Gastroenteritis Outbreaks rev March 2021

Rapid investigation of gastroenteritis outbreaks of unknown etiology is critical for the identification of contaminated food vehicles or other possible sources of exposure, as well as the prevention of additional cases.

The purpose of this chapter is to provide essential information to local and regional health departments on how to investigate a gastroenteritis outbreak of known or unknown origin. Additionally, information is given on prevention and control measures to help reduce the burden of gastroenteritis outbreaks in the future.

If an etiologic agent for the outbreak is identified, refer to the investigation guideline for that specific condition.

BASIC EPIDEMIOLOGY

There are many infectious and a few noninfectious agents that can cause gastroenteritis:

- Viruses- e.g., Norovirus, hepatitis A virus, rotavirus
- Bacteria- e.g., *Shigella*, *Salmonella*, Shiga toxin-producing *E. coli*, *Campylobacter jejuni*, *Listeria monocytogenes, Yersinia enterocolitica, Vibrio* spp.
- Bacterial toxins- e.g., *Bacillus cereus* emetic and diarrheal toxins, *Clostridium perfringens* toxin, *Staphylococcus aureus* toxin, *Clostridium botulinum* toxin
- Parasites- e.g., *Cryptosporidium*, *Cyclospora cayetanensis*, *Giardia*, *Trichinella*
- Noninfectious agents- e.g., metals, scombroid, mushroom and shellfish toxins

Transmission

Transmission can occur through the ingestion of contaminated food or water or through direct contact with an infected person, fomite, animal or an animal's environment.

Incubation Period

It varies depending on the agent. Toxins often cause illness shortly after consumption (less than 24hrs), compared to a longer incubation period due to an infectious agent.

Communicability

Illnesses caused by preformed toxins (e.g., *Bacillus cereus*, *Staphylococcus aureus*, *C. botulinum* toxin) are not communicable. The communicable period varies for those infected with bacteria, viruses or parasites; please see agent specific guidelines.

Clinical Illness

Gastroenteritis is an illness triggered by the infection and inflammation of the digestive system. Typical symptoms include abdominal cramps, diarrhea, and vomiting. Other symptoms may include loss of appetite, bloating, nausea, bloody diarrhea, lethargy and body aches.
A Foodborne Illness Chart of common foodborne disease agents, descriptions of associated symptoms and incubation periods, is available at
http://www.dshs.state.tx.us/idcu/health/foodborne_illness/investigation/

DEFINITIONS

Outbreak Definition
An outbreak is defined as two or more cases with symptoms clustered in time and space.

The most common types of outbreaks reported to local and regional health departments include:

- Common event, or point source outbreaks- occurs as a result of a common exposure at a defined time and place. E.g., the occurrence of gastroenteritis among people who attended an event, such as a wedding reception or party.
- Outbreaks of gastroenteritis in facilities- often caused by viruses such as norovirus (which are most commonly, but not exclusively, spread person-to-person). E.g., long term care facilities, child-care centers.
- Outbreaks of gastroenteritis allegedly related to food or a food premise- can be the result of food items contaminated from nature, by an ill food handler, by cross-contamination with a contaminated food or the environment, or by a combination of these factors. E.g., restaurant outbreak or contaminated food item in circulation.

OUTBREAK INVESTIGATION

Outbreak Investigation
Notification of an outbreak without a known etiology might be sent from a healthcare provider, hospital laboratory, event manager, or anyone else who knows of or suspects an outbreak has occurred.

Outbreak Investigation Checklist

- ☐ Prepare a linelist of all cases. Minimal information needed for the line list might include patient name or other identifier, DSHS or laboratory specimen identification number, specimen source, date of specimen collection, any lab results, date of birth, county of residence, date of onset (if known), symptoms, underlying conditions, treatments and outcome of case, and risky foods eaten, foods eaten leading up to illness, or other risky exposures, such as animal contact and travel, reported by the case or surrogate.

