Cholera

Vibrio Cholerae

Note: This chapter pertains to *Vibrio cholerae*. Other species of *Vibrio* (e.g., *V. parahaemolyticus, V. vulnificus*) are also reportable to the New Jersey Department of Health and Senior Services (see chapter titled "Vibriosis").

DISEASE REPORTABLE WITHIN 24 HOURS OF DIAGNOSIS

Per N.J.A.C. 8:57, healthcare providers and administrators shall report by mail or by electronic reporting within 24 hours of diagnosis, confirmed cases of cholera to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. A directory of local health departments in New Jersey is available at http://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml.

If the health officer is unavailable, the healthcare provider or administrator shall make the report to the Department by telephone to 609.826.5964, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.

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1 THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Cholera is an acute diarrheal illness caused by infection of the intestine with the bacterium *Vibrio cholerae*. Two serogroups, O1 and O139, are responsible for causing extensive epidemics and multicountry outbreaks of disease. *V. cholerae* other than serogroups O1 and O139 cause similar illness and infection but are not associated with large epidemics.

B. Clinical Description

Infection by O1 or O139 serogroups of *V. cholerae* can have a range of clinical presentations, from an asymptomatic infection to mild illness involving only diarrhea, to acute enteric infection and severe illness characterized by profuse watery stools, nausea, vomiting, leg cramps, severe dehydration, and shock. If the infection is left untreated, death may occur within a few hours. The case-fatality ratio in severe untreated cases may exceed 50%; with proper treatment, the ratio is less than 1%.

C. Reservoirs

Humans are the primary reservoir, although environmental reservoirs exist in coastal or estuarine waters (ocean bays) that have been contaminated by sewage containing *V. cholerae*.

D. Modes of Transmission

V. cholerae is usually transmitted via the ingestion of food or water contaminated (directly or indirectly) by feces or vomitus of infected persons (e.g., via sewage) or by ingestion of raw or undercooked seafood harvested from polluted waters.

E. Incubation Period

The incubation period ranges from a few hours to five days, usually two to three days.

F. Period of Communicability or Infectious Period

Although direct person-to-person spread has not been demonstrated, cholera is presumably transmitted as long as stools test positive for the bacterium, usually only a few days after recovery. Occasionally the carrier state or shedding of bacteria may persist for several months. Antibiotics effective against the infecting strains shorten the period of communicability.

G. Epidemiology

Cholera has been rare in industrialized nations for the past 100 years; however, the disease is still common today in other parts of the world, including the Indian subcontinent and sub-Saharan Africa. Although cholera can be life threatening, it is easily prevented and treated. In the United States, because of advanced water and sanitation systems, cholera is not a major threat; however, everyone, especially travelers, should be aware of how the disease is transmitted and what can be done to prevent it. Since the early 19th century, pandemic cholera has appeared in various parts of the world. During the late 20th century, as recent as 1991, epidemics reported included one that began along the Pacific Coast of Peru, quickly spread to other neighboring countries, and by 1994 resulted in approximately one million cholera cases in the region of Latin America. Another explosive epidemic reported in 1994 to the World Health Organization occurred in Zaire and resulted in approximately 70,000 cases and 12,000 deaths over the course of little more than one month. In the United States, most cases generally occur in persons with recent travel to endemic areas. Other sporadic cases have been associated with ingestion of raw or incompletely cooked seafood. However, indigenous infections and at least one outbreak have occurred in Texas and the Gulf Coast of Louisiana. People with low gastric acidity and persons with blood group “O” are at increased risk for cholera infection. Studies show that some protection against biotypes (strains) within a serogroup is conferred from previous infection; however, no protection results from infection with O1 strains against O139 infection and vice versa.

2 CASE DEFINITION

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

1. Clinical Description

An illness characterized by diarrhea and/or vomiting; severity is variable.

2. Laboratory Criteria for Diagnosis

Isolation of toxigenic (i.e., cholera toxin–producing) *V. cholerae* O1 or O139 from stool or vomitus, OR

Serologic evidence of recent infection.

