A. Agent
Vibriosis is an infection caused primarily by species of the *Vibrio* genus that do not produce toxins\(^1\). The organisms are Gram-negative bacteria that thrive in salty environments\(^1\). Various species of *Vibrio* can lead to different infection sites including gastrointestinal, wound, and bloodstream\(^{1,3}\). The most commonly reported cause of gastrointestinal infections is due to *Vibrio parahaemolyticus* and non-Cholera *Vibrio cholerae*\(^1\). *V. vulnificus* primarily causes sepsis and wound infections – although the other species can cause these syndromes; and *V. alginolyticus* primarily causes wound and ear infections\(^1\).

B. Clinical Description
Those with gastroenteritis will experience acute onset of watery, nonbloody diarrhea and abdominal pain\(^{1,3}\). Half of these cases will develop a low-grade fever, headaches, and chills; and approximately 30% will have vomiting\(^1\). Most cases of vibriosis are mild with recovery in two to five days and no lasting effects\(^3\). Severe illness is rare and most often seen in individuals with weakened immune systems\(^{1,3}\). *Vibrio* can also lead to ear infections and wound infections that can progress to sepsis\(^{1,3}\). *Vibrio* infections can also cause swelling, pain, redness, and/or blistering or necrosis of the skin\(^1\); and death\(^{1,3}\).

C. Reservoirs
*Vibrio* species are naturally found in aquatic environments around the world, particularly in brackish and salt waters\(^{1,2}\). *Vibrio* can also be found in fish and shellfish as the bacteria numbers peak in warm seasons\(^3\).

D. Mode of Transmission
Gastroenteritis is caused by ingestion of raw or inadequately cooked seafood or any food cross-contaminated by handling raw seafood or by rinsing with contaminated water\(^1\). Wound infections can result from exposure of a wound to seawater contaminated with Vibrio spp. or from a break in the skin due to mishandling of shellfish\(^{1,3}\).

E. Incubation Period
Typically 24 hours, range from 5 to 92 hours, and is 1 to 7 days for wound infections and septicemia\(^1\).

F. Period of Communicability
Vibriosis is not transmitted person-to-person\(^{1,3}\).

G. Susceptibility and Resistance
People with weakened immune systems, especially those with chronic liver disease, are more likely to become infected with *Vibrio*\(^{1,2,3}\). Additionally, people with low gastric acidity are more susceptible to infection\(^1\). Wound infections usually are attributable to *V. vulnificus* and can result from exposure of a preexisting wound to contaminated seawater or from punctures resulting from handling of contaminated fish or shellfish. Exposure to contaminated water during natural disasters, such as hurricanes, has resulted in wound infections\(^1\).

H. Treatment
Diarrhea typically is mild and self-limited and requires only oral rehydration. Wound infections require prompt surgical débridement of necrotic tissue, if present. Antimicrobial therapy is indicated for severe diarrhea, wound infection, and septicemia. Septicemia with or without hemorrhagic bullae and wound
Disease Management

Infections should be treated with a third-generation cephalosporin plus either doxycycline or ciprofloxacin. Severe diarrhea should be treated with doxycycline or ciprofloxacin. Doxycycline can be used for short durations (ie, 21 days or less) without regard to patient age.

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

J. Laboratory Criteria for Diagnosis

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

Presumptive Testing
- Detection of a species of the family *Vibrionaceae* (other than toxigenic *Vibrio cholerae* O1 or O139, which are reportable as cholera) from a clinical specimen using a culture-independent diagnostic test (CIDT).

<table>
<thead>
<tr>
<th>CASE CLASSIFICATION</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmed</td>
<td>A case that meets the laboratory criteria for diagnosis.</td>
</tr>
<tr>
<td>Probable</td>
<td>A case that meets the presumptive laboratory criteria for diagnosis; OR A clinically-compatible case that is epidemiologically linked to a case that meets the presumptive or confirmatory laboratory criteria for diagnosis.</td>
</tr>
</tbody>
</table>

Note: Species identification and, if applicable, serotype designation (i.e., *Vibrio cholerae* non-O1/non-O139 or *Grimontia hollisae*) should be reported.

