

# Salmonellosis (Non-Typhoid)

---

*Note:* For information about typhoid fever (or salmonellosis caused by *Salmonella* Typhi) refer to the chapter entitled “Typhoid Fever.”

## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Salmonellosis is caused by any serotype of bacteria in the genus *Salmonella* other than *Salmonella* Typhi (the *Salmonella* serotype that causes typhoid fever). There are more than 2,000 different serotypes of *Salmonella*.

### B. Clinical Description

The most common symptoms of salmonellosis are diarrhea (sometimes bloody), stomach cramps, fever, nausea, and sometimes vomiting. Dehydration may be severe, especially among infants and the elderly, and invasive disease may occur. The infection may also present as septicemia, an abscess, arthritis, or cholecystitis (inflammation of the gallbladder).

### C. Reservoirs

*Salmonella* bacteria are widely distributed in the animal kingdom, including livestock, pets, poultry and other birds, reptiles and amphibians. Most infected animals are chronic carriers. Humans can also be sources of infection.

### D. Modes of Transmission

*Salmonella* bacteria are transmitted via the fecal-oral route. A relatively large dose of organisms is usually needed to cause infection (compared to other organisms such as *Shigella* or *E. coli* O157), but the infectious dose may be lower for certain susceptible groups, such as children, the elderly and the immunocompromised. The most common mode of transmission is ingestion of food or water that has been contaminated with human or animal feces. This includes raw or undercooked poultry, eggs and egg products; undercooked meats; produce; and raw milk or milk products. However, any food contaminated with the bacteria can be a source of infection. In addition, pet chicks and reptiles such as iguanas, snakes, and lizards are chronic carriers of these bacteria and can be sources of infection. Person-to-person spread can also occur, especially among household contacts, preschool children in childcare, and the elderly and developmentally disabled living in residential facilities. Person-to-person transmission can also occur through certain types of sexual contact (e.g., oral-anal contact).

### E. Incubation Period

The incubation period can vary from 6 to 72 hours but is usually about 12–36 hours, although incubation periods longer than 3 days have been documented.

### F. Period of Communicability or Infectious Period

The disease is communicable for as long as the infected person excretes *Salmonella* bacteria in their stool, however, persons are most infectious while they have diarrhea. *Salmonella* carriage lasts from

# Colorado Communicable Disease Manual

ISSUED: 11/8/2004

REVISED: 05/26/2005

PAGE: 2

SUBJECT: Salmonellosis (Non-Typhoid)

days to months, depending on the serotype, but rarely lasts more than one year. Treatment with antibiotics may prolong carriage.

## **G. Epidemiology**

Salmonellosis is reported throughout the year in Colorado, however, reported cases peak in the summer months. The three most commonly reported serotypes are *S. Typhimurium*, *S. Enteritidis*, and *S. Newport*.

Colorado *Salmonella* statistics are available at the CDPHE website:  
[www.cdphe.state.co.us/dc/CODiseaseStatistics/index.html](http://www.cdphe.state.co.us/dc/CODiseaseStatistics/index.html)

## **2) CASE DEFINITION**

### **Clinical Description**

An illness of variable severity commonly manifested by diarrhea (sometimes bloody), abdominal pain, nausea, and sometimes vomiting. Asymptomatic infections may occur and the organism may cause extra-intestinal infections.

### **Laboratory Criteria for Diagnosis**

Isolation of *Salmonella* from a clinical specimen (including stool, blood, and urine).

*Note:* For *Salmonella Typhi*, see chapter on “Typhoid Fever.”

### **Case Classification**

Probable: a clinically compatible case that is epidemiologically linked to a confirmed case

Confirmed: a case that is laboratory confirmed. Confirmed cases include asymptomatic infections and infections at sites other than the gastrointestinal tract that are laboratory confirmed.

## **3) REPORTING CRITERIA**

### **What to Report to the Colorado Department of Public Health and Environment (CDPHE) or local health agency**

- Confirmed and probable salmonellosis cases.
- Salmonellosis cases should be reported within 7 days of diagnosis or a positive laboratory test.
- Cases should be reported using the Colorado Electronic Disease Reporting System (CEDRS), or fax or telephone to CDPHE or local health departments. See below for phone and fax numbers.
- Suspected foodborne/enteric disease outbreaks should be reported to CDPHE or local health departments within 24 hours, even if the causative agent is not yet known.