3. Case Classification

CONFIRMED
A clinically compatible case AND

Isolation of toxigenic (cholera toxin–producing) *V. cholerae* O1 or O139 from stool or vomitus OR

Serologic evidence of recent infection.

PROBABLE
Not used.

POSSIBLE
Not used.

B. Differences from CDC Case Definition

The NJDHSS and Centers for Disease Control and Prevention (CDC) case definitions are the same.

3 LABORATORY TESTING AVAILABLE

Laboratory diagnosis is based on isolation of toxigenic *V. cholerae* O1 or O139 serogroup from stool or vomitus, or demonstration of a significant rise in titer of antitoxic or vibriocidal antibodies in patient serum. For clinical purposes a quick presumptive diagnosis can be made by visualization of moving vibrios inhibited by serotype-specific antiserum.

The Public Health and Environmental Laboratories (PHEL) will test stool specimens for the presence of *V. cholerae* and confirm isolates submitted from other laboratories. Biotyping and serotyping of confirmed isolates is included in the confirmation of this organism.

After authorization from the Infectious and Zoonotic Disease Program (IZDP), PHEL will test implicated food or water from a cluster or outbreak.

4 PURPOSE OF SURVEILLANCE AND REPORTING REQUIREMENTS

A. Purpose of Surveillance and Reporting

- To identify transmission sources of public health concern (e.g., contaminated food or water) and to stop transmission from such sources.

- To identify whether the patient may be a source of infection for other persons (e.g., daycare worker or attendee, food handler, healthcare provider) and, if so, to prevent further transmission.
- To provide education about reducing the risk of infection.

B. Laboratory Reporting Requirements

The New Jersey Administrative Code (NJAC 8:57-1.6) stipulates that laboratories report (by telephone, by confidential fax, or over the Internet using the Communicable Disease Reporting and Surveillance System [CDRSS]) all cases of cholera to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located. The report shall contain, at a minimum, the reporting laboratory's name, address, and telephone number; the age, date of birth, gender, race, ethnicity, home address, and telephone number of person tested; the test performed; the date of testing; the test results; and the healthcare provider's name and address.

C. Healthcare Provider Reporting Requirements

The New Jersey Administrative Code (NJAC 8:57-1.4) stipulates that healthcare providers report (by telephone, by confidential fax, or in writing) all cases of cholera to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located. The report shall contain the name of the disease; date of illness onset; and name, age, date of birth, race, ethnicity, home address, and telephone number of the person whom healthcare providers are reporting. Additionally, name, address, institution, and telephone number of the reporting official and other information as may be required by NJDHSS concerning a specific disease should be reported.

D. Health Officer's Reporting and Follow-Up Responsibilities

The New Jersey Administrative Code (NJAC 8:57-1.7) stipulates that each local health officer must report the occurrence of any case of cholera within 24 hours of receiving a report from a laboratory or healthcare provider to the NJDHSS IZDP. A report can be mailed or filed electronically over the Internet using the confidential and secure CDRSS.

5 CASE INVESTIGATION

A. Forms

It is the health officer's responsibility to complete the official CDC Cholera and Other Vibrio Illness Surveillance Report (Insert hyperlink here)) reporting form by interviewing the patient and others who may be able to provide pertinent information. Much of the Clinical information can be obtained from the patient's healthcare provider or the medical record.

NOTE: Regarding Question 8 (Preexisting Conditions) in this section, if immunodeficiency is a condition, do not indicate a patient's HIV status.

- When asking about exposures, follow the incubation period guidelines provided on the form (e.g., "Did the patient travel in the seven days before the illness began?").
- Complete the "Seafood Investigation" section if illness is suspected to be associated with seafood consumption. Record any restaurants, oyster bars, or food stores at which seafood was obtained by the patient.
- In a case of an outbreak, immediately notify the NJDHSS IZDP by telephone at 609.588.7500 during business hours and 609.392.2020 after business hours and on weekends and holidays.
- If there have been several unsuccessful attempts to obtain patient information, please fill out the report with as much information as possible. Please note on the report why it could not be completed.

