

NON-CHOLERA *VIBRIO* INFECTIONS

I. DESCRIPTION AND EPIDEMIOLOGY

A. Overview

Vibrio species are gram-negative bacteria that occur naturally in marine environments and brackish water (a mixture of fresh and salt water, which is often found where rivers meet the sea and in estuaries). Infection with pathogenic *Vibrio* spp. causes two distinct clinical syndromes: cholera and vibriosis. Cholera is caused only by toxigenic (i.e., toxin producing) *V. cholerae* serogroup O1 or O139, and is rare in the United States. For more information about cholera, please visit the [CDC Cholera website](#). This chapter focuses on vibriosis, which are infections caused by non-cholera *Vibrio* species (spp.).

Non-cholera *Vibrio* spp. most frequently cause gastrointestinal illness but may also cause infections ranging from wound or ear infections to severe systemic disease. The most clinically relevant non-cholera *Vibrio* species are *V. parahaemolyticus* and *V. vulnificus*. However, illness has been associated with other organisms in the family *Vibrionaceae*, including *V. alginolyticus*, *V. cholerae* non-O1 and non-O139, *V. fluvialis*, *Grimontia hollisae* (previously *V. hollisae*), and *Photobacterium damsela* (previously *V. damsela*). *V. parahaemolyticus* is the leading cause of seafood-associated gastroenteritis in the U.S. and is the most common non-cholera *Vibrio* species to cause infection; however, *V. vulnificus* causes the most non-cholera *Vibrio* infection-related deaths.

B. Vibriosis in California

Approximately 200 to 350 cases of vibriosis occur each year in California. Most cases are sporadic, though clusters associated with raw oyster consumption from certain harvest or growing areas have occurred.

C. Symptoms

The symptoms of infection depend on the species and route of infection (ingestion vs. direct contact). Most *Vibrio* species can cause gastroenteritis or skin/wound infections. The more common species causing infection are:

- *V. parahaemolyticus*: Most commonly present as gastroenteritis with watery diarrhea, abdominal cramps, nausea, vomiting, fever, and headache. Symptoms are generally self-limited, lasting 1 to 7 days. *V. parahaemolyticus* rarely causes wound infections.
- *V. alginolyticus*: In addition to gastroenteritis, can cause skin infections, most commonly ear infections (otitis externa).
- Non-toxigenic serogroups of *V. cholerae*: Can cause gastroenteritis that is milder than classical cholera.

- *V. vulnificus*: The most important clinical manifestations include primary septicemia and wound infections. Primary septicemia occurs through ingestion of the organism, usually through raw or undercooked contaminated shellfish. The clinical course of *V. vulnificus* sepsis is frequently fulminant with rapid progression to death. Sepsis is often accompanied by distinctive bullous skin lesions. *V. vulnificus* may also infect wounds exposed to contaminated water, shellfish, or fish. These wound infections can range from cellulitis to severe myositis and necrotizing fasciitis. Persons who are at high risk for severe *V. vulnificus* disease and death include those with chronic liver disease, alcoholism, diabetes, hemochromatosis, or another immunocompromising condition.

D. Transmission

Transmission occurs most commonly through ingestion of undercooked or raw contaminated shellfish, particularly unprocessed raw oysters. Transmission may also occur through breaks in the skin when handling contaminated seafood or via wound exposure to contaminated seawater, such as swimming. Direct person-to-person transmission does not normally occur. Because *Vibrio* species thrive in warm water temperatures, infections occur more often during the summer months.

E. Incubation Period

The incubation period for *V. parahaemolyticus* is usually 12 to 24 hours but can range from 4 to 96 hours. For *V. vulnificus*, the incubation period is usually 12 to 72 hours but can range from 4 hours to 21 days.

F. Clinical Management

Clinical management decisions should be made by the patient's primary care physician or infectious diseases specialist. High clinical suspicion and early initiation of treatment for invasive vibriosis is important because the infection may progress rapidly to death.