Line list example:

ID	Name	Age	Sex	Ethnicity	Onset	Symptoms	Food	Animal	Notes
1	NT	34	F	W/N	2/4/16	Bl. D, F	Chicken, eggs	Dog	Dog food
2	PR	2	M	U/U	1/30/16	V,D,F	Chicken, spinach	None	Brother ill

- ☐ Administer questionnaires to cases in the outbreak
  - If there is no known event or other possible common exposure for the cases, use the Hypothesis Generating Questionnaire for Gastroenteritis Complaints (http://www.dshs.state.tx.us/idcu/health/foodborne_illness/investigation/). If a common event or other possible common exposure has already been identified, then you would most likely administer a questionnaire that is based on exposures (e.g., menus) for the common event. You will need to work with event coordinators, ill persons, and others (as needed) to

obtain information on the food and beverages served at the event, as well as other possible exposures.

- ☐ Request medical records for any case-patients in your jurisdiction who died or were too ill to be interviewed and for whom there are no appropriate surrogates to interview.
- ☐ Characterize the outbreak: Compile all of the available information on all cases in the outbreak.
  - See Characterize the Outbreak below.
- ☐ Attempt to identify additional cases. Methods might include:
  - Contact health care providers/hospitals in your jurisdiction to alert them to the possibility of additional cases with similar symptoms.
  - Contact others potentially exposed to the suspected source (e.g., event attendees).
  - Release a media alert, if indicated.
- ☐ Confirm the outbreak.
  - Confirmation can be made if there are at least two cases with similar symptoms and exposure to a common event, food, or other risk factor within a reasonably short period of time.
- ☐ Create an outbreak definition, which includes an onset date range, and exposure to a common restaurant, event or other risk factor.
  - The outbreak definition will usually specify a geographic area or location, of either residence or exposure (or both).
  - The outbreak definition might be expanded or contracted during the investigation, as additional information is received.
- ☐ Arrange for appropriate laboratory testing, if needed.
  - See Laboratory Procedures section for testing available at the DSHS laboratory.
  - Specimens should not be submitted to the DSHS laboratory unless approved by EAIDU. Contact an EAIDU foodborne epidemiologist to discuss further.
- ☐ Conduct environmental field investigation, if indicated.
  - Facility assessment:
    - Collect information on facility operations.
    - Identify and correct items that may have contributed to the outbreak.
  - Obtain names and contact information of those present at facility during outbreak timeframe, e.g., employees, food workers, customers, residents, students, etc.
  - If food is suspected:
    - Obtain menus.
    - Interview food employees for illness history and job duties.
      - Restrict individuals from handling food until they are free from symptoms for at least 24 hours without the use of symptom suppressing medications.
    - Collect food samples or embargo food, if necessary.
      - Decisions about testing implicated food items can be made in consultations with an EAIDU foodborne epidemiologist.
    - Provide food safety education. See Control Measures Section.
- ☐ Implement facility control measures. See Control Measures Section.
- ☐ Consider testing hypotheses with an epidemiological study (i.e. case control or cohort).
- ☐ Communicate regularly with all parties involved in outbreak investigation:
  - Provide Situation Reports through email.
  - Hold conference calls to discuss the outbreak investigation
- ☐ Report findings at conclusion of investigation:
  - Create Outbreak Summary Report.
  - Enter outbreak into **National Outbreak Reporting System (NORS)** at the conclusion of the outbreak investigation. See Reporting and Data Entry Requirements section.

Characterize the Outbreak

Provide descriptive information in narrative, tabular, and graphic form, for the outbreak:

- Calculate or estimate the number of persons at risk.
- Calculate or estimate the number of ill persons, including primary ill, and secondary ill persons.
- Calculate or estimate the attack rate.
- Calculate or estimate the mean, median, and range for the illness incubation period.
- Calculate the number and frequency of symptoms expressed by ill persons.
- Calculate the number and percentage of ill persons who sought medical care.
- Calculate the number and percentage of ill persons hospitalized overnight.
- Calculate the number and percentage of ill persons who visited an emergency room for their illness.
- Calculate the number and percentage of ill persons who died.
- Calculate the percentage of total cases in the age groups:
  <1y, 1-4y, 5-9y, 10-19y, 20-49y, 50-74y, ≥75y.
- Calculate the median age and the age range.
- Calculate the gender distribution of illness (% female, % male).
- Document the illness onset dates and range of dates.
- Prepare an epi-curve for the outbreak.
- Prepare a geographic map or table for outbreak cases.