After completing the worksheet, mail it (in an envelope marked "Confidential") to the NJDHSS IZDP or file the report electronically over the Internet using the confidential and secure CDRSS. The mailing address is:

NJDHSS
Division of Epidemiology, Environmental and Occupational Health
Infectious and Zoonotic Diseases Program
PO Box 369
Trenton, NJ 08625-0369

B. Entry into CDRSS

The mandatory fields for all cases in CDRSS include: disease, last name, county, municipality, gender, race, ethnicity, case status, report status.

The following table can be used as a quick reference guide to determine which fields in CDRSS are necessary for accurate and complete reporting of cholera cases. The first column represents the tabs along the top of the CDRSS screen. The Required Fields column reflects a detailed explanation of the essential data for each tab.

CDRSS Screen	Required Information
Patient Info	Enter disease name "CHOLERA", patient demographics, patient onset and date report was made to the local health department. There are three subgroups for CHOLERA, ("PENDING", "NON 01/0139," "01," AND "0139") select the appropriate subgroup as noted in lab results.

CDRSS Screen	Required Information
Addresses	Use as needed for additional addresses (e.g., work address, school, temporary NJ address for out-of-state case, vacation address/location). Use the Comments section in this screen to record any pertinent information about the alternate address. Entering an alternate address will allow other disease investigators access to the case if the alternate address falls within their jurisdiction.
Clinical Status	Clinical information such as past medical history, any treatment that the patient received, name of medical facility(s) including date of initial healthcare evaluation and dates of hospitalization, treating physician(s), symptom onset date and mortality status are entered here. (**NOTE:** If the patient received care from two or more medical facilities, be sure all are recorded in the case including admit/discharge dates so the case can be accessed by all infection control professionals (ICPs) covering these facilities)
Signs/Symptoms	Make every effort to get complete information by interviewing the physician, family members, ICP, or others who might have knowledge of the patient's illness. Check appropriate boxes for signs and symptoms and indicate their onset and resolution.
Risk Factors	Enter complete information about risk factors including complete food history (including any seafood consumption), travel history, any exposure to fresh or salt water, etc. in Comments section. When asking about exposures, follow the incubation period guidelines provided on the CDC Cholera and Other Vibrio Illness Surveillance Report (e.g., "Did the patient travel in the seven days before the illness began?"). If possible, record any restaurants at which the case-patient ate, including food item(s) and date consumed.
Laboratory Eval	Laboratory test name "MICROORGANISM IDENTIFIED", Lab Specimen ID, Specimen, Date specimen collected, Lab Name, Referring Physician Name, Referring Medical Facility name, Test Result i.e., Positive/reactive or Negative/no reactive. (**NOTE:** Accurately record the type of cholera isolated (O1, O139, or non-O1 non-O139) in the lab test Comments

CDRSS Screen	Required Information
Contact Tracing	All potentially exposed contacts are entered into the contact tracing tab for local, county and statewide surveillance efforts. CDRSS requires a "Yes" response to one of the two CHOLERA exposure questions in order to add case contacts. Contacts are added individually by selecting the Enter Contact By Name feature: Each contact record reflects the period of exposure, symptomatic or asymptomatic, contact demographics, telephone numbers, marital status, primary language, exposure risk i.e., close, casual, unknown, and LHD response activities are noted. An exposure setting is selected for each contact from the drop down to the right of the contact's name.
Case Comments	Any additional case investigation findings that can not be entered in discrete data fields are documented in the general comment section.
Epidemiology	Select the route of transmission route, import status of infection i.e., whether the case was imported and from where (another county, state, country), LHD notification of illness and association with high-risk venue type, name, location and last day of attendance. The NJDHSS assigned outbreak or investigation number is selected for all involved cases which automatically populates a summary of the initial report.
Case Classification Report Status	Case status options are: "REPORT UNDER INVESTIGATION (RUI)," "CONFIRMED," "PROBABLE," "POSSIBLE," and "NOT A CASE." • All cases entered by laboratories (including LabCorp electronic submissions) should be assigned a case status of "REPORT UNDER INVESTIGATION (RUI)." • Cases still under investigation by the LHD should be assigned a case status of "REPORT UNDER INVESTIGATION (RUI)." • Upon completion of the investigation, the LHD should assign a case status on the basis of the case definition. "CONFIRMED" and "NOT A CASE" are the only appropriate options for classifying a case of cholera. (See section 2). Report status options are: "PENDING," "LHD OPEN," "LHD REVIEW," "LHD CLOSED," "DELETE," "REOPENED," "DHSS