K. Classification of Import Status:
Import status reflects where the Vibrio infection was acquired: in county, in state, international, out of county but in Arizona, out of state but in the U.S., or location of infection is unknown. Mark as bi-national if infection acquired in Mexico or Canada or food was consumed from Canada or Mexico and was not purchased in a U.S. store during the exposure period. For more information, please refer to the MEDSIS User Guide. You can find the guide in MEDSIS under: Resources → MEDSIS Documentation → User Guides.

L. Laboratory Testing
Gold Standard: Culture.

For health departments to facilitate stool specimen submission for testing at ASPHL, instructions for collecting stool specimens are available at: [https://azdhs.gov/preparedness/epidemiology-disease-control/index.php#reporting-labs](https://azdhs.gov/preparedness/epidemiology-disease-control/index.php#reporting-labs)

<table>
<thead>
<tr>
<th>TEST</th>
<th>SPECIMEN &amp; TRANSPORT</th>
<th>TESTING AVAILABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture</td>
<td>Stool (Cary-Blair Transport Medium); Do not refrigerate; Submit as soon as possible (preserved stool should be submitted)</td>
<td>Routine stool culture for enteric pathogens</td>
</tr>
</tbody>
</table>
M. Assessing Laboratory Results
The organism can be isolated from the stool of patients with gastroenteritis, blood, and wound exudates⁴. *Vibrio* species grow well on most nonselective growth media that contain sodium chloride, for example blood or chocolate agar¹. To inhibit background fecal flora, fecal specimens should be cultured on thiosulfate citrate bile salts sucrose agar¹.

At ASPHL, cultures suspected to contain *Vibrio cholerae*, and other Vibrio species are tested with commercial biochemical systems⁵. Cultures presumptively identified as *Vibrio cholerae* will be tested against specific antisera to determine the serogrouping of the isolate⁵. *Vibrio cholerae* strains will fall into two groups based on this serological testing⁵. O group 1 strains (O1) are associated with epidemic cholera; non-O1 strains may cause cholera-like and other illnesses, but are not involved in epidemics⁵.

Criteria to Distinguish a New Case from an Existing Case⁴:
A case should not be counted as a new case if laboratory results were reported within 30 days of a previously reported infection in the same individual. When two or more different species of the family Vibrionaceae are identified in one or more specimens from the same individual, each should be reported as a separate case.

Comment⁴: The use of CIDTs as stand-alone tests for the direct detection of Vibrio in stool is increasing. Specific performance characteristics such as sensitivity, specificity, and positive predictive value of these assays likely depend on the manufacturer and are currently unknown. It is therefore useful to collect information on the type(s) of testing performed for reported vibriosis cases. When a specimen is positive using a CIDT it is also helpful to collect information on all culture results for the specimen, even if those results are negative.

Note: If a patient has a sample submitted to ASPHL for Vibrio (or other enteric pathogens), regardless of the ASPHL’s result, the clinical laboratory result should be documented in MEDSIS before submitting the case to ADHS.

N. Outbreak Definition

- Diagnosis or detection of two or more individuals from different households and families who experience an illness clinically compatible with *Vibrio* infection, at least one with laboratory-confirmed Vibriosis, after exposure to a common food or a shared experience; OR
- An unexplained, unexpected increase in cases of laboratory-confirmed *Vibrio* infection that is clustered by time, place, or person.

NOTE: See Infectious Disease Outbreak Investigation and Management webpage and Outbreak Threshold Guidelines — healthcare providers/facilities and schools/child care establishments/shelters for additional information/guidance.

Vibrio Protocol
Last Updated: 3/16/2022
O. Time Frame
All confirmed and probable cases of Vibriosis are to be reported within one working day to the local health department. Providers must submit a report to the Local Health Department within one working day after a case or suspect case is diagnosed, treated, or detected. Providers must submit a report to the Local Health Department within 24 hours after the case or suspect case is diagnosed, treated, or detected, if a case or suspect case is a food handler or works in a child care establishment or a health care institution. Clinical Laboratories must submit a report to ADHS within 1 working day after obtaining a positive test result. Clinical Laboratories must submit an isolate of the organism, if available, for each positive culture to ASPHL within one working day.

Outbreaks should be entered into the MEDSIS Outbreak Module within 24 hours of receipt of report.

Note: CDC Cholera and Other Vibrio Illness Surveillance Report should be sent to CDC within 30 days of specimen collection.

