

# Cholera and Other Vibrio Illness

## Investigation Guideline

### CONTENT:

### VERSION DATE:

#### Investigation Protocol:

- Investigation Guideline

02/2012

#### Supporting Materials found in attachments:

- Fact Sheet

11/2010

### Revision History:

Date	Replaced	Comments
11/2010	09/2009	Removal of recommendation for prophylaxis of household contacts. Minor edits to fact sheet. Additional notes on testing at CDC.
02/2012	11/2010	Updated to Vibriosis to CDC 2012 case definition. Removed references to KS-EDSS. Added notification section.

# Cholera and Other Vibrio Illness

## Disease Management and Investigative Guidelines

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### CASE DEFINITION (CDC 1996) – Cholera (*Vibrio cholerae*)

#### Clinical Description for Public Health Surveillance:

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

#### Laboratory Criteria for Case Classification:

- Isolation of toxigenic (i.e., cholera toxin-producing) *Vibrio cholerae* O1 or O139 from stool or vomitus, or
- Serologic evidence of recent infection.

#### Case Classification:

- **Confirmed:** A clinically compatible illness that is laboratory confirmed.

**Note:** Illnesses caused by strains of *V. cholerae* other than toxigenic *V. cholerae* O1 or O139 should be reported as “*Vibrio Spp. (Not V. cholerae)*”. The etiologic agent of a case of cholera should be reported with the serotype indicated – as either *V. cholerae* O1 or *V. cholerae* O139. Only confirmed cholera cases are reported to CDC by state health departments.

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### CASE DEFINITION (CDC 2012) – Vibriosis (Non-cholera *Vibrio spp.*)

#### Clinical Description for Public Health Surveillance:

- An infection of variable severity characterized by watery diarrhea, primary septicemia, or wound infection. Asymptomatic infections may occur, and the organism may cause extra-intestinal infection.

#### Laboratory Criteria for Case Classification:

- Isolation of a species of the family Vibrionaceae (other than toxigenic *Vibrio cholerae* O1 or O139, which are reportable as cholera) from a clinical specimen.

#### Case Classification:

- **Confirmed:** A case that meets the laboratory criteria for diagnosis. Note that species identification and, if applicable, serotype designation (i.e., *Vibrio cholerae* non-O1, non-O139 or *Grimontia hollisae*) should be reported.
- **Probable:** A clinically compatible case that is epidemiologically linked to a confirmed case.

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#### Additional Comments:

- In addition to reporting through the National Notifiable Diseases Surveillance System (NNDSS), CDC requests that states collect and report the information on the standard form for Cholera and Other Vibrio Illness Surveillance (COVIS), available at: [www.cdc.gov/nationalsurveillance/cholera\\_vibrio\\_surveillance.html](http://www.cdc.gov/nationalsurveillance/cholera_vibrio_surveillance.html).
- ICDC requests that all *Vibrio* isolates be forwarded to the Enteric Diseases Laboratory Branch (EDLB) for characterization. EDLB (specifically the Epidemic Investigations Laboratory) requests that state public health labs immediately forward all suspect *V. cholerae* isolates for serogrouping and cholera toxin testing as well as biotype and antimicrobial susceptibility testing.

## LABORATORY ANALYSIS

Specimens or isolates are not required to be sent to the State Public Health Laboratory (KHEL); but they are equipped to test for *V. cholerae* or other non-cholera *Vibrio spp.*, if requested.

- Specimens: Fresh stool or vomitus in Cary-Blair or *Vibrio* isolates sent on nutrient agar or other growth supporting medium.
- For testing to occur at the state laboratory, the Bureau of Epidemiology and Public Health Informatics (BEPHI) must be notified at 1-877-427-7317.
- For shipment to KHEL use:
  - KHEL Enteric mailer for stool or vomitus specimens, or
  - IDS (Infectious Disease Shipper) for isolates.
- For testing in private laboratories, the physician **must** notify the lab that they are considering cholera so that a stool culture can be set up on TCBS culture.
- **Special request from the CDC on forwarding isolates to the CDC Foodborne and Diarrheal Disease Laboratory:**
  - KHEL will forward *V. cholerae* and *V. parahaemolyticus* isolates to the CDC Laboratory for characterization.
  - *V. cholerae* outbreaks: it is required that the CDC lab is notified and that a rush shipment of every isolate to the CDC lab occurs.
  - Foodborne outbreaks of non-cholerae *Vibrio*: all isolates and implicated foods can be sent to the CDC lab via routine procedures

