

# Shiga Toxin-Producing E. coli (STEC), including Escherichia coli 0157:H7 Investigation Guideline

**CONTENT:**

**VERSION DATE:**

**Investigation Protocol:**

- Investigation Guideline**06/2012**

**Attachments:**

- Fact Sheet**05/2012**
- Sample Letter, Enteric to Case**05/2012**

**Revision History:**

<b>Date</b>	<b>Replaced</b>	<b>Comments</b>
06/2012	05/2011	Updated investigation sections to agree with new surveillance system and added reporting form.
05/2011	03/2009	Minor formatting of investigation guideline. Incorporated disease-specific agent recommendations from Enteric Outbreak in Daycares Manual into guideline. Updated Laboratory Analysis and Management of Special Situations. BEPHI replaced BSE throughout. Included revised Fact Sheet. (02/2012) Removed references to KS-EDSS.

# Shiga Toxin-Producing *E. coli* (STEC), including *Escherichia coli* 0157:H7 Disease Management and Investigation Guidelines

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## CASE DEFINITION (CDC 2005)

### Clinical Description for Public Health Surveillance:

- An infection of variable severity characterized by diarrhea (often bloody) and abdominal cramps. Illness may be complicated by hemolytic uremic syndrome (HUS) or thrombotic thrombocytopenic purpura (TTP); asymptomatic infections also may occur and the organism may cause extraintestinal infections.

### Laboratory Criteria for Case Classification:

- Isolation of *Escherichia coli* O157:H7 from a clinical specimen, or
- Isolation of Shiga toxin-producing *E. coli* (STEC) from a clinical specimen

**Note:** *E. coli* 0157:H7 is assumed to be Shiga toxin-producing; for other *E. coli*, Shiga toxin production or toxin genes must be detected to be consider STEC

### Case Classification:

- **Confirmed:** A case that meets the laboratory criteria for diagnosis. When available, O and H antigen serotype characterization should be reported.
- **Probable:**
  - A case with isolation of *E. coli* O157 from a clinical specimen, pending confirmation of H7 or Shiga toxin production, or
  - A clinically compatible case that is epidemiologically linked to a confirmed or probable case, or
  - Identification of an elevated antibody titer to a known Shiga toxin-producing *E. coli* serotype from a clinically compatible case.
- **Suspect:**
  - A case of post-diarrheal HUS or TTP.
  - Identification of Shiga toxin in a specimen from a clinically compatible case without isolation of Shiga-toxin producing *E. coli*.

## LABORATORY ANALYSIS

Special media is required for *E. coli* 0157 isolation, and specific testing is needed to detect toxin production. When STEC toxin is detected, only a culture can identify the specific type of STEC.

- Specimen type: Feces; marble size amount in Cary-Blair
- Collection materials: Use enteric kit (bottle with Cary-Blair medium (0.16%))
- Timing of specimen collection to remove school/work restrictions:
  - Collect the first specimen >48 hours after the discontinuation of antibiotics.
  - Collect second specimen  $\geq$  24 hours later

***Submission of STEC isolates to the Kansas Health and Environmental Laboratories (KHEL) is required by law.***

- Shipment of isolates: Use infectious disease mailers available through KHEL.

For additional information concerning collection or transport:

- Call (785) 296-1620 or refer to [www.kdheks.gov/labs/lab\\_ref\\_guide.htm](http://www.kdheks.gov/labs/lab_ref_guide.htm)

## EPIDEMIOLOGY

More than 100 serotypes of *E. coli* produce Shiga or Shiga-like toxins. The most commonly identified Shiga toxin-producing *E. coli* (STEC) in North America is *E. coli* O157:H7 (i.e., “*E. coli* O157” or “O157”) which was first identified in 1982. In the U.S., it is estimated that 70,000 infections per year are caused by *E. coli* O157. Persons of all ages are susceptible. Very young children and the elderly are more likely to develop severe illness and hemolytic uremic syndrome (HUS). Sporadic cases occur throughout the year and peak in the summer. Ground beef, apple cider, unpasteurized milk and other foods have been associated with outbreaks.

