoon built into the lid of the vial to place small scoops of the stool into the vial until the contents of the vial rise to the "FILL LINE" on the vial label.
4. For best results, select areas of the stool that appear bloody or watery. If the stool is formed (hard), sample small amounts from each end and the middle.
5. When sufficient stool added to raise the level to the "FILL LINE", replace and twist the cap onto the vial to tightly close.
6. Once the cap is tight, shake the vial vigorously until the contents are well mixed.
7. Wash your hands thoroughly after collection of the specimen.
8. Place properly labeled vial into a zip-lock plastic specimen bag or other leak-proof container. Do not place the specimen paperwork unprotected within the same zip-lock bag or container with the vial to prevent contamination should the sample leak.
9. Return the sample and paperwork immediately to your local health department or location as instructed when you were given the collection kit.
10. Store at room temperature.

Contact the Health Department at _____ to make arrangements for pick-up or delivery of stool sample.

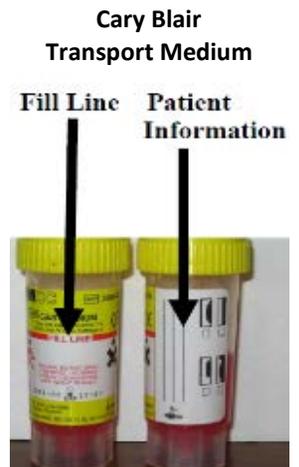
Patient Instructions for Collecting Stool Specimens

1. Use the Stool Specimen Collector Pan by placing it under the toilet seat. If you did not receive a collector pan, collect stool on a newspaper or plastic wrap placed on the rim of the toilet bowl and held down by the toilet seat. You may be asked to provide a stool specimen in Cary Blair Transport Media (also called C&S medium) and/or in a bulk stool specimen container.

DO NOT GET URINE (PEE) IN THE STOOL SPECIMEN.



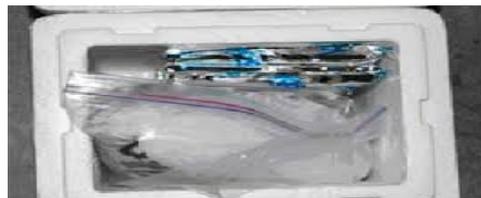
2. Prior to adding stool to the containers, use a pen or permanent marker and neatly label the Cary Blair and/or Bulk Stool Container with your name and date of birth.
3. Using the collection spoon built into the lid of the Cary Blair, fill the vial until the contents reach the "FILL LINE" on the label. Important: Do Not Over-Fill. A plastic spoon or tongue depressor may also be used. If asked to provide a bulk specimen, put about 4 tablespoons of stool into the Bulk Stool Specimen Container. When putting the specimen into the container, select areas of the stool that appear bloody or watery, or if mostly solid, select small amounts from each end and the middle.



4. Securely fasten the lid of the containers, gently mix stool specimen with the Cary Blair medium by gently inverting the vial several times. Place the container into the zip lock portion of the specimen bag. Only place one specimen container per bag. Completed paperwork should be placed into the outer pocket of the specimen bag.



5. Keep the Cary Blair at room temperature. The bulk stool specimen should be kept cool, either in a refrigerator or on a cold pack in a cooler. **DO NOT FREEZE EITHER SPECIMEN.**



6. Contact the Health Department at _____ to make arrangements for pick-up or delivery your specimens.

Video instructions for the collection of Cary Blair and bulk stool specimens can be found at:

http://progressive.powerstream.net/008/00153/Stool_Sample_Collection_for_Patients.mp4

GUIDELINES FOR SHIPPING FOOD SAMPLES AND STOOL SPECIMENS TO ODH LABORATORY

General

1. Only ship specimens on Monday through Thursday.
2. Do **not** ship the day before a major holiday.
3. Use a carrier who will get samples to ODH Laboratory (ODHL) within 24 hours.
4. Ship in a styrofoam-lined cardboard shipping box. The address for the outside of the box is:

ATTENTION: Microbiology Specimen Receiving
Ohio Department of Health Laboratory
8995 East Main Street
Building 22
Reynoldsburg, Ohio 43068

Note: The East Main Street address and zip code of 43068 must be used!

5. In **all** cases, contact Outbreak Response and Bioterrorism Investigation Team (ORBIT) at 614-995-5599 before collecting specimens for:
 - a) guidance on what tests to request
 - b) information on fee waiver
 - c) any other special instructions

Food Samples

1. Using aseptic technique, collect at least 4 ounces (100 grams) of the food into food-grade zip-lock bags. Pack so the sample will not leak.
2. Complete the [Food/Environmental Sample Collection Report](#) for each food item, and enclose it in the package to be shipped.
3. Food that is normally held at room temperature can be shipped without refrigerants (e.g. cereal, cookies, dry goods).
4. Food that is normally held at refrigerator temperature needs to be shipped on frozen freeze packs. **Do not use ice cubes.** Dry ice is generally not needed.

C&S Medium Stool Samples

1. C&S transport medium is suitable for all bacterial enteric pathogens. For parasites (e.g. *Giardia*, *Cryptosporidium*), use the Ova & Parasite kit. C&S medium and Ova & Parasite kits are available from ODH Lab. Call Outbreak Response and Bioterrorism Investigation Team to request some: 614-995-5599.
2. Provide the patient with instructions (see "Instructions for Collecting Stool Samples Using C&S Medium" above).
3. Complete the [ODH Microbiology Form](#) for each stool sample and ship with each stool sample to ODH Lab.
4. Once the stool is introduced to the C&S medium, **it must be tested within 96 hours. Please ship promptly to ODH Lab.**

Bulk Stool Samples

1. Bulk stool samples are examined for *Norovirus*. Whenever bulk stool samples are collected, C&S samples should also be collected to rule out bacterial etiologies.
2. See "Instruction for Collecting Bulk Stool Samples" above for more detailed instructions on the collection of bulk stools.
3. Keep the bulk stool cool; do not freeze. Provide patients with a small styrofoam box and a freeze pack so they can keep the specimen cool without putting it in their home refrigerator. This makes the stool collection process more acceptable.

The Ova & Parasite Stool Kit

1. The Ova & Parasite kit (Par-a-Pak) is available from ODHL and is used when parasites (e.g. *Giardia*, *Cryptosporidium*, *Cyclospora*) are suspected. Most parasites associated with food have an average incubation period of 7 days.
2. Since parasites are shed intermittently, 3 samples, collected 24-48 hours apart within a 10 day period, are required to adequately test for parasites. Each sample is collected into two tubes (one pink and one blue): one for the cyst stage and one for the trophozoite stage.
3. Complete the [Microbiology Form](#) for each sample.
4. Stool specimens in the Ova & Parasite solutions are shipped to ODH Lab **without refrigerant**.

FOODBORNE OUTBREAK FORMS

[Investigation of a Foodborne Outbreak – CDC 52.13](#)

[National Outbreak Reporting System \(NORS\) Appendix](#)

[National Outbreak Reporting System \(NORS\) Guidance Document](#)

[Enteric Case Report](#)

[Microbiology Form - ODH 2530](#)

[STAT Form – CDC 50.34](#)

[Food/Environmental Sample Collection Report](#)

[Outbreak Report for Suspected Viral Gastroenteritis](#)

[Foodborne Disease Report Individual Case History](#)

[Food Histories](#)

[Food-Related Alert/Complaint Record](#)

[Foodborne Illness Complaint Log](#)