For additional information concerning collection or sample transport, call (785) 296-1620 or refer to guidance at [www.kdheks.gov/labs/lab\\_ref\\_guide.htm](http://www.kdheks.gov/labs/lab_ref_guide.htm)

## EPIDEMIOLOGY

In the United States, cholera was prevalent in the 1800s but has been virtually eliminated by modern sewage and water treatment systems. However, as a result of improved transportation, more persons from the United States travel to parts of Africa, Asia, or Latin America where epidemic cholera is occurring. U.S. travelers to areas with epidemic cholera may be exposed to the cholera bacterium. In addition, travelers may bring contaminated seafood back to the United States; foodborne outbreaks have been caused by contaminated seafood brought into this country by travelers. There has been a modest increase in imported cases since 1991 related to ongoing epidemic that began in 1991. Since 1995, over 80% of reported cholera cases have occurred in Africa.

Non-01/non-0139 *V. cholerae* is associated with 2-3% of cases of diarrhea illness in tropical developing countries. Isolation rates are higher in coastal areas. *V. parahaemolyticus* has been reported in sporadic cases and common-source outbreaks associated with undercooked seafood. Raw or undercooked clams or oysters are often implicated and cases occurring primarily in warm months. *V. vulnificus* is the most common agent of serious infections caused by *Vibrio* in the U.S. with 0.5 cases per 100,000 people living in coastal areas occurring annually. Infection with other *Vibrio* species has been associated with sporadic cases of diarrheal disease and rarely with outbreaks.

## DISEASE OVERVIEW

### A. Agent:

Cholera: *Vibrio cholerae* serogroup O1 or O139 that produce cholera enterotoxin. Non-cholera vibriosis: *V. cholerae* other than O1 and O139, as well as other *Vibrio* species, such as *V. parahaemolyticus* and *V. vulnificus*.

### B. Clinical Description:

Cholera is an acute enteric disease; a severe form is seen with sudden onset of profuse painless watery stools, nausea and vomiting. Untreated cases may experience rapid dehydration, acidosis, circulatory collapse, hypoglycemia and renal failure. With severe dehydration, death may occur within a few hours and the case-fatality rate may exceed 50%; with proper treatment, the case-fatality rate is < 1%. Most cases are asymptomatic or have mild diarrhea; infection can be transmitted by asymptomatic carriers. Non-O1/non-O139 *V. species* cause milder forms of gastroenteritis, wound infections and in rare cases primary septicemia. In persons with underlying medical conditions, especially liver disease, *V. vulnificus* can cause bloodstream infections characterized by fever, chills, decreased blood pressure, blistering skin lesions, and often death.

### C. Reservoirs:

Brackish, warm marine waters and estuaries are a natural environment for all *Vibrio spp.* non-O1/non-O139. *V. cholerae* can also be found in fresh water lakes. Humans are considered the only natural host for *V. cholerae* O1 and O139; all *Vibrio spp.* can attach to the chitin-containing shells of crabs, shrimps, and shellfish. *Vibrio spp.* other than *V. cholerae* O1 and O139 can be found in fish and shellfish.

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

Ingestion of food or water contaminated directly or indirectly with feces or vomitus of infected persons (e.g., sewage). Large epidemics often related to fecal contamination of water supplies or street vended foods. Eating raw or undercooked shellfish that are naturally contaminated can result in transmission. Wound infections from exposure to warm seawater.

### E. Incubation Period:

Cholera: Range two hours to 5 days; most commonly, 2-3 days.  
Non-O1/non-O139 *V. cholerae*: Range 5.5 to 96 hours, usually 12-24 hours.  
*V. parahaemolyticus*: Range 4 to 30 hours, usually 12-24 hours.  
*V. vulnificus*: Usually 12-72 hours after eating raw seafood.