## DISEASE OVERVIEW

### A. Agent:

Gram-negative bacilli, *Escherichia coli*, that produce Shiga and Shiga-like toxins. In addition to *E. coli* O157, the most common serogroups in the United States are O26, O111, O103, O45, and O121.

### B. Clinical Description:

Majority of cases present with an acute onset of diarrhea 3 to 4 days after exposure. Other symptoms include abdominal cramping and grossly bloody diarrhea. Fever may or may not be present. Severe cases can develop HUS that results in renal failure and death.

### C. Reservoirs:

Cattle are of significant public health importance; however, humans and other animals, such as goats, sheep, and deer, serve as reservoirs and carriers.

### D. Mode(s) of Transmission:

Fecal-oral, including: person-to-person, animal-to-person, waterborne and foodborne. Transmission occurs from consuming food or liquids, including water, contaminated with human or animal feces. Transmission may occur via types of sexual contact (e.g., oral-anal contact).

### E. Incubation Period:

Range 2-10 days; median 3-4 days.

### F. Period of Communicability:

Variable, for as long as the organism is excreted; typically 1 week in adults and up to 3 weeks in some children.

### G. Susceptibility and Resistance:

The infectious dose is very low and little is known about differences in susceptibility between serotypes.

### H. Treatment:

Fluid and electrolyte replacement therapy may be indicated. There is evidence that antibiotic treatment may precipitate HUS and its use is controversial. Anti-diarrheal medication should be avoided.

## NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

Escherichia coli enteric infection from *E. coli* 0157:H7 and other shiga toxin-producing *E. coli*, also known as STEC, shall be designated as infectious or contagious in their nature, and cases or suspect cases shall be reported within seven days:

1. Health care providers and hospitals: report to the local public health jurisdiction
2. Local public health jurisdiction: report to KDHE-BEPHI (see below)
3. Laboratories: report to KDHE-BEPHI (see below)

**Kansas Department of Health and Environment (KDHE)  
Bureau of Epidemiology and Public Health Informatics (BEPHI)**

**Phone: 1-877-427-7317**

**Fax: 1-877-427-7318**

### **Further responsibilities of state and local health departments to the CDC:**

*As a nationally notifiable condition, STEC cases require a STANDARD report to the Center of Disease Control and Prevention (CDC).*

1. STANDARD reporting requires KDHE-BEPHI to file an electronic report for cases within the next reporting cycle.
  - KDHE-BEPHI will file electronic reports weekly with CDC.
2. Local public health jurisdiction will report information as requested in the Kansas electronic surveillance system, as soon as possible, ensuring that the electronic form is completed within 7 days of receiving a notification of a report.

## INVESTIGATOR RESPONSIBILITIES

- 1) [Report](#) all confirmed, probable and suspect cases to the KDHE-BEPHI.
- 2) Use the [case definition](#), to confirm the diagnosis with the medical provider.
  - If *E. coli* was not isolated from the clinical specimen, have the stool specimen forwarded to state lab for isolation procedures.
- 3) Conduct [case investigation](#) to identify potential source of infection.
- 4) Conduct [contact investigation](#) to locate additional cases and/or contacts.
- 5) Identify whether the source of infection is major public health concern,
  - Isolation of STEC or presumptive STEC (including *E. coli* 0157) from clinical specimen: ensure bacterial isolate is sent to KHEL.
  - Involvement of foodhandler, daycare, or a direct patient care provider.
  - Commercial raw milk or water supply involved.
- 6) Initiate control and prevention measures to prevent spread of disease.
- 7) Complete and report information requested in the state electronic surveillance system.
- 8) As appropriate, use the notification letter(s) and the disease [fact sheet](#) to notify the case, contacts and other individuals or groups.