CDRSS Screen	Required Information
	OPEN," "DHSS REVIEW," and "DHSS APPROVED." • Cases reported by laboratories (including LabCorp electronic submissions) should be assigned a report status of "PENDING." • Once the LHD begins investigating a case, the report status should be changed to "LHD OPEN." • The "LHD REVIEW" option can be used if the LHD has a person who reviews the case before it is closed (e.g., health officer or director of nursing). • Once the LHD investigation is complete and all the data are entered into CDRSS, the LHD should change the report status to "LHD CLOSED." • "LHD CLOSED" cases will be reviewed by DHSS and be assigned one of the DHSS-specific report status categories. If additional information is needed on a particular case, the report status will be changed to "REOPENED" and the LHD will be notified by e-mail. Cases that are "DHSS APPROVED" cannot be edited by LHD staff. If a case is inappropriately entered as a case of cholera the case should be assigned a report status of "DELETE." A report status of "DELETE" should NOT be used if a reported case of cholera simply does not meet case definition. Rather, it should be assigned the appropriate case status, as described above.

C. Other Reporting/Investigation Issues

1. Case report forms (Cholera and Other Vibrio Illness Surveillance Report and labs) DO NOT need to be mailed to NJDHSS as long as mandatory fields in CDRSS indicated in section B are completed.

2. Once LHD completes its investigation and assigns a report status of "LHD CLOSED," NJDHSS will review the case. NJDHSS will approve the case by changing the report status to "DHSS APPROVED." At this time, the case will be submitted to CDC and the case will be locked for editing. If additional information is received after a case has been placed in "DHSS APPROVED," you will need to contact NJDHSS to reopen the case. This should be done only if the additional information changes the case status of the report.

3. Every effort should be made to complete the investigation within three months of opening a case. Cases that remain open for three months or more and have no investigation or update notes will be closed by NJDHSS.

6 CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (NJAC 8:57-1.10)

Food handlers or any person directly preparing or handling food, which can include patientcare providers or childcare providers, with cholera must be excluded from work.

1. Minimum Period of Isolation of Patient

After diarrhea has resolved, food-handling facility employees may return to work after producing one negative stool specimen. If the patient is treated with an antimicrobial, the stool specimen shall not be submitted until at least 48 hours after completion of the therapy. **In outbreak circumstances, a second consecutive negative stool specimen (no less than 24 hours after the first negative stool specimen) may be required before the patient returns to work**.

2. Minimum Period of Quarantine of Contacts

Contacts with diarrhea who are food handlers shall be managed in the same manner as a patient (see above paragraph).

B. Protection of Contacts

Persons who shared food or water with a patient during their infectious period should be observed for five days from last exposure for signs of illness. Preventive antibiotic therapy is usually not recommended for household contacts in the United States, because secondary spread is rare.

C. Managing Special Situations

1. Locally Acquired Case

A locally acquired case of cholera is an unusual occurrence, as most cases occur among travelers returning from areas experiencing epidemic cholera. If you determine during the course of an investigation that a patient or suspect patient does not have a recent travel history to an endemic country, contact the IZDP at 609.588.7500 during business hours, or 609.392.2020 after business hours. IZDP staff can assist in an investigation to determine the source of infection and prevent further transmission.