II. COUNCIL OF STATE AND TERRITORIAL EPIDEMIOLOGISTS (CSTE) SURVEILLANCE CASE DEFINITION

Vibriosis (any species of the family *Vibrionaceae*, other than toxigenic *Vibrio cholerae* O1 or O139) (2017)

Vibriosis has been a nationally notifiable condition since 2007. Please see the [2017 CSTE case definition](https://ndc.services.cdc.gov/case-definitions/vibriosis-2017/) (https://ndc.services.cdc.gov/case-definitions/vibriosis-2017/).

[CSTE Position Statement 16-ID-05](https://cdn.ymaws.com/www.cste.org/resource/resmgr/2016PS/16_ID_05.pdf)

(https://cdn.ymaws.com/www.cste.org/resource/resmgr/2016PS/16_ID_05.pdf)

Clinical Criteria

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 Diagnosis

Confirmatory laboratory evidence

- 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.

Supportive laboratory evidence

- 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).

Epidemiologic Linkage

- A clinically compatible case that is epidemiologically linked to a case that meets the supportive or confirmatory laboratory criteria for diagnosis.

Criteria to Distinguish a New Case from an Existing Case

- 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.

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) should be reported.

Probable

- A case that meets the supportive laboratory criteria for diagnosis, or a clinically compatible case that is epidemiologically linked to a case that meets the supportive or confirmatory laboratory criteria for diagnosis.

Please refer to [Appendix A](#): Non-Cholera *Vibrio* Infections Diagram for CDPH Case Classification and Reporting.

III. CASE SURVEILLANCE, INVESTIGATION, AND REPORTING

A. Purpose of Surveillance, Investigation, and Reporting

- To understand the epidemiology of vibriosis in California and to develop targeted interventions to decrease rates of illness.
- To identify vibriosis outbreaks, recognize food vehicles, and interrupt potential sources of ongoing transmission.
- To detect new and emerging *Vibrio* species or serotypes, and monitor epidemiologic trends.
- To educate people about how to reduce their risk of vibriosis.

B. Local Health Department (LHD) General Case Investigation Recommendations

- Begin investigation as soon as vibriosis is reported from a healthcare provider or clinical laboratory. These are reportable to public health within one working day of identification.
- Patients should be interviewed using CalREDIE or the CDPH Cholera and Other *Vibrio* Illness Case Report Form (CDPH 8587, see [III. C. LHD Reporting](#)). Please obtain information about seafood consumption and water exposures in the 7 days prior to symptom onset. If seafood was consumed, obtain details on the date and location the seafood was purchased (such as a market or restaurant) and method of preparation. Of particular interest are bivalve shellfish exposures, especially raw oyster consumption. Efforts should be made to determine the specific type of shellfish consumed, including variety (Pacific, Kumamoto, Happy Hour special, etc.). Below are some interviewing tips:
 - *If seafood is purchased from a commercial source (restaurant, market/grocery, food truck, or other commercial establishment)*: It is helpful to use an online menu, if available, to guide the interview. Be aware that the seafood eaten may have been a special item not on the menu. To identify meal dates and times, ask the patient to look at receipts, online bank statements, and calendars. Some restaurants serve multiple types of shellfish, and it is important to identify as closely as possible which shellfish were eaten.
 - *If recreational harvest*: Gather details about who harvested the shellfish or other seafood (including contact information if additional information needs to be collected), when and where it was harvested, storage conditions, and how the items were prepared (served raw, if cooked, how cooked, possibilities for cross-contamination in storage or preparation).
 - *If patient handled raw shellfish*: Obtain specific details about the type of shellfish and source (market, recreational harvest, restaurant, other source).
- If seafood is suspected as the source of infection, local environmental health should investigate the source of the seafood and obtain available shellfish tags if

bivalve shellfish, such as oysters, clams, or mussels, were consumed. Please refer to [Appendix B](#): CDC Prioritization Guidance for Seafood Investigations. Local environmental health should complete the CDC Cholera and Other *Vibrio* Illness Seafood Investigation Report Form (Section 5 of the CDC COVIS form) (see [III. C. LHD Reporting](#)) that documents the source of bivalve shellfish that was ingested. CDPH may also request that this form be completed for other seafood exposures (e.g., scallops, crab, shrimp, etc.) especially if the case is suspected to be part of an outbreak. Local environmental health should also notify the CDPH Food and Drug Branch (FDB) Shellfish Program Specialist at SeafoodReporting@cdph.ca.gov.