## STANDARD CASE INVESTIGATION AND CONTROL METHODS

### Case Investigation

- 1) Contact the medical provider who ordered testing of the case or is attending to the case and obtain the following information. (This includes medical records for hospitalized patients.).
  - Obtain data on symptoms, onset date and time and recovery date and time.
  - Determine if further laboratory testing is needed.
    - If STEC or presumptive STEC (including *E. coli* 0157) was isolated from clinical specimen, ensure bacterial isolate was or is sent to KHEL.
  - Collect case's demographic data and contacting information (birth date, county, sex, race/ethnicity, address, phone number(s))
  - Record hospitalizations: location and duration of stay
  - Record outcomes: survived or date of death
- 2) Interview the case to determine source, risk factors and transmission settings:
  - At least 3 phone attempts at different times of day should be made before the [Enteric Letter to Case](#) is used or the case is closed as lost to follow-up.
  - For the **7 days** prior to symptom onset, unless otherwise noted, examine:
    - Exposure to others with diarrhea in or outside the household.
      - Obtain date(s) of exposure, relationship to case and occupation of possible source
      - Note transmission setting, if applicable (i.e., household, daycare)
    - Food history (including place of purchase)
      - Examine risks such as poorly cooked beef products, unpasteurized dairy or juice, melons, lettuce and sprouts.
      - Consider food-handling practices and opportunities for cross-contamination.
    - Restaurant or group gathering history.
      - Obtain name, location of restaurant/gathering, food eaten and date(s).
    - Contact with animals.
      - Specify type and location (e.g. farm, petting zoo, school).
    - In-state and out-of-state travel up to 2 weeks prior to onset.
      - Obtain dates and location(s).
      - Include hiking, camping or hunting trips.
    - Drinking water sources.
      - Specify type (e.g. private, treated, or bottled)
    - Recreational water exposure.
      - Obtain dates, locations and participation type.
    - Association with childcare, residential facility or any institutions.
      - Obtain dates and locations.
    - Underlying medical conditions, special diets or allergies, GI procedures, medicines (include over-the-counter, “organic/holistic” or vitamins/herbs.)
  - For infants  $\leq 3$  months of age, if a source is not identified, consider:
    - Collecting detailed epidemiologic data and performing stool cultures on caretaker(s), even if asymptomatic.

- Carefully review food-handling practices to determine whether cross-contamination of infant formula or food may be involved.
  - Collect information from case for the [Contact Investigation](#). (See below).
- 3) Investigate epi-links among cases (clusters, household, co-workers, etc).
- If the case had contact with person(s) who have/had the disease or if there was a possible point source of infection, determine if the other “cases” have been reported to the state:
    - Use names and birthdates of possible cases to search the electronic surveillance system.
    - If found, record the previously reported case’s record number in the notes of the case you are investigating.
  - Highly suspected cases, that have not previously been reported should be investigated as a suspect case and reported in Kansas EpiTrax.
  - For suspected [outbreaks](#) refer to Managing Special Situations section.

### Contact Investigation

Consider the following types of contacts during a contact investigation:

- General contacts: Household and intimate/sexual contacts of case or those who ate food prepared by the case.
- Daycare contacts: (Risk of transmission increases with younger children who exhibit lack of fecal continence and frequent hand-to-mouth activity.)
  - All direct caregivers and room/classmates of the case in a daycare with only children who are toilet trained or who are all over 2 years of age.
  - All employees and attendees of a daycare with non-toilet trained attendees, if one or more employee or child is infected or if household contacts of two or more separate attendees are infected.
  - All employees, attendees and household contacts of diapered attendees of a daycare in which outbreak recognition is delayed by  $\geq 3$  weeks.
  - Individuals who work the same shift in a daycare kitchen with an infectious food handler are also considered contacts.
  - Daycare attendees and employees who eat food prepared by an infected food handler, especially if the food handler handled ready-to-eat foods with bare hands or worked while experiencing diarrhea.
- School Contacts: **Only** with epidemiologic evidence of transmission in a school setting consider those who share similar exposure activities with the cases (e.g. common food/drink, animal or recreational water sources).
- Food Service Contacts: Patrons of the establishment of an infected food handler if (1) the food handler worked while infectious, (2) had poor personal hygiene, and (3) had the opportunity to have bare-hand contact with ready-to-eat food.
- Direct patient care provider contact: Patients of an infected care provider if there is evidence that the provider was (1) symptomatic with poor personal hygiene and (2) had an opportunity for bare-hand contact with the patient’s ready-to-eat foods, oral medications, or oral treatments.
- High risk contacts: those at risk for developing severe disease or those who may expose persons at high risk for severe disease.