### **Purpose of Surveillance and Reporting**

- To identify cases for investigation and potential outbreaks
- To monitor trends in disease incidence

### **Important Phone Numbers and Web Resources**

- CDPHE Communicable Disease Epidemiology Program
  - Phone: 303-692-2700 or 800-866-2759

# Colorado Communicable Disease Manual

**ISSUED: 11/8/2004**

**REVISED: 05/26/2005**

**PAGE: 3**

**SUBJECT: Salmonellosis (Non-Typhoid)**

- Fax: 303-782-0338
- After hours: 303-370-9395
- CDPHE Microbiology Laboratory: 303-692-3480
- Communicable Disease (CD) Manual website:  
[http://www.cdphe.state.co.us/dc/epidemiology/dc\\_manual.html](http://www.cdphe.state.co.us/dc/epidemiology/dc_manual.html)

## 4) STATE LABORATORY SERVICES

### Laboratory Testing Services Available

*The services listed below are for public health purposes; clinical laboratories are **not** charged for these services.*

- CDPHE Laboratory requests all *Salmonella* isolates from clinical laboratories be submitted for serotyping.
- The CDPHE Microbiology Laboratory will test bulk stool or rectal swab specimens for the presence of *Salmonella* and will serotype isolates of *Salmonella*.
- Pulsed Field Gel Electrophoresis (PFGE) testing (i.e., molecular typing) is routinely performed on the ten most common serotypes, and is performed on isolates of other serotypes when clusters are identified.
- For more information contact the CDPHE Microbiology Laboratory.
- **Note:** Authorization from the CDPHE Communicable Disease Program is required before submitting bulk stool, rectal swabs, or implicated food items to the CDPHE Laboratory.
- See Section 6 (E)--Environmental Measures, for more information about food testing.

## 5) CASE INVESTIGATION

Interview all salmonellosis cases including symptomatic contacts of confirmed cases and others whose symptoms are suspected to be caused by *Salmonella* to determine:

- Potential source of infection, and implement control measures as appropriate
- If others are ill (i.e. Could this be an outbreak?)
- If case may be a source of infection for others (e.g. a high-risk worker or a diapered child), and if so, prevent further transmission

Organized local health departments have primary responsibility for interviews of sporadic cases in their jurisdictions. In other jurisdictions, public health nursing services should consult with regional epidemiologists to establish primary responsibility for interviews of sporadic cases.

For single cases, complete the CDPHE [Salmonellosis Case Investigation Form](#) or similar local health agency form. Following patient interviews, complete the CEDRS record for all confirmed and probable cases. If an outbreak is suspected, outbreak-specific interview forms should be used. Please contact CDPHE for assistance.

### A. Case Investigation / Forms

Complete all sections of the CDPHE [Salmonellosis Case Investigation Form](#) that can be found on the CD manual website. Local health departments are encouraged to use the standard CDPHE investigation form.

# Colorado Communicable Disease Manual

ISSUED: 11/8/2004

REVISED: 05/26/2005

PAGE: 4

SUBJECT: Salmonellosis (Non-Typhoid)

For agencies that choose to use their own case investigation forms, the report should capture the following information:

- *Demographics (including address, date of birth, gender, ethnicity and race)*
- *Occupation (**High risk occupations include: food service, child care, and health care**)*
- *Childcare or School Attendance*
- *Symptoms and Onset Date*
- *Laboratory (date of specimen collection)*
- *Hospitalization and Medical Treatment Received*
- *Food History (during 72 hours prior to onset)*
- *Restaurant History (include food items and date consumed)*
- *Farm or Animal Exposure (including reptiles and amphibians)*
- *Travel History (locations and dates)*
- *Drinking Water Source*
- *Recent Group Activities*
- *Contacts with Persons with Gastrointestinal Illness*

## **B. Identify and Evaluate Contacts**

### **1. Symptomatic Contacts**

- Contacts of a confirmed case, who have diarrhea, are probable cases and are treated the same as confirmed cases for disease control purposes. See Section 6--Disease Control Measures.
- Complete a case investigation form for all epidemiologically-linked individuals having symptoms compatible with salmonellosis.
- Refer symptomatic individuals who have not previously been tested (especially if they are high-risk workers) to their health care providers for stool cultures. If testing will be performed by CDPHE, refer to the [Food and Stool Specimen Collection Instructions](#) on the CD manual website.
- CDPHE recommends that people who are experiencing symptoms submit stool specimens through their health care provider rather than to the state laboratory for several reasons:
  - The patient will receive appropriate medical care for the illness, including antimicrobial therapy, if appropriate.
  - Results will be known more quickly if stool is tested by a commercial laboratory than if tested at the state laboratory.
  - Commercial labs generally perform antimicrobial susceptibility testing, whereas, the state lab does not routinely perform such testing.
- Symptomatic contacts should be entered into CEDRS as probable salmonellosis cases. (It is helpful if you enter the CEDRS ID numbers of the lab-confirmed cases to whom probable cases are epi-linked in the CEDRS case notes.)
- If a common source of infection is suspected, please notify CDPHE.