- If the bivalve shellfish exposure occurred in a California jurisdiction other than the jurisdiction where the patient lives, the LHD staff can work directly with the other LHD for the jurisdiction where the exposure occurred. If the shellfish exposure occurred outside of California, please notify the CDPH Infectious Diseases Branch (IDB) *Vibrio* Subject Matter Expert (SME) at 510-620-3434 to coordinate the environmental health investigation.
- Determine if the patient is in a sensitive occupation and administer appropriate infection control recommendations (see [IV. Case Management and Public Health Control Measures](#)).
- If the patient has a wound or ear infection due to a *Vibrio* species such as *V. alginolyticus*, it is not necessary to ask about a history of seafood ingestion, but be sure to inquire about water exposures, such as swimming in seawater. Obtain details such as water types, exact locations, and dates of exposures.
- If the patient appears to be part of a point-source outbreak, follow your protocol for foodborne outbreak investigations. This should include notifying CDPH about the outbreak.
- If you require assistance with your investigation, contact the DIS *Vibrio* SME at 510-620-3434.

C. LHD Reporting

LHD Reporting Overview

Non-cholera vibriosis became nationally notifiable in January 2007. Both CDC's [Annual Tables of Nationally Notifiable Infectious Diseases and Conditions](#) (https://wonder.cdc.gov/nndss/nndss_annual_tables_menu.asp) and California's final case count for the [Yearly Summary Reports](#) include only confirmed and probable cases of vibriosis that have been reviewed and closed by the DIS *Vibrio* SME.

Please refer to [Appendix A](#): Non-Cholera *Vibrio* Infections Diagram for CDPH Case Classification and Reporting.

Confirmed and probable vibriosis cases should be reported to CDPH using CalREDIE or the CDPH Cholera and Other *Vibrio* Illness Case Report Form (CDPH 8587). Of

note, all *Vibrio* species, including *cholerae* and non-*cholerae* species, are reportable. However, cholera as a disease entity refers only to toxigenic *V. cholerae* serogroup O1 or O139. All other *V. cholerae* infections should be reported as non-cholera vibriosis cases.

CalREDIE or the CDPH Cholera and Other *Vibrio* Illness Case Report Form (CDPH 8587) should be used to interview all patients. CDPH 8587 is available in the CalREDIE Document Repository under the CDPH tab of the ribbon in the CalREDIE application (see below). These forms collect data including demographic characteristics, signs and symptoms, medical history, treatment details, lab information, food and water exposures, and travel history.

Please note that the CDC also has a reporting form called the Cholera and Other *Vibrio* Illness Surveillance Report Form (CDC COVIS, CDC OMB 0920-0728) that is divided into five separate sections. It is **not** necessary for the LHD to complete the entire CDC COVIS form, as CalREDIE and the CDPH Cholera and Other *Vibrio* Illness Case Report Form capture the pertinent data. We request that only Section 5 (which is called the CDC Cholera and Other *Vibrio* Illness Seafood Investigation Report Form and found in the CalREDIE Document Repository under the CDPH tab of the ribbon in the CalREDIE application) be completed and submitted to CDPH, as it captures details regarding the source of seafood consumed during the incubation period that may be used for traceback purposes. The CDC Cholera and Other *Vibrio* Illness Seafood Investigation Report Form (Section 5 of COVIS, CDC OMB 0920-0728) should be completed for all vibriosis patients who consumed bivalve shellfish (e.g., oysters, clams, mussels) during the 7 days before illness onset. CDPH may also request that this form be completed for other seafood exposures (e.g., scallops, crab, shrimp, etc.) especially if the case is suspected to be part of an outbreak. This form is usually completed by local environmental health staff. Please note that the CDC Cholera and Other *Vibrio* Illness Seafood Investigation Report Form (Section 5 of COVIS, CDC OMB 0920-0728) is not in CalREDIE and must be completed as a PDF and uploaded into the CalREDIE filing cabinet. Jurisdictions not participating in CalREDIE (Extended Data Exchange Jurisdictions or EDEJs) should send the PDF case report form to CDPH (see Instructions for EDEJs below).