- 1) Consider case's occupation and activities, especially food handling and/or child or direct patient care
  - Obtain dates, activities and locations during the period from illness onset till the resolution of symptoms.
- 2) ONLY if a risk of transmission exists, create a line listing of contacts at-risk of developing disease. Note possible high risk contacts
- 3) Follow-up with household and close contacts (especially high risk contacts) as recommended under [Contact Management](#).
- 4) Institute control measures; see [Isolation, Work and Daycare Restrictions](#).

### Isolation, Work and Daycare Restrictions

#### **K.A.R 28-1-6 for Shiga toxin-producing *Escherichia coli* (STEC):**

- Enteric precautions followed for the duration of acute symptoms.
- Each infected person shall be excluded from food handling, patient care, and any occupation involving the care of young children and the elderly, until two negative stool cultures are obtained at least 24 hours apart and no sooner than 48 hours following discontinuation of antibiotics.
- No infected child shall attend a child care facility, or a family day care home until two negative stool cultures are obtained at least 24 hours apart and no sooner than 48 hours following discontinuation of antibiotics

For the purposes of the regulation "enteric precautions" shall mean thorough hand washing after attending to infectious cases or touching the feces of an infected person, disinfection of articles that have been in contact with infectious cases or feces, and sanitary disposal of feces.

Food handlers are managed according to the Kansas Food Code. Refer to the comments below and special restrictions for STEC association found in [Table 1](#).

#### **Kansas Food Code 2005:**

- Food handlers with diarrhea, fever or vomiting must be restricted from handling food, or be excluded from work if they serve high risk groups, until symptoms have resolved for 24 hours.

*Exclusion is not allowing the employee to work at the facility. Restriction is restricting the employee in the facility by not allowing food handling; cleaning of equipment, utensils or linens; or unwrapping of single-use articles.*

*High risk groups are immunocompromised or older adults in a health care or assisted living facility or are preschool age children in a facility that provides custodial care.*

Diarrhea?	Diagnosed with STEC?	Stool Culture Positive for <i>E. coli</i> 0157:H7?	Illness in last month with STEC	Exposed † to STEC	Restriction or Exclusion ‡	Reinstatement of Employee to Full Duties
Yes	Yes				<b>Exclude</b> from all facilities. Reduce to <b>restriction</b> (still no food handling) in facilities not serving highly susceptible populations* after asymptomatic for 24 hours.	With the approval from regulatory authority. § <b>(See minimum requirements below.)</b>
Yes	No				<b>Exclude</b> from facilities that serve highly susceptible populations*. <b>Restrict</b> in other situations.	After asymptomatic for 24 hours or with written medical documentation that the symptom is noninfectious.
No		Yes			<b>Exclude</b> from facilities that serve highly susceptible populations*. <b>Restrict</b> in other situations.	With the approval from regulatory authority. § <b>(See minimum requirements below.)</b>
No		No	Yes		<b>Exclude</b> from facilities that serve highly susceptible populations*.	With the approval from regulatory authority. § <b>(See minimum requirements below.)</b>
No	No	No	No	Yes	<b>Restrict</b> in facilities that serve highly susceptible populations*.	3 days after employee was exposed or after household contact became asymptomatic.

(Refer to the **KDHE Foodborne Illness and Outbreak Investigation Manual** for additional information)

† **Exposure** is defined as a food handler consuming or preparing food implicated in a foodborne outbreak of STEC or that was prepared by a person infected with STEC or a food handler who has a household contact that attended or worked at a setting where there was a foodborne outbreak of STEC or who was diagnosed with STEC.