Characterize the outbreak setting, event, or food item:

- Document the likely location of exposure for the cases (e.g., food eaten at home, food eaten in a restaurant, food eaten at a hospital, etc.).
- Document any confirmed or suspected source of the outbreak (*Note*: More than one suspect source can be entered into NORS).
- Collect any documentation from regulatory partners regarding tracebacks they conducted.
- Document characteristics of the setting, event, or food that might have contributed to the outbreak.
- Document any food or environmental specimens that were tested for pathogens.

Exclusions

School/child-care: The standard exclusion for diarrhea or fever applies:

- Children with diarrhea should be excluded from school/child-care until they are free from diarrhea for 24 hours without the use of diarrhea suppressing medications.
- Children with a fever from any infection should be excluded from school/child-care for at least 24 hours after fever has subsided without the use of fever suppressing medications.

Food Employee: The standard exclusion for vomiting or diarrhea applies:

- Food employees are to be excluded if symptomatic with vomiting or diarrhea until:
  - Asymptomatic for at least 24 hours without the use of diarrhea suppressing medications OR
  - Medical documentation is provided stating that symptoms are from a noninfectious condition.

Please see Guide to Excluding and Restricting Food Employees in Appendix A.

CONTROL MEASURES

Control measures should be implemented as soon as a potential outbreak is recognized. Specific recommendations for the prevention of additional cases should be based on the findings of the epidemiologic investigation**.**

General Control Measures at Facilities:

- **Hand washing**
  - Hands should be washed with warm water and soap for 15-20 seconds, especially:
    - Before preparing, handling or eating any food.
    - After going to the bathroom.
    - After changing a diaper.
    - After caring for someone with diarrhea.
- **Environmental Disinfection**
  - If the facility does not have an Environmental Protection Agency-registered commercial virucide, use bleach. The CDC recommends the use of a chlorine bleach solution with a concentration of 1000–5000 ppm (5–25 tablespoons of household bleach (5.25%) per gallon of water) on all surfaces. Leave the surface wet for ≥5 minutes or follow the directions on the commercial cleaner to allow sufficient time for the bleach to kill the pathogen.
- **Exclusion and Isolation**
  - Restrict individuals from handling food, engaging in child-care, healthcare work, or attending child-care until they are free from symptoms for at least 24 hours without the use of symptom suppressing medications.

Recommended Control Measures for Schools and Child-Care Centers:

- **Hand Washing**
  - Encourage children and adults to wash their hands frequently, especially before handling or preparing foods and after wiping noses, diapering, using toilets, or handling animals.
  - Wash hands with soap and water long enough to sing the "Happy Birthday" song twice.
  - Sinks, soap, and disposable towels should be easy for children to use.
  - If soap and water are not available, clean hands with gels or wipes with alcohol in them.
- **Diapering**
  - Keep diapering areas near hand washing areas.
  - Keep diapering and food preparation areas physically separate. Keep both areas clean, uncluttered, and dry.
  - The same staff member should not change diapers and prepare food.
  - Cover diapering surfaces with intact (not cracked or torn) plastic pads.
  - If the diapering surface cannot be easily cleaned after each use, use a disposable material such as paper on the changing area and discard the paper after each diaper change.
  - Sanitize the diapering surface after each use and at the end of the day.
  - Wash hands with soap and water or clean with alcohol-based hand cleaner after diapering.
- **Environmental Surfaces and Personal Items**
  - Regularly clean and sanitize all food service utensils, toys, and other items used by children.
  - Discourage the use of stuffed toys or other toys that cannot be easily sanitized.
  - Discourage children and adults from sharing items such as combs, brushes, jackets, and hats.
  - Maintain a separate container to store clothing and other personal items.
  - Keep changes of clothing on hand and store soiled items in a nonabsorbent container that can be sanitized or discarded after use.
  - Provide a separate sleeping area and bedding for each child, and wash bedding frequently.