Instructions for CalREDIE-participating jurisdictions:

- Enter the patient information into CalREDIE upon notification of the case by the clinical laboratory or healthcare provider. Select “Vibrio Infections (Non-Cholera)” as “Disease Being Reported”.
- In the Laboratory Info tab, please enter collection date, specimen type (stool, wound, etc.), culture and CIDT result (positive, negative, not done, unknown), and species information (*parahaemolyticus*, *vulnificus*, etc.).
 - When two or more different species of the family *Vibrionaceae* are identified in one or more specimens from the same individual, each may be counted as a separate case, but multiple CalREDIE incidents do not

need to be created. If multiple species have been identified, please enter in information for each species by clicking on the “Add” button at the bottom of the section. Then enter collection date, specimen type, culture and CIDT result, and species information.

- If the isolate is *V. cholerae*, please indicate serogroup (e.g., O1, O139, non-O1/non-O139), serotype (if known), and verify that it is not toxigenic.
- Note: If toxigenic *V. cholerae* is confirmed or suspected, notify DIS immediately at (510) 620-3434. Please have the clinical laboratory forward the isolate or specimen to a local public health laboratory (PHL) for additional testing. A local PHL that cultures *V. cholerae* from a specimen or receives isolates from clinical laboratories should subsequently submit isolates to the CDPH Microbial Diseases Laboratory (MDL) for serogrouping and cholera toxin testing (e.g., testing for the presence of the cholera toxin gene).
- If the patient reports bivalve shellfish exposure, notify local environmental health to investigate and complete the CDC Cholera and Other *Vibrio* Illness Seafood Investigation Report Form (Section 5 of COVIS, CDC OMB 0920-0728), which is found in the CalREDIE Document Repository under the CDPH tab of the ribbon in the CalREDIE application. Scan the completed form and upload into the CalREDIE Electronic Filing Cabinet. Include copies of available shellfish tags, invoices, labels, and inspection reports.
 - Please refer to [Appendix B](#): CDC Prioritization Guidance for Seafood Investigations.
- Note: Please document the status of environmental health investigations and shellfish tag collection in the Epidemiologic Info tab “Seafood Exposure/Environmental Health Investigation” section.
- The CalREDIE report will NOT be reviewed by the IDB *Vibrio* SME and “Closed by State” unless the process status is “Closed by LHD”, regardless of the resolution status. The “Closed by LHD” process status is the trigger for the SME to review the incident report.
- Local Environmental Health investigators should also submit the completed CDC Cholera and Other *Vibrio* Illness Seafood Investigation Report Form (Section 5 of COVIS, CDC OMB 0920-0728) and shellfish tags, invoices, labels, and inspection reports directly to the CDPH FDB Shellfish Program Specialist by fax at (916) 636-6498 or email at SeafoodReporting@cdph.ca.gov.

Instructions for Extended Data Exchange Jurisdictions (EDEJs):

- For jurisdictions currently not participating in CalREDIE, confidential morbidity report (CMR) and the Cholera and Other *Vibrio* Illness Case Report Form (CDPH 8587) must still be reported. The EDEJ may contact DIS (510-620-3434) for the CDPH 8587 if needed.