P. Forms
- CDC Cholera and other Vibrio Illness Surveillance Report: http://azdhs.gov/documents/preparedness/epidemiology-disease-control/disease-investigation-resources/cholera-form.pdf [to be completed within 30 days of specimen collection]
- ADHS Reporting & Investigation Forms: https://www.azdhs.gov/preparedness/epidemiology-disease-control/index.php#investigations-forms

Q. Investigation Steps
- Confirm Diagnosis
  i. Verify case meets confirmed or probable case definition.
  ii. Obtain demographic information and information on any laboratory tests performed and results. For hospitalization, obtain medical records, including admission and discharge summary.
    a. Note symptoms and onset date and time
       - Nausea
       - Vomiting
       - Diarrhea (maximum stool number in 24 hours), blood in stool
       - Abdominal cramps
       - Headaches
       - Muscle pain
       - Shock
       - Cellulitis or bullae (anatomical site)
    b. Note complications, outcome, pre-existing conditions, and outcome.
  iii. Ensure specimen is forwarded to ASPHL by calling the clinical lab and requesting it be sent. Note: If there is a positive result at the clinical lab, please be sure to document the clinical lab report to the case in MEDSIS.
● **Conduct Case Investigation**
  i. Cases should be entered into MEDSIS as soon as possible and contacted by the investigator.
     a. The investigator will attempt three phone calls, or text messages following unreturned voicemails, before sending a letter to the patient's address (depending upon local health department's protocols and capacity).
     b. All interview attempts, even if unsuccessful (i.e., leaving a voicemail or text message), should be entered into the Case Contacted & Interviews table in MEDSIS as close to real time as possible.
     c. If phone numbers appear invalid or non-functioning, contact food@azdhs.gov to request a LexisNexis search. This can be conducted for individuals 18 years and older. For those younger than 18, a parent/guardian name must be used to search in LexisNexis; otherwise, a search can be conducted in ASIIS for the individual under 18 years of age..
  ii. Report electronically through MEDSIS and use the [CDC Cholera and other Vibrio Illness Surveillance Report](https://www.cdc.gov/ncidod/dhqp/pdf/vibrio surveillance report.pdf) to conduct the investigation. Once completed, attach the form to the case in MEDSIS, and ADHS will send it to the CDC COVIS team.
     a. Focus on incubation period of 7 days prior to illness onset
     b. Examine exposures to others with similar illness
     c. Assess if case has had travel to other cities, states or countries
        - Dates and location of travel, as well as hotel, flight and travel accommodation information
     d. Note seafood eaten and if undercooked or raw/street-vended food.
     e. Note the type of water consumed during the incubation period.
     f. Notify local environmental health if seafood was consumed from a restaurant, as an inspection is warranted, especially if seafood was served raw.

● **Conduct Contact Investigation**
  **Contact definition:** Anyone exposed to the implicated food or body of water.
  i. Individuals living in the same household are at low risk from exposure to *Vibrio*.
  Contacts showing symptoms and with the same exposures may be interviewed. A detailed contact and environmental investigation will be completed if a particular source is considered highly likely to be the cause of illness among groups of people.
     a. Create a line list of primary contacts with contact information.
     b. Collect any information on symptoms.
     c. Follow-up symptomatic contacts as probable cases.

● **Initiate Control and Prevention Measures**
  i. Enteric precautions should be followed for the duration of acute symptoms, meaning soap and water hand washing must be performed instead of alcohol-based rubs.
  ii. Generally, no environmental measures are indicated for sporadic cases.
     - Collect food, drink or water samples as necessary.
     - Proper chlorination or boiling of water prevents illness transmission.
     - Clean and sanitize potentially contaminated surfaces with 1:10 solution of household bleach or proper germicides.
iii. In the event that food service, child care center, or public supply is implicated in transmission, coordinate through the proper regulatory agency.

iv. Provide education that includes basic information about the disease and ways to prevent transmission of illness.
   ● Individuals who are symptomatic should not prepare food for others.
   ● Wash hands often with soap and safe water.
   ● Instruct cases on the necessary enteric precautions.
   ● Counsel contacts on the period of time to watch for signs or symptoms and to seek medical care if symptoms develop.
   ● Instruct cases and contacts to be aware of the risk that infection poses to children, immunocompromised people, and people with chronic liver disease.
   ● While traveling internationally, individuals should:
     ▪ Avoid drinking unsafe water or beverages made with unsafe water. Safe water is bottled with an unbroken seal, carbonated bottled water, or water that has been boiled or treated with chlorine. Use safe water to brush your teeth, prepare food, wash your hands, clean surfaces and to make ice.
     ▪ Cook food well, particularly seafood. Cook or peel fruits and vegetables.
     ▪ Use latrines or bury your feces; do not defecate into a body of water. If this is not possible, defecate at least 30 meters from a body of water.
     ▪ Wash yourself, children, diapers and clothes at least 30 meters away from drinking water sources

v. Please refer to the ‘Vibrio Webpage’ for more information when providing education.