‡ **Exclusion** is not allowing the employee to work at the food establishment. **Restriction** is not allowing the employee to work with food; to clean equipment, utensils or linens; or to un-wrap single-use articles in the food establishment.

\* A **highly susceptible population** is more likely to experience foodborne disease because they are immunocompromised or older adults and in a facility that provides health care or assisted living services, such as a hospital or nursing home; or preschool age children in a facility that provides custodial care, such as a daycare center.

§ **Approval by a regulatory authority (i.e. local health officer) requires written documentation of 2 consecutive negative stools taken 48 hours after discontinuance of antibiotics and 24 hours apart or a declaration that the person has been asymptomatic for 7 days.**

School-aged children: With an understanding of and ability to practice good hygiene, children usually do not represent a risk of spreading this pathogen via the fecal-oral route. Children are a risk only if the infected child is unable to or fails to maintain good hygiene, including hand hygiene after toilet use. Children in diapers at any age constitute a far greater risk of spreading this enteric pathogen. In school settings:

1. Exclude children with diarrhea or fever until symptoms resolve.
2. Recommend the exclusion of infected school-aged students who are diapered until two negative stool cultures are obtained at least 24 hours apart and no sooner than 48 hours following discontinuation of antibiotics.
3. During a school-based, person-to-person outbreak of *E. coli* O157:H7, it is recommended an ill child not be allowed to reenter their room until diarrhea has stopped and two stool cultures are negative for *E. coli* O157:H7.

Recreational water use restrictions: Infected individuals (adults and children) with diarrhea caused by this pathogen should not use recreational water venues (i.e., pools, slides) until their symptoms have resolved for 2 weeks.

### Case Management

- 1) Educate case on measures to avoid future illness and to prevent transmission.
- 2) Additional follow-up is needed if:
  - A case is suffering complications from illness (i.e. hospitalization)
  - A case cares for young children, the elderly or handles food or is involved in patient care to assure compliance with work restrictions.
  - Stool cultures are needed to lift work, school, or daycare restrictions.
- 3) Collect additional specimens for cultures ONLY if necessary for lifting work, school, or daycare restrictions.
  - Coordinate testing and shipping of specimens with the KHEL.
- 4) Initiate outbreak control measures appropriate to setting, as needed
  - If necessary, reference the [Kansas Community Containment Toolbox](#) for templates concerning isolation measures.
- 5) Report any changes any changes in patient status, especially complications.

### Contact Management

- 1) Prophylaxis: None.
- 2) If a contact listing was created because of the high possibility of disease transmission, follow-up with contacts to determine if transmission occurred.
  - Collect information on each contact's health status, noting any symptoms
  - Collect information on each contact's occupation.
  - Note any school or daycare attendance. (Include facility name and location.)
  - Note any high risk contacts or situations and handle appropriately.
  - A contact that is a food-handler should be restricted from facilities that serve highly susceptible populations. Consult [Table 1](#).
- 3) As needed, provide education on avoiding further exposures and to ensure proper medical care is obtained and precautions taken if symptoms develop.
- 4) Symptomatic contact:
  - Considered a probable case; [report](#) to KDHE-BEPHI

- Initiate any [restrictions](#) and encourage the ill to seek medical evaluation.
- 5) In outbreak situations:
- Cultures to confirm epi-linked cases may be warranted

## Environmental

Environmental Investigation: If a commercial food service, daycare center, public water supply or commercial raw milk dairy is implicated in transmission, coordinate with the proper regulatory agency to accomplish the following:

- 1) Inspecting the facility.
- 2) Collecting food, drink or water samples

Consult the [KDHE Foodborne Illness and Outbreak Investigation Manual](#) for further information on facilities associated with food.

Environmental control measures:

- 1) Proper chlorination or boiling of water prevents illness transmission.
- 2) Clean/sanitize contaminated surfaces with 1% bleach or proper germicides.