- In the Laboratory Information Section, please enter collection date, specimen type (stool, wound, etc.), culture and CIDT result (positive, negative, not done, unknown), and species information (*parahaemolyticus*, *vulnificus*, etc.).
 - When two or more different species of the family *Vibrionaceae* are identified in one or more specimens from the same individual, each may be counted as a separate case, but multiple case report forms do not need to be completed. Report all species identified by checking the appropriate boxes on the CDPH 8587 form.
 - If the isolate is *V. cholerae*, please indicate serogroup (e.g., O1, O139, non-O1/non-O139), serotype (if known), and verify that it is not toxigenic.
- Note: If toxigenic *V. cholerae* is confirmed or suspected, notify IDB immediately at (510) 620-3434. Please have the clinical laboratory forward the isolate or specimen to a local PHLPHL for additional testing. A local PHL that cultures *V. cholerae* from a specimen or receives isolates from clinical laboratories should subsequently submit isolates to the CDPH MDL for serogrouping and cholera toxin testing (e.g., testing for the presence of the cholera toxin gene).
- If the case appears to be shellfish-associated, please notify local environmental health to investigate and complete the CDC Cholera and Other *Vibrio* Illness Seafood Investigation Report Form (contact DIS for the PDF form). Please refer to [Appendix B](#): CDC Prioritization Guidance for Seafood Investigations.

IDB sends a blank copy of the Vibriosis Preliminary Report Sheet to EDEJs at the beginning of each year. EDEJs should notify the *Vibrio* SME and CDPH FDB Shellfish Program Specialist by emailing the completed Vibriosis Preliminary Report Sheet to the recipient email addresses located in the first row of the sheet (contact IDB for a blank Vibriosis Preliminary Report Sheet if needed). This alerts the FDB Shellfish Program Specialist to follow up with the local environmental health investigator and begin traceback to specific shellfish beds and growing regions. Early action ensures that potential regulatory action is not delayed.

Please include the following minimum information on the Vibriosis Preliminary Report Sheet:

- Local ID
 - First three letters of the patient's last name
 - Local health jurisdiction
 - Date of illness onset
 - Case classification
 - Type of shellfish consumed/ date of consumption
 - Location of purchase
 - Name/ contact information of the LHD environmental health specialist
- Once the CDPH 8587 form is completed, submit to the CDPH IDB Surveillance and Statistics Section electronically or by mail (address on form) through your

communicable disease reporting staff. When the CDC Cholera and Other *Vibrio* Illness Seafood Investigation Report Form (Section 5 of COVIS, CDC OMB 0920-0728) has been completed by environmental health, submit the form and a duplicate copy of the corresponding case report form to CDPH IDB Surveillance and Statistics Section, include available shellfish tags, invoices, labels, and inspection reports.

- Local environmental health investigators should also submit the CDC Cholera and Other *Vibrio* Illness Seafood Investigation Report Form (Section 5 of COVIS, CDC OMB 0920-0728) and shellfish tags, invoices, labels, and inspection reports directly to the CDPH FDB Shellfish Program Specialist by fax at 916-636-6498 or email at SeafoodReporting@cdph.ca.gov.

Reporting Outbreaks and Clusters

Suspected outbreaks should be reported immediately to CDPH.

- *CalREDIE-participating jurisdictions*: Create a new outbreak in CalREDIE. From the dropdown list for “Disease”, select the appropriate disease category such as “GI, Foodborne”, “GI, Waterborne”, “GI, Other/Unknown”, etc.
- *EDEJs*: For foodborne outbreaks, complete and submit the Foodborne Disease Outbreak Report form (CDPH 8567, contact DIS 510-620-3434 for an electronic copy (i.e., PDF) if needed).

D. Laboratory Considerations/ Microbial Diseases Laboratory (MDL) and Food and Drug Laboratory Branch (FDLB) Resources

Laboratory Testing Overview

The diagnosis of vibriosis is typically made by the isolation of *Vibrio* species from stool, blood, or wound culture. Healthcare providers suspecting vibriosis should notify the laboratory of their suspicions so that the appropriate selective culture medium, such as thiosulfate-citrate-bile salts-sucrose (TCBS) agar, can be used to isolate *Vibrio*. Any suspected *V. cholerae* isolate should be forwarded to a public health laboratory for serogrouping and cholera toxin testing.