### **2. Asymptomatic Contacts**

- Ask about sensitive occupations, food handling, childcare, and/or school.
- Provide information about symptoms and preventive measures. See Section 6 (C)--Education.

## Colorado Communicable Disease Manual

ISSUED: 11/8/2004

REVISED: 05/26/2005

PAGE: 5

SUBJECT: Salmonellosis (Non-Typhoid)

- Counsel asymptomatic high-risk workers (e.g., food handlers). Stress importance of good handwashing, personal hygiene, and removing themselves from working and notifying their supervisor whenever they have a diarrheal illness.
- If an asymptomatic contact who is a high-risk worker develops diarrhea, exclude her/him from work, obtain a stool sample and notify the worker's supervisor.
- Consult with Environmental Health staff and recommend a glove order if necessary.

### **C. Reported Incidence Is Higher than Usual/Outbreak Suspected**

If the number of reported cases of *Salmonella* in your jurisdiction is higher than usual, or if an outbreak is suspected, investigate to determine the source of infection and mode of transmission. Consult with a CDPHE Communicable Disease Epidemiologist. CDPHE staff can assist local public health agencies to investigate outbreaks and determine a course of action to prevent further cases, and can coordinate surveillance of cases that cross county lines.

## **6) DISEASE CONTROL MEASURES**

A [Salmonellosis Fact Sheet](#) is available on the CD manual website.

### **A. Treatment**

Antibiotics are not usually indicated for uncomplicated salmonellosis cases. Antibiotics don't shorten the duration of disease and may prolong shedding of the bacteria in the stool. However, antibiotics are recommended for cases with gastroenteritis and an increased risk of invasive disease, such as:

- Infants < 3 months of age
- Chronic gastrointestinal tract disease
- Malignant neoplasms
- HIV infection
- Immunosuppressive illnesses and therapies
- Severe colitis

### **B. Prophylaxis**

No prophylactic treatment of close contacts is recommended.

### **C. Education**

- Educate case and household contacts on proper hand washing techniques.
- Always wash hands thoroughly with soap and water before eating or preparing food, after using the toilet, after changing diapers, and after touching pets or other animals (especially reptiles).
- After changing diapers, wash your hands AND the child's hands.
- In a childcare setting, dispose of stool and soiled diapers in a sanitary manner.
- Cases should not prepare food for other individuals until symptoms resolve.
- Keep food that will be eaten raw, such as vegetables, from becoming contaminated by animal-derived food products.
- Thoroughly cook all food products from animals, especially poultry and eggs, and avoid consuming raw or cracked eggs, unpasteurized milk, or other unpasteurized products.
- Infants, children, elderly, and immunocompromised individuals should avoid contact with reptiles and reptiles' cages.

# Colorado Communicable Disease Manual

ISSUED: 11/8/2004

REVISED: 05/26/2005

PAGE: 6

SUBJECT: Salmonellosis (Non-Typhoid)

- Avoid sexual practices that may permit fecal-oral transmission. Latex barrier protection should be emphasized as a way to prevent the spread of salmonellosis to sexual partners as well as being a way to prevent the exposure to and transmission of other pathogens.

## **D. Managing Special Situations**

### **1. Food Handlers**

- Food handlers should be excluded from work until symptoms have resolved.
- While individual circumstances may vary, cases are generally not required to provide two negative stools to return to work.
- If a case has questionable hygienic practices or there are other concerns, a food handler should be excluded from work until two negative stool cultures have been obtained at least 24 hours apart.
- In an outbreak situation, negative cultures may be required to return to food handling.
- If the case being re-tested has received antibiotics, stool should be collected at least 48 hours after antibiotics are completed.

### **2. Childcare / Preschool**

Refer childcare providers to the CDPHE **Infectious Disease in Child Care Settings: Guidelines for Child Care Providers** ([www.cdphe.state.co.us/dc/epidemiology/dc\\_guide.asp](http://www.cdphe.state.co.us/dc/epidemiology/dc_guide.asp)) for additional *Salmonella* information.

- Children and staff members with *Salmonella* infection who have diarrhea should be excluded until their diarrhea has resolved. Parents of cases should be counseled not to take their children to another childcare center during this period of exclusion.
- Children returning to childcare are not required to provide follow up cultures.
- Since most child care center staff are considered food handlers, see Section 6 (D1)--Food Handlers above.
- If there are concerns about hygienic practices at the child care center, consider obtaining two negative stool cultures at least 24 hours apart before a case returns to class.
- If the case being re-tested has received antibiotics, stool should be collected at least 48 hours after antibiotics are completed.
- When a case of salmonellosis is identified in a child attending childcare, determine whether additional children have or have recently had diarrhea. Other children with diarrhea should be excluded, should be seen by their physician, and should submit stool for culture. If other cases in the center are identified, consider sending a letter home to parents.
- If the case is the only child in the classroom or center who has been ill, no further action is indicated for other children in that classroom or center.
- Reinforce the importance of meticulous handwashing with childcare center staff.