## Education

- 1) Instruct cases on the necessary [restrictions](#).
- 2) Counsel contacts to watch for signs or symptoms occurring within 10 days of exposure, and to seek medical attention if needed.
- 3) Provide education about preventing the spread of disease:
  - Stress that case should wash hands thoroughly with soap and water before eating/handling food or after using the toilet.
  - Education should emphasize cleaning fingernails and personal hygiene.
  - Remind contacts that when taking care of someone with diarrhea scrub hands with plenty of soap and water after cleaning the bathroom, helping the person use the toilet, or changing diapers, soiled clothes or sheets.
- 4) Provide education on preventing future illness:
  - Hand washing: washing hands thoroughly with soap and water before eating/handling food or after handling raw food, using the toilet, changing diapers and handling pets, fowl, or other animals and/or feces.
  - Avoid eating raw or undercooked meat or poultry, especially hamburger. Cook hamburger to an internal temperature of at least 160°F (70°C).
  - Do not drink unpasteurized milk or eat anything made from it.
  - Use only clean utensils, dishes and cutting boards to prepare food that is already cooked or will be eaten raw or lightly cooked. Anything used to prepare raw meat, seafood, or poultry, including hands and table or counter top, should be washed thoroughly before touching other food.
  - Wash fresh produce before cutting or consuming.
  - Properly refrigerate and store perishable foods. Store in small containers and do not leave at room temperature for more than 2 hours.
  - Avoid drinking or swallowing untreated surface water. Surface water should be boiled or otherwise disinfected before consumption.

## MANAGING SPECIAL SITUATIONS

### A. Outbreak Investigation:

Outbreak definition: (1) An unexpected, unexplained increase in cases clustered by time, place, or person; or (2) two or more cases in different households with the same strain or pulsed-field gel electrophoresis (PFGE) pattern clustered by person, place or time (within the incubation period).

- 1) Notify KDHE immediately, 1-877-427-7317.
  - Consult [KDHE Foodborne Manual](#) for outbreaks involving food.
- 2) Organize and maintain all data related to outbreak:
  - Construct and maintain case listing which includes:
    - Record number, name, DOB (or age) and other specific demographics,
    - Symptoms; onset date and time; recovery date and time
    - Source of exposure (i.e., case ID, setting, classroom),
    - Specimen collection date and lab results,
    - Case status (i.e., confirmed, probable, suspect)
  - All epidemiologic data will be reported and managed with the Kansas electronic surveillance system's outbreak module.
- 3) Identify population(s) at risk of infection based on the scope and spread of the outbreak; use the information collected in case investigations to define:
  - Person: who is becoming ill (i.e., age, gender, occupations)
  - Place: where are the cases (i.e. classrooms, address) and to what settings or activities are they associated
  - Time: when did it start and is it still going on
- 4) Enhance surveillance and perform active case finding:
  - Maintain active surveillance with medical providers serving the affected communities for two incubation periods from last confirmed case.
- 5) Outbreak control:
  - Target efforts on those population(s) identified as at risk.
  - Evaluate the effectiveness of and consider amendments to the restrictions discussed in [Isolation, Work and Daycare Restrictions](#).
  - Establish protocols for control measures necessary to slow or prevent the transmission of disease in affected settings.

### B. Public Gathering Implicated:

- 1) Food sources may include undercooked meat, cross-contaminated food, or possibly food contaminated by food handler.
- 2) Conduct active case finding; ask about recent illness among food handlers.
- 3) If a food establishment or distributor is implicated as the source of infection refer to "[Case Is a Food Handler or Food Establishment Is Implicated](#)."
- 4) If animal sources are implicated:
  - Hygienic and control measures may need to be initiated on farms, petting zoos or fairs. (Refer to [Animals in Public Places Compendium](#).)
  - Proper hand washing after handling animals should always be stressed.