The use of CIDTs as stand-alone tests for the direct detection of *Vibrio* in stool is increasing. CIDTs include PCR-amplified, antigen-based and/or multi-analyte panel tests that are often ordered based on a clinical syndrome rather than a specific suspected pathogen. Specific performance characteristics such as sensitivity, specificity, and positive predictive value of these assays likely depend on the manufacturer. It is therefore useful to collect information on the type(s) of testing performed for reported vibriosis cases. When a specimen is positive for *Vibrio* using a CIDT, it is also helpful to collect information on all culture results for the specimen, even if those results are negative. Culture confirmation of CIDT positive specimens is ideal,

although it might not be practical in all instances. Local public health agencies should make efforts to encourage reflexive culturing by clinical laboratories that adopt CIDs. This is a particular issue for *Vibrio cholerae* CIDs, which do not distinguish between toxigenic *V. cholerae* O1/O139 (a true cholera case) and nontoxigenic *V. cholerae* (a non-cholera vibriosis case). Therefore, any specimen that is CIDT positive should undergo reflex culture, and any suspected *V. cholerae* isolate should be forwarded to a public health laboratory for serogrouping and cholera toxin testing.

CSTE defines *Vibrio* detected through CIDT as a probable case, which will be counted towards the year-end case count for vibriosis by CDC and by CDPH. CIDT-positive patients should be investigated by the LHD as any other probable or confirmed vibriosis case.

CDPH MDL Resources

It is not required for clinical isolates of *Vibrio* spp. to be sent to MDL for confirmation. However, MDL has the capacity to:

- Identify *Vibrio* at the species level;
- Identify the serogroup of *V. cholerae* isolates and can test *V. cholerae* isolates for the presence of the cholera toxin gene; and
- Can conduct whole genome sequencing (WGS) testing on *Vibrio* isolates submitted to MDL upon request by local, state, and/or federal partners for outbreak investigation. Pulsed-field gel electrophoresis was discontinued as of July 2019.

For additional information see the [MDL services and test catalog](https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/MDLServicesAndTestCatalog.aspx) (<https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/MDLServicesAndTestCatalog.aspx>).

For questions on submittals or laboratory testing email the MDL Foodborne & Waterborne Diseases Section at mdl.fwds@cdph.ca.gov.

CDPH FDLB Resources

FDLB can:

- Test shellfish for *V. cholerae* and *V. parahaemolyticus*; and
- Conduct WGS testing on environmental isolates.

Contact IDB at 510-620-3434 and ask to speak with the *Vibrio* SME if interested in shellfish testing. For additional questions, email the Food and Drug Laboratory at: fdlb.info@cdph.ca.gov.

IV. CASE MANAGEMENT AND PUBLIC HEALTH CONTROL MEASURES

A. Management of Cases

There are no specific codes guiding the management of patients with vibriosis. The California Association of Communicable Diseases Controllers (CACDC) has proposed guidelines which are not bound by state statute (and therefore, is left to the discretion of the Health Officer).

- For a symptomatic case in a sensitive occupation or setting: Restrict/exclude until 48 hours after resolution of signs and symptoms. Clearance specimens not required.
- For an asymptomatic case or previously symptomatic but now recovered case: No restriction is needed.
- For a child 5 years and younger in a group setting who is symptomatic: Restrict/exclude until 48 hours after resolution of signs and symptoms. Clearance specimens not required.
- For a child 5 years and younger in a group setting who is NOT symptomatic or was previously symptomatic but now recovered: No restriction is necessary.

For additional information, see the [Enteric Disease Matrix](https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/CACDC-Enteric-Disease-Matrix-2016-2017.pdf) (password protected) (<https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/CACDC-Enteric-Disease-Matrix-2016-2017.pdf>).

B. Management of Contacts

There are no specific codes guiding the management of contacts of vibriosis. The CACDC has proposed guidelines which are not bound by state statute (and therefore, is left to the discretion of the Health Officer).

- For a symptomatic contact: Restrict/exclude until 48 hours after resolution of signs and symptoms. Consider collection of one stool specimen for testing in a PHL for case ascertainment.
- For an asymptomatic contact: No restriction is necessary.

C. Infection Control Measures

Vibriosis patients must be educated regarding appropriate hand hygiene after using the toilet, changing diapers, and before preparing or eating food.

Hospitalized patients should be cared for using standard precautions. For patients who are diapered or incontinent, use contact precautions for the duration of the illness or to control institutional outbreaks.