General Food Safety:

- **Clean-** wash hands and surfaces often.
  - Wash hands properly for 15-20 seconds.
  - Wash surfaces and utensils after each use.
  - Wash fruits and veggies - but not meat, poultry, or eggs.
- **Separate**- don't cross-contaminate.
  - Use separate cutting boards and plates for produce and for meat, poultry, seafood, and eggs.
  - Keep meat, poultry, seafood, and eggs separate from all other foods at the grocery.
  - Keep meat, poultry, seafood, and eggs separate from all other foods in the fridge.
- **Cook** - cook to the right temperature
  - Use a food thermometer. For a chart of safe cooking temperatures, visit http://www.foodsafety.gov/keep/charts/mintemp.html
  - Keep food hot after cooking (at 140 ˚F or above).
  - Microwave food thoroughly (to 165 ˚F).
- **Chill-** refrigerate promptly
  - Refrigerate perishable foods within two hours.
  - Never thaw or marinate foods on the counter.
  - Know when to throw food out.

For more information on food safety, please visit http://www.foodsafety.gov/

REPORTING AND DATA ENTRY REQUIREMENTS

Provider, School, Child-Care Facility, and General Public Reporting Requirements
Cases or suspected cases of illness considered being **public health emergencies, outbreaks, exotic diseases**, and unusual group expressions of disease must be reported to the local health department or DSHS **immediately**. Other diseases for which there must be a quick public health response must be reported **within one working day**.

Local and Regional Reporting and Follow-up Responsibilities

When an outbreak is investigated, local and regional health departments should:

- Report outbreaks within 24 hours of identification to the regional DSHS office or to EAIDU at **512-776-7676**
- Enter outbreak information into the **National Outbreak Reporting System (NORS)** at the conclusion of the outbreak investigation.
  - For NORS reporting, the definition of an outbreak is two or more cases of similar illness associated with a common exposure.
  - The following should be reported to NORS:
    - Foodborne disease, waterborne disease, and enteric illness outbreaks with person-to-person, animal contact, environmental contact, or an indeterminate route of transmission.
  - Enter outbreaks into NORS online reporting system at https://wwwn.cdc.gov/nors/login.aspx
  - Forms, training materials, and other resources are available at http://www.cdc.gov/nors/
- To request a NORS account, please email FoodborneTexas@dshs.texas.gov.
  - Please put in Subject Line: NORS User Account Request
  - Information needed from requestor: name, email address, and agency name
  - After an account has been created a reply email will be sent with a username, password, and instructions for logging in.

LABORATORY PROCEDURES

CLINICAL SPECIMENS

Available testing at DSHS laboratory for clinical specimens includes:

- Viral
  - Real time RT-PCR: Norovirus
- Bacterial
  - Enteric pathogen isolation and ID
  - EIA: Shiga-toxin producing *E. coli*
  - EHEC, shiga-like toxin assay
  - Real time RT-PCR: STEC
  - WGS
- Parasitic
  - Ova and Parasite detection and ID

Specimen Collection

Plain raw stool is best for viral testing, but most specimens should also be subdivided into Cary-Blair transport media. This will greatly enhance the possibility of bacterial recovery should the viral tests be negative.

- Viral
  - Only raw stool is acceptable for norovirus testing.
- Bacterial
  - Transfer raw stool to Cary-Blair transport media, for optimal recovery of bacterial pathogens.
  - Raw stool also acceptable up to 30 days from time of collection but not it is not the preferred specimen.
- Parasitic
  - Transfer raw stool to O & P collection vials.
    - 10% formalin & Z-PVA

Submission Form

- Use DSHS Laboratory G-2B form for specimen submission.
- Select appropriate test(s):
  - Molecular Studies
    - Check "PCR" and "Norovirus"
  - Bacteriology
    - Check "Culture, stool" under Clinical Specimen
  - Parasitology
    - Check "Fecal ova and parasite examination"
- Check "Outbreak association" and write in name of outbreak, (bottom of Section 2)
- Payor source (Section 6):
  - Check "IDEAS" to avoid bill for submitter

Specimen Shipping

- Norovirus testing (only raw stool accepted)
  - Transport temperature: 2-8ºC (ice pack)
  - Transport time: as soon as possible
- Enteric pathogen isolation:

Specimen type	Transport time to lab from time of collection	Transport temperature
Raw stool	≤24 hours	4ºC (ice pack)
Raw stool	>24 hours	Freeze immediately at ≤-70ºC. Ship on dry ice.
Stool in transport solution/medium	Time of collection to ≤3 days	Room temp or 4ºC (ice pack)
Stool in transport solution/medium	>3 days	Freeze immediately at ≤-70ºC. Ship on dry ice.
All	*The above transport times are optimal for recovery of pathogenic organisms. In the interest of public health, specimens will be accepted up to 30 days from date of collection.	*The above transport temperatures are optimal for the recovery of pathogenic organisms. In the interest of public health, specimens will be accepted at non-optimal temperature transport.