### **3. School**

Refer school personnel to the CDPHE **Infectious Disease Guidelines for School Personnel** ([www.cdphe.state.co.us/dc/epidemiology/dc\\_guide.html](http://www.cdphe.state.co.us/dc/epidemiology/dc_guide.html)) for additional *Salmonella* information.

- Students or staff with *Salmonella* infection who have diarrhea should be excluded until their diarrhea has resolved.
- In general, students or staff with *Salmonella* who do not have diarrhea and are not otherwise sick may remain in school.

## Colorado Communicable Disease Manual

ISSUED: 11/8/2004

REVISED: 05/26/2005

PAGE: 7

SUBJECT: Salmonellosis (Non-Typhoid)

- If there are concerns about the case's hygiene (e.g. the case has developmental disabilities and wears diapers) consider obtaining two negative stool cultures at least 24 hours apart before a case returns to class.
- If the case being re-tested has received antibiotics, stool should be collected at least 48 hours after antibiotics are completed.
- Students or staff who handle food and have a *Salmonella* infection must not prepare food until their diarrhea has resolved. See Section 6 (D1)--Food Handlers.

#### **4. Community Residential Programs (facilities serving the developmentally disabled)**

Actions taken in response to a case of salmonellosis in a community residential program will depend on the type of program and the level of functioning of the residents. In general:

- Residents with salmonellosis should be placed on contact precautions until symptoms subside.
- If the resident has questionable hygiene, is incontinent, or there are other concerns, the resident should remain on contact precautions until two negative stool cultures have been obtained at least 24 hours apart.
- If the case being re-tested has received antibiotics, stool should be collected at least 48 hours after antibiotics are completed.
- Residents with salmonellosis must be excluded from handling or preparing food for other residents until their diarrhea has resolved.
- Staff members who provide direct patient care (e.g., feed patients, give mouth or denture care, or give medications) are considered foodhandlers and are subject to foodhandler restrictions. See section 6 (D1)--Food Handlers.
- Staff members with *Salmonella* infection should be excluded from work until their diarrhea has resolved.

#### **5. Patients and Staff in Health Care Facilities (Hospitals and Long Term Care Facilities)**

Hospitals and long term care facilities generally have written infection control policies and procedures for handling cases of communicable disease among patients and staff members. If a facility does not have such policies in place, provide the following recommendations:

- Patients with salmonellosis should be placed on contact precautions until their symptoms subside.
- If the patient has questionable hygiene, is incontinent, or there are other concerns, the patient should remain on contact precautions until two negative stool cultures are obtained at least 24 hours apart.
- If case being re-tested has received antibiotics, stool should be collected at least 48 hours after antibiotics are completed.
- Healthcare workers should be excluded from work until diarrhea has resolved.
- While individual circumstances may vary, in general, healthcare workers are not required to provide two negative stools to return to work.
- In an outbreak situation, negative cultures may be required to return to work.

#### **E. Environmental Measures**

- Implicated food items must be removed from the environment.
- A decision about testing suspect/implicated food items must be made in consultation with CDPHE Communicable Disease Program.

## Colorado Communicable Disease Manual

ISSUED: 11/8/2004

REVISED: 05/26/2005

PAGE: 8

SUBJECT: Salmonellosis (Non-Typhoid)

- If a commercial product is suspected, CDPHE Communicable Disease Program will coordinate follow-up with the CDPHE Consumer Protection Division and relevant outside agencies.
- CDPHE [Food and Stool Specimen Collection Instructions](#) are available on the CD manual website.
- The general policy of the CDPHE Laboratory and the Communicable Disease Program is only to test food samples associated with outbreaks, not in single cases.
- For single cases, CDPHE may suggest that the holders of food locate a private laboratory that will test food, or that they store the food in their freezer for a period of time in case additional reports are received.
- The CDPHE laboratory can test food samples associated with isolated cases of illness on a fee for service basis. For more information, contact the CDPHE Microbiology Laboratory.

## REFERENCES

American Academy of Pediatrics. *2003 Red Book: Report of the Committee on Infectious Diseases, 26<sup>th</sup> Edition*. Illinois, Academy of Pediatrics, 2003.

Case Definitions for Infectious Conditions Under Public Health Surveillance.  
<http://www.cdc.gov/epo/dphsi/casedef/>

CDC Website: <http://www.cdc.gov/> → click on “Diseases and Conditions”.

Heymann DL, ed. *Control of Communicable Diseases Manual, 18<sup>th</sup> Edition*. Washington, DC, American Public Health Association, 2004.