### F. Period of Communicability:

For *V. cholerae* as long as it shed in stools. Antibiotics may shorten the period of communicability. Chronic biliary infection, lasting for years, has been observed in adults and is associated with intermittent shedding in their stool. Other *Vibrio species* are not transmitted person to person.

### G. Susceptibility and Resistance:

Variable. Infection with serogroup O1 may confer limited immunity.

### H. Treatment:

Oral or parenteral rehydration therapy for dehydration and electrolyte imbalance. Antimicrobial therapy is useful adjunctive therapy for severely ill.

## NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

All confirmed or **suspected** cholera cases shall be reported within **4 hours by phone**:

1. Health care providers and hospitals: report to the local public health jurisdiction or KDHE-BEPHI (see below)
2. Local public health jurisdiction: report to KDHE-BEPHI (see below)
3. Laboratories: report to KDHE-BEPHI (see below)
4. KDHE-BEPHI will contact the local public health jurisdiction by phone within one hour of receiving any report.

**Kansas Department of Health and Environment (KDHE)  
Bureau of Epidemiology and Public Health Informatics (BEPHI)  
Phone: 1-877-427-7317**

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

*As a nationally notifiable condition, Vibriosis cases require 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 requested as soon as possible, ensuring that the electronic form is completed within 7 days of receiving a notification of a Vibriosis report.

## INVESTIGATOR RESPONSIBILITIES

- 1) [Report](#) all confirmed, probable and suspect cases to the KDHE at 877-427-7317 within 4 hours of the initial report.
- 2) Use current [case definition](#), to confirm diagnosis with the medical provider.
- 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,
  - Example: Commercially available seafood.
- 6) Initiate control and prevention measures to prevent spread of disease.
- 7) Complete all information requested in the Kansas electronic surveillance system.
- 8) Use the disease [fact sheets](#), as needed.

## STANDARD CASE INVESTIGATION AND CONTROL METHODS

### Case Investigation

- 1) Contact the medical provider who reported or ordered testing of the case.
  - Obtain information from the provider or medical chart.
    - If patient hospitalized, obtain medical records, including admission notes, progress notes, lab report(s), and discharge summary.
  - Note symptoms: fever (note maximum temperature); nausea, vomiting,

- diarrhea (not maximum stool number / 24 hours); blood in stools; abdominal cramps; headache; muscle pain; shock; cellulitis or bullae (anatomical site)
- Record onset date and time of first symptoms
  - Record duration of illness in days
  - Examine the laboratory testing that was done, especially:
    - Note any other organisms isolated from the specimen that yielded *Vibrio*.
    - Identify if specimen was forwarded to state lab for confirmation.
    - For *V. cholerae* 01 and 0139, note serotype, biotype and any toxin test
  - Collect case's demographic data and contact information (birth date, county, sex, race/ethnicity, occupation, address, phone number(s))
  - Record hospitalizations: location, admission and discharge dates
  - Note complications. (i.e., amputation, skin graft)
  - Record outcomes: survived or date of death
  - Record antibiotics prescribed, date started and date ended.
  - Note pre-existing conditions: alcoholism; diabetes; peptic ulcer; heart disease or failure; gastric surgery (type) hematologic, liver or renal disease (type); immunodeficiency; disease; malignancy
- 2) Interview the case to determine source and risk factors:
- Focus on incubation period 5 days prior to illness onset.
  - Examine exposure to others with diarrheal illness.
  - Examine travel outside of home state: location, date entered and exit.
  - Specify seafood that was eaten and note if undercooked or raw. (clams, crab, lobster, mussels, oysters, shrimp, crawfish, other shellfish or fish)
  - For skin exposure: information on exposure to body of water (note type) or drippings from raw seafood or other contact with marine or fresh water life. Record activity involved with exposure; date and time of exposure and if there was a pre-existing wound or a wound occurred during the exposure.
  - For *V. cholerae* 01 or 0139: collect specific information related to exposure:
    - Raw or cooked seafood or street-vended food
    - Other person(s) with cholera or cholera-like illness
    - Foreign travel (if yes to foreign travel review the type of education received on cholera prevention and the reason for travel)
  - For implicated seafood, a detailed seafood investigation will occur. The agency involved in traceback and inspections will depend on the seafood source. For further information refer to the [Foodborne Illness and Outbreak Manual](#). The local health department will assist the agency performing the traceback by collecting the following for each type of seafood:
    - Type of seafood, date and time consumed and amount consumed
    - If patient ate multiple seafoods; note why a specific seafood was investigated.
    - How was seafood prepared?
    - Where seafood was obtained; record contact information on the source.
  - Collect information from case for the [Contact Investigation](#). (See below).
- 3) Investigate epi-links among cases (clusters, household, co-workers, etc).