7 OUTBREAK SITUATIONS

If an outbreak is suspected, or if multiple cases are reported among people who have not traveled outside the United States, investigate to determine the source of infection and mode

of transmission. A contaminated vehicle (such as water or food) should be sought and applicable preventive or control measures should be instituted. Since person-to-person transmission is theoretically possible, special emphasis should be placed on personal cleanliness and sanitary disposal of feces. The IZDP staff should be consulted for determining the course of action to prevent further cases, and for the course of action required to implement disease surveillance for other cases that may cross several jurisdictions and therefore be difficult to identify at a local level.

NOTE*:* The NJDHSS Food and Drug Safety Program (FDSP) will provide policy and technical assistance with the environmental investigation. The Program can be contacted at 609.588.3123. FDSP will coordinate the relevant follow-up with outside agencies if indicated.

8 PREVENTIVE MEASURES

A. Environmental Measures

Implicated food items from New Jersey or elsewhere in the United States must be removed from the environment. A decision about testing implicated food items will be made in consultation with FDSP and IZDP. If a commercial product is suspected, FDSP will coordinate follow-up with relevant outside agencies.

B. Personal Preventive Measures/Education

To avoid exposure, recommend that individuals

- Do not eat raw or undercooked fish or shellfish. Despite good sanitation, even shellfish harvested from coastal US waters have periodically been contaminated with *V. cholerae*.
- Always wash their hands thoroughly with soap and water before eating or preparing food, after using the toilet, and after changing diapers.
- After changing diapers, wash the child's hands as well as their own.
- In a daycare setting, dispose of feces in a sanitary manner.
- Scrub their hands with plenty of soap and water after cleaning the bathroom; helping the person use the toilet; or changing diapers, soiled clothes, or soiled sheets when caring for someone with diarrhea.

C. International Travel

Travelers going to cholera-endemic areas should pay attention to what they eat and drink. They should also consider getting vaccinated against cholera but be warned that vaccines are not 100% effective. Avoiding risky foods, however, will also help protect against other illnesses, including traveler's diarrhea, typhoid fever, dysentery, and hepatitis A.

Travelers should

- "Boil it, cook it, peel it, or forget it."
- Drink only bottled or boiled water**.**
- Ask for drinks without ice unless the ice is made from bottled or boiled water.
- Avoid popsicles and flavored ices that may have been made with contaminated water.
- Eat foods that have been thoroughly cooked and that are still hot and steaming.
- Avoid raw vegetables and fruits that cannot be peeled. Vegetables such as lettuce are easily contaminated and are very hard to wash well.
- Wash hands and peel their own raw fruits or vegetables before eating.
- Avoid foods and beverages from street vendors.
- Avoid undercooked or raw fish or shellfish, including ceviche.
- Not bring any perishable food back to the United States.

Additional Information

A *Cholera Fact Sheet* can be obtained at the NJDHSS Web site at http://www.state.nj.us/health.

Additional information can be obtained from the US Food and Drug Administration's Center for Food Safety and Applied Nutrition Web site at www.cfsan.fda.gov.

References

American Academy of Pediatrics *2000 Red Book: Report of the Committee on Infectious Diseases*. Pickering LK, ed. 25th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2000.

Centers for Disease Control and Prevention. Case definitions for infectious conditions under public health surveillance. *MMWR Morb Mortal Wkly Rep*. 1997;46:RR-10.

Centers for Disease Control and Prevention. Cholera: frequently asked questions. Available at: http://www.cdc.gov/ncidod/dbmd/diseaseinfo/cholera_g.htm. Accessed June 2007.

Chin J, ed. *Control of Communicable Diseases Manual*. 17th ed. Washington, DC: American Public Health Association; 2000.

Massachusetts Department of Public Health, Division of Epidemiology and Immunization. *Guide to surveillance and reporting.* Massachusetts Department of Public Health, Division of Epidemiology and Immunization; Jamaica Plain, MA January 2001.

Tauxe R, Mintz E, Quick R. Epidemic cholera in the new world: translating field epidemiology into new prevention strategies. *Emerg Infect Dis.* 1995;1(4):141-146.