* Note: Pathogen recovery rates decrease over time. For best results, submit ASAP.
** For suspected Vibrio species submit at room temperature.

- Parasitic testing
  - Raw stool should be transferred within a few hours to 10% Formalin & Z-PVA vials.
  - Can be shipped at Room Temp or 2-8ºC (ice pack).
  - Do Not Freeze
- Ship specimens to:

Laboratory Services Section, MC-1947
Texas Department of State Health Services
Attn. Walter Douglass (512) 776-7569
1100 West 49th Street
Austin, TX 78756-3199

FOOD SAMPLES

Food is tested only upon prior approval

- Contact an EAIDU foodborne epidemiologist to discuss further.

General Policy

- Test only food samples implicated in a suspected outbreak (not associated with single cases).
- In outbreak settings, food items will not be tested unless a pathogen has been identified in a clinical specimen.
- Food samples must be **collected by a registered sanitarian.**

Available Tests

- Aerobic Plate Count
- *Bacillus cereus* Enumeration
- *Campylobacter spp.*
- *Cronobacter sakazakii*
- *Clostridium perfringens* Enumeration
- Coliform Count
- *Escherichia coli* O157:H7
- *Escherichia coli* count
- non-O157 STEC in meat products (O26; O45; O103; O111; O121; and O145)
- *Listeria monocytogenes*
- *Salmonella spp.*
- *Shigella spp.*
- *Staphylococcus aureus* enterotoxin
- *Staphylococcus aureus* Enumeration
- *Vibrio cholerae, Vibrio parahaemolyticus, Vibrio vulnificus*
- Yeast & Mold Count
- *Yersinia enterocolitica*

Submission Form

Complete the G-23 form for each food sample submitted.

Specimen Collection and Handling

- Food samples must be **collected by a registered sanitarian.**
- Food items should be refrigerated and maintained at 0^{o} to 4^{o} Celsius, until arrival at the laboratory.
- Whenever possible, submit samples to the laboratory in the original, unopened containers.
- If the original container is too large, transfer representative portions to sterile containers using aseptic technique.
- Dry or canned foods that are not perishable should be collected and shipped at ambient temperature. Frozen foods should be shipped frozen.
- Do not freeze refrigerated foods.
- Collect at least 100 grams of each sample unit. (100 grams = 3.53 ounces or 0.22 pounds).

ENVIRONMENTAL SWABS

Environmental swabs are tested only upon prior approval

- Contact an EAIDU foodborne epidemiologist to discuss further.

General policy

- Test environmental swabs only from facilities implicated in a suspected outbreak (not associated with single cases).
- In outbreak settings, environmental swabs will not be tested unless a pathogen has been identified in a clinical specimen.
- Environmental swabs **must be collected by a registered sanitarian.**

Submission Form

Complete the G-23 form for each environmental swab submitted.

Specimen Collection and Handling

- Swabs must be tested within 48 hours of collection and prior to their expiration dates.
    - Acceptable swabs include Quik-Swabs (3M) or Spongesicles (Various providers).

Specimen Shipping for Clinical Samples, Food Samples, and Environmental Swabs:

- Ship specimens via overnight delivery.
- DO NOT mail on a Friday, state or federal holiday, unless special arrangements have been pre-arranged with an EAIDU foodborne epidemiologist or DSHS Laboratory.
- Ship specimens to:

Laboratory Services Section, MC-1947
Texas Department of State Health Services
Attn. Walter Douglass (512) 776-7569
1100 West 49th Street
Austin, TX 78756-3199

UPDATES

March 2021

- Entire section