- Highly suspected sources should be investigated.
- For suspected [outbreaks](#) refer to Managing Special Situations section.

## Contact Investigation

Contacts are anyone exposed to the implicated food or body of water.

- Individuals living in the same household are at low risk from exposure to *V. cholerae* and are not considered at risk from other *Vibrio spp.*
    - Only when there is a high probability of fecal exposure would such individuals be considered contacts of *V. cholerae*.
  - High risk contacts at risk for developing severe disease are all children, immunocompromised people, and people with chronic liver disease.
- 1) Create a line listing of primary contacts with contact information.
  - 2) Collect on any information on symptoms.
  - 3) Note any high risk contacts.
  - 4) Follow-up symptomatic contacts as suspect cases. A contact of non-01 and non-0139 *Vibrio*, meeting the clinical case definition is a probable case.
  - 5) Institute control measures for school or day-care contacts as indicated under [Isolation, Work and Daycare Restrictions](#).
  - 6) Follow-up with contacts (especially high risk contacts) as recommended under [Contact Management](#).

## Isolation, Work and Daycare Restrictions

### **K.A.R 28-1-6 for Cholera:**

- Enteric precautions shall be followed for the duration of acute symptoms.

### **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.
- Workers in schools, residential programs, daycare and healthcare facilities, who feed, give mouth care or dispense medications to clients, are subject to the same restrictions as food handlers.

- 1) Restrict food handlers and workers in schools, residential programs, daycare and healthcare facilities, who feed, give mouth care or dispense medications from handling food, giving mouth care or dispensing medications until symptoms have resolved for 24 hours.
- 2) Asymptomatic but infected food handlers and hospital employees need not be excluded from work if proper personal hygiene measures, including hand hygiene, are maintained.
- 3) Children with diarrhea may not attend daycare or school until symptoms have resolved.

## Case Management

Case management is not necessary beyond assurance with compliance with any [work or school restrictions](#).

## Contact Management

- 1) For *V. cholerae*, chemoprophylaxis of contacts is rarely advisable. It should only be considered in very special circumstances in which the probability of fecal exposure is high and delivery of medication can occur rapidly (i.e. within 24 hours of identification of the index case).
- 2) The best measure is to provide education to susceptible contacts on incubation period and symptoms of disease and precautions to take if symptoms develop.
- 3) For implicated seafood or bodies of water, work with cooperating agencies to ensure contacts are notified and protected against further exposure.

## Education

- 1) Provide education that includes basic information about the disease and its complications and ways to prevent transmission of illness.
- 2) Instruct cases on the necessary enteric precautions.
- 3) Counsel contacts on the period of time to watch for signs or symptoms and to seek medical care immediately if symptoms develop.
- 4) Instruct cases and contacts to be aware of the risk that infection poses to children, immunocompromised people, and people with chronic liver disease and that those individuals should avoid consuming raw or undercook seafood.