### C. Case Is a Food handler or Food Establishment Is Implicated:

- 1) Contact the Kansas Department of Agriculture (KDA) Division of Food Safety and Lodging at (785) 296-5600.
- 2) The assigned local food facility inspector will perform the following:
  - Interview the manager to identify other possible cases among staff or patrons within the past 2 weeks.
  - Inquire into any recent complaints from other patrons.
  - Execute any [work restrictions](#) for ill food handlers.
  - Report findings to KDHE (or local health department, if requested).
- 3) The local health department will perform or coordinate the following:
  - Collect stool samples from any staff or patron with history of diarrheal illness within the past 2 weeks.
  - Ensure proper [work restrictions](#) have been executed.
  - If needed, approve reinstatement of food handler(s) to full duties [after necessary conditions](#) have been met.

In addition, with a food handler case or if >1 case is associated to the facility:

- 1) An assigned local food inspector will also perform the following:
  - A thorough inspection of the establishment.
  - Collection of any suspected food samples.
  - Survey employees using the “Gastrointestinal Employee Survey”
  - Instruct the facility operator to call the health department if new cases of diarrhea occur in staff members within the next 2 weeks.
- 2) The local health department will also perform or coordinate the following:
  - Initiate an [outbreak investigation](#) and notify KDHE-BEPHI, if:
    - The associated cases are from different households, or
    - There are additional cases within the two week period.
  - Initiate a [contact investigation](#) if warranted based on inspection.

### D. Health Care Setting Associated:

- 1) Hospitals: Diarrheogenic *E. coli*, while usually community acquired, is occasionally associated with nosocomial infections.
  - Nosocomial describes infections not present or incubating prior to the patient being admitted but acquired in hospitals and usually observed >48 hours after admission. As the incubation period will vary to some extent based on underlying health conditions, each infection should be assessed individually. Nosocomial infections include those acquired in the hospital but not evident until after discharge.
  - Coordinate investigation efforts with hospital infection control.
- 2) Nursing home: Crowded communal living conditions and age-related risk factors including immune status and higher rates of antibiotic usage, dementia, and incontinence may allow transmission of enteric pathogens.
  - Coordinate investigation efforts through nursing home administrator.
  - Kansas Department of Aging should be notified if a nursing home, adult care, or long-term care facility is involved in an outbreak.

## E. Daycare Worker or Attendee:

For one case, proceed with the following activities:

- 1) Interview the operator and request a review of attendance records to identify other possible cases among staff or attendees in the past 2 weeks.
- 2) Coordinate the collection stool specimens or rectal swabs from any attendees or staff with a history of diarrheal illness within the past 2 weeks.
  - Stool cultures from three to five symptomatic individuals will help to confirm the diagnosis in a suspected outbreak situation.
  - Collect samples first from those who are still symptomatic followed by those who most recently had their symptoms resolve.
- 3) Reinforce the need to [exclude](#) culture positive (symptomatic and asymptomatic) children and adults until after the submission of two negative stool samples taken from the excluded person 24 hours apart and, if treated, 48 hours after the discontinuation of any antibiotic treatment.

If >1 case or suspected case is identified among attendees or workers:

- 1) Contact KDHE-BEPHI and initiate an [outbreak investigation](#).
- 2) Contact the KDHE Child-Care Licensing Program at (785) 296-1270, and/or the local daycare inspector to coordinate the following:
  - Thorough inspection of the facility.
    - Investigate hand washing, diapering and disinfection procedures.
    - Investigate for possible source of infection during last 7 days:
      - Possible index cases or animal contact (on-site and field trips).
      - Water-play areas
      - For suspected point source outbreaks, collect menus of food and drinks served during the last 7 days from the first date of onset.
  - Review findings with daycare operator and implement control measures.
  - Request stool samples from the following:
    - Symptomatic (or previously symptomatic) children, food handlers and childcare givers at the facility.
    - Symptomatic household/close contacts of symptomatic individuals.
    - Consider stool cultures of asymptomatic contacts that are food handlers, attendees, and staff in the facility.
  - For culture positive (symptomatic and asymptomatic) children and adults, exclude until they have had no diarrhea for 24 hours and have submitted two negative stool samples taken 24 hours apart and, if treated, 48 hours after the end of any antibiotic treatment.
  - For culture negative symptomatic individuals, exclude until after cessation of diarrhea.
  - Recommend all lab-confirmed individuals seek medical care for evaluation and possible treatment.
- 3) Closing of daycares:
  - Close to new admissions if there is evidence of noncompliance with control measures or continued transmission within the daycare center.
  - Closure to readmission or temporary closure is not recommended.
  - Permanent closure/revocation of license may occur only if deemed necessary by the Child Care Licensing Program.