- Isolation, Work, and Child Care Restrictions

Per A.A.C. R9-6-393, a Vibrio infection case or suspect case working as a food handler, caring for patients or residents in a health care institution, or caring for children or attending a child care establishment shall be excluded until:
1. Diarrhea has resolved, or
2. The local health agency has determined that the case or suspect case is unlikely to infect other individuals and Using an aquatic venue until diarrhea has resolved;

- Case Management
   i. Educate case on measures to avoid future illness and its transmission.
   ii. Follow-up is indicated if a case cares for young children, the elderly or patients or handles food to assure compliance with work restrictions.
   iii. Additional stool cultures are not routinely indicated.

- Contact Management
   i. Cultures to confirm epi-linked cases may be warranted in outbreak situations.
   ii. Follow-up of contacts may be needed to assure no additional cases arise.

- Notifications

Generally, routine notification through MEDSIS is appropriate for sporadic cases.
   ● Report data electronically via MEDSIS or by fax if necessary, including:
• All essential data that was collected during the investigation, especially data that helps confirm or classify a case. Remember to verify that all key Disease Specific Observation fields are filled out. The key fields are listed below:
  ● Travel
  ● Exposure to body of water
  ● Exposure to other marine/freshwater life
• For epi-linked cases, include the MEDSIS ID of the related case in the case notes section.
  ● Maintain communication with local jurisdiction, ADHS, the Chief Medical Officer and all other associated partners in the investigation process to ensure coordination of efforts.
  ● As appropriate, use a notification letter and disease fact sheets to notify individuals or groups such as daycares.
  ● If appropriate, work with the Chain of Command and Public Information Officer to ensure appropriate and timely dissemination of public information.
  ● ADHS will notify CDC and federal regulatory agencies (FDA, USDA) as necessary.
  ● If a particular food product or body of water is identified as the definite source, notify the public and medical community who may have consumed, bought, or sold this product.

R. Outbreak Guidelines
Refer to the Outbreak section of the Disease Investigation Manual. For complete guidelines to investigating foodborne outbreaks, consult the ADHS Foodborne and Waterborne Disease Outbreak Investigation Resource Manual.

NOTE: See Infectious Disease Outbreak Investigation and Management webpage and Outbreak Threshold Guidelines – healthcare providers/facilities and schools/child care establishments/shelters for additional information/guidance.

S. Special Situations
Childcare Settings:
• Interview the operator and ask that they review attendance records to identify staff or attendees with a history of diarrheal illness within the past 2 weeks.
• Reinforce the need to exclude symptomatic children or adults. Exclude symptomatic children and adults until diarrheal symptoms have resolved for 24 hours.
• Educate on handwashing, diapering and disinfection procedures.

Healthcare settings:
• **Staff:** If case cares for patients or residents in a healthcare facility, they shall be excluded until diarrhea has resolved, or they are unlikely to infect others.

• **Patients:**
  a. Patients with *Vibrio* should be managed with standard precautions.
  b. Good hand washing before and after glove use is essential to prevent spread of pathogens.
  c. Diapered or incontinent patients should remain in contact isolation for the duration of diarrhea symptoms.
  d. No airborne isolation of patients is necessary.
Public Gathering Implicated:
● Food sources may include undercooked or raw seafood, cross-contaminated food or drink, or possibly food contaminated by food handlers, though it is unlikely.
● Conduct active case finding; ask about seafood exposures.
● If a food establishment or distributor is implicated, contact Environmental Health to coordinate investigation.

Community Water Source Implicated:
● Consult with LHD Environmental Health, Arizona Department of Environmental Quality, and epidemiology program manager when the investigation implicates a community drinking water system.
References