## MANAGING SPECIAL SITUATIONS

### A. Outbreak Investigation:

- 1) Outbreak definition: Two or more cases with a common serogroup within a 3-month timeframe occurring in a defined population or community.
- 2) Notify KDHE immediately, 877-427-7317.
- 3) Organize and maintain all data related to outbreak:
- 4) Construct and maintain case listing which includes:
  - Record number, name, DOB (or age) and other demographics,
  - Symptoms; Onset date and time; recovery date and time
  - Source of exposure (i.e., record number, setting),
  - Specimen collection date and lab results,
  - Case status (i.e., confirmed, probable, suspect)
- 5) All epidemiologic data will be reported and managed with the Kansas state electronic disease reporting system (outbreak module).
- 6) 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:
  - 1) Person: who is becoming ill (i.e., age, gender, occupations)
  - 2) Place: where are the cases (i.e. classrooms, addresses) and to what settings or activities are they associated
  - 3) Time: when did it start and is it still going on

- 7) Enhance surveillance and perform active case finding:
  - 1) Maintain active surveillance with medical providers serving the affected communities for two incubation periods from last confirmed case.
- 8) Outbreak control:
  - 1) Target efforts on those population(s) identified as at risk.
  - 2) Evaluate the effectiveness of and consider amendments to the restrictions discussed in [Isolation, Work and Daycare Restrictions](#).
  - 3) Establish protocols for control measures necessary to slow or prevent the transmission of disease in affected settings.
- 9) Recommendations will be made based on the KDHE Foodborne Illness and Outbreak Manual:  
[www.kdheks.gov/epi/download/kansas\\_foodborne\\_illness\\_manual.pdf](http://www.kdheks.gov/epi/download/kansas_foodborne_illness_manual.pdf)

## **B. Bioterrorism / Intentional Contamination Situation:**

*Vibrio cholerae* is considered a Category B bioterrorism agent in that it is a food and water safety threat. If the natural etiology cannot be readily established by a prompt and vigorous investigation, the situation should be considered to be a bioterrorist act until proven otherwise. If suspected:

- 1) Notify local law enforcement and state public health officials.
- 2) Implement "[Chain of Custody](#)" procedures for all samples collected, as they will be considered evidence in a criminal investigation.
- 3) Work to define population at risk which is essential to guide response activities. Public health authorities will play the lead role in this effort, but must consult with law enforcement, emergency response and other professionals in the process. The definition may have to be re-evaluated and redefined at various steps in the investigation and response.
- 4) Once the mechanism and scope of delivery has been defined, identify symptomatic and asymptomatic individuals among the exposed and recommend treatment and/or chemoprophylaxis.
- 5) Establish and maintain a detailed line listing of cases, suspect cases, exposed, and potentially exposed individuals with accurate identifying and locating information as well as appropriate epidemiological information.

### Safety Considerations:

- Food and water are the most likely mechanism of delivery.
- No isolation or quarantine measures are indicated beyond standard enteric precautions.

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

### **A. Organize and collect data.**

### **B. Report data via state electronic surveillance system:**

- At a minimum, data collected during the investigation that helps to confirm or classify a case.
- Report as "Cholera (*Vibrio cholerae*)" or "Vibriosis (non-cholera *Vibrio* species infections)".

## 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. **Kansas Regulations/Statutes Related to Infectious Disease:** [www.kdheks.gov/epi/regulations.htm](http://www.kdheks.gov/epi/regulations.htm)
- E. **KDHE Foodborne Illness and Outbreak Manual:** [www.kdheks.gov/epi/download/kansas\\_foodborne\\_illness\\_manual.pdf](http://www.kdheks.gov/epi/download/kansas_foodborne_illness_manual.pdf)
- F. **KDHE Foodborne Illness Resources:** [www.kdheks.gov/epi/foodborne.htm](http://www.kdheks.gov/epi/foodborne.htm)
- G. **Intentional Biological Event:** Kansas Biological Incident Annex at: [www.kdheks.gov/cphp/operating\\_guides.htm](http://www.kdheks.gov/cphp/operating_guides.htm)
- H. **Chain of Custody:** KDHE Chain of Custody Standard Operating Guide, [www.kdheks.gov/cphp/operating\\_guides.htm#coc](http://www.kdheks.gov/cphp/operating_guides.htm#coc)
- I. **Additional Information (CDC):** [www.cdc.gov/health/default.htm](http://www.cdc.gov/health/default.htm)

# Supporting Materials

Supporting Materials are available under attachments:

**CLICK HERE TO VIEW ATTACHMENTS**

Then double click on the document to open.

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