In all instances:

- 1) Educate on how to prevent disease transmission at center and at home.
- 2) Instruct the facility operator to call the health department immediately if new cases of diarrhea occur.
- 3) Call or visit each week for 2 weeks after the last case's onset to verify no further cases and that appropriate hygienic measures are being carried out.

**F. Commercial Dairy or Community Water Source Implicated:**

Consult with the State epidemiology staff if a case reports drinking raw milk from a commercial dairy with no other identifiable source of infection or when the investigation implicates a community drinking water system.

**G. Intentional Contamination**

As a category B agent and food safety threat, it is moderately easy to disseminate, results in moderate morbidity but low mortality.

- 1) If suspected, notify local law enforcement and state public health officials.
  - Consider epidemiologic clues and law enforcement guidance.
  - Observations during environmental assessments may provide evidence.
- 2) Implement "Chain of Custody" procedures for all samples collected, as they will be considered evidence in a criminal investigation.
- 3) Refer to the [KDHE Foodborne Illness and Outbreak Investigation Manual](#) for situations involving food.

## **DATA MANAGEMENT AND REPORTING TO THE KDHE**

- A. Organize and collect data.
- B. Report data via the state electronic surveillance system.
  - Especially data that collected during the investigation that helps to confirm or classify a case.

## ADDITIONAL INFORMATION / REFERENCES

- A. **Treatment / Differential Diagnosis:** American Academy of Pediatrics. 2009 Red Book: Report of the Committee on Infectious Disease, 28th Edition. Illinois, Academy of Pediatrics, 2009.
- B. **Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual, 19th Edition. Washington, DC, American Public Health Association, 2009.
- C. **Case Definitions:** CDC Division of Public Health Surveillance and Informatics, Available at: [www.cdc.gov/osels/ph\\_surveillance/nndss/casedef/case\\_definitions.htm](http://www.cdc.gov/osels/ph_surveillance/nndss/casedef/case_definitions.htm)
- D. **Quarantine and Isolation:** Kansas Community Containment Isolation/ Quarantine Toolbox Section III, Guidelines and Sample Legal Orders [www.kdheks.gov/cphp/operating\\_guides.htm#coc](http://www.kdheks.gov/cphp/operating_guides.htm#coc)
- E. **KDHE Control of Enteric Disease Outbreaks in Childcare Facilities:** [www.kdheks.gov/epi/download/Enteric\\_Disease\\_in\\_Daycare\\_Centers.pdf](http://www.kdheks.gov/epi/download/Enteric_Disease_in_Daycare_Centers.pdf).
- F. **Kansas Regulations/Statutes Related to Infectious Disease:** [www.kdheks.gov/epi/regulations.htm](http://www.kdheks.gov/epi/regulations.htm)
- G. **KDHE Foodborne Illness and Outbreak Investigation Manual:** [www.kdheks.gov/epi/download/kansas\\_foodborne\\_illness\\_manual.pdf](http://www.kdheks.gov/epi/download/kansas_foodborne_illness_manual.pdf)
- H. **Animals in Public Places Compendium:** [www.kdheks.gov/epi/human\\_animal\\_health.htm](http://www.kdheks.gov/epi/human_animal_health.htm)
- I. **Additional Information (CDC):** [www.cdc.gov/health/default.htm](http://www.cdc.gov/health/default.htm)

## ATTACHMENTS

- **KDHE STEC Report Form**
- **Fact Sheet**
- **Sample Letter, Enteric to Case**

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