D. Special Considerations

Most vibriosis can be prevented by eating seafood that has been cooked thoroughly, particularly oysters. It is especially important for persons with conditions that predispose to invasive vibriosis that they avoid eating raw, unprocessed oysters.

For more information on safe seafood, see the [U.S. Food and Drug Administration \(FDA\) Seafood webpage](https://www.fda.gov/food/resources-you-food/seafood) (<https://www.fda.gov/food/resources-you-food/seafood>).

To prevent wound infections, avoid exposing wounds to seawater, especially in summer months or along coastal regions in the southeastern U.S.

V. APPLICABLE STATE STATUTES

There are no applicable state statutes regulating the management of patients with vibriosis. However, in response to the risk of serious vibriosis associated with Gulf of Mexico oyster consumption, California adopted a regulation in 1991 to decrease these illnesses. Restaurants and other food establishments that sold or served raw Gulf Coast oysters were required to provide a written warning about the potential risk of consuming raw oysters. In 1997, this regulation was updated to require the written warning be provided both in English and in Spanish; as well as to require that these warnings were more prominently displayed.

Because serious illnesses continued, particularly due to *V. vulnificus*, an emergency regulation was enacted in 2003 to restrict the sale in California of raw oysters harvested from the Gulf of Mexico from April 1 through October 31 each year unless the oysters were treated with a scientifically validated process to reduce *V. vulnificus* to nondetectable levels.

The text of these regulations can be found here:

California Code of Regulations, Title 17, Article 10.5. Raw Oysters. Section 13675. Raw Gulf Oysters: Labeling, Written Warnings and Additional Requirements.
<https://www.cdph.ca.gov/Programs/CEH/DFDCS/CDPH%20Document%20Library/FDB/FoodSafetyProgram/Seafood/GulfOysterReg.pdf>

VI. ADDITIONAL RESOURCES

A. General Information/Patient Education

- [CDPH Vibriosis \(Non-Cholera\) webpage](https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Vibriosis.aspx) (<https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Vibriosis.aspx>)
- [CDC Vibrio website](https://www.cdc.gov/vibrio/index.html) (<https://www.cdc.gov/vibrio/index.html>)

B. Shellfish Safety

- [CDPH Food and Drug Branch Seafood and Shellfish Safety Program](#): Seafood processors are regulated by California statutes and federal regulations for Good Manufacturing Practices and Seafood Hazard Analysis Critical Control Point (HACCP). Shellfish dealers are also required to meet the requirements of the [National Shellfish Sanitation Program](#) (<https://www.fda.gov/food/federalstate-food-programs/national-shellfish-sanitation-program-nssp>).
- [CDPH Environmental Management Branch, Marine Biotoxin Monitoring Program](#): The purpose of the preharvest shellfish activities is to establish sanitary requirements for shellfish growing waters and to regulate the commercial growing and harvesting of shellfish to assure that shellfish are safe for human consumption (<https://www.cdph.ca.gov/Programs/CEH/DRSEM/Pages/EMB/Shellfish/Marine-Biotoxin-Monitoring-Program.aspx>).
- [FDA Seafood webpage](#) (<https://www.fda.gov/food/resources-you-food/seafood>)

C. References

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- Vugia D, Tabnak F, Newton A, Hernandez M, Griffin P. Impact of 2003 state regulation on raw oyster-associated *Vibrio vulnificus* illnesses and deaths, California, USA. *Emerg Infect Dis*. 2013; 19 (8):1276-1280.
- [Vibriosis Investigation Toolkit. Washington Integrated Food Safety Center of Excellence website](#). Accessed May 1, 2023. <https://foodsafety.uw.edu/resources/vibrio-toolkit>
- [Food and Drug Administration. Bad Bug Book, Foodborne Pathogenic Microorganisms and Natural Toxins](#). Second Edition. 2012 (<https://www.fda.gov/food/foodborne-pathogens/bad-bug-book-second-edition>)

VII. UPDATES

- Original version finalized and completed on August 10, 2015.
- August 30, 2017: Updated to incorporate the 2017 CSTE case definition, change the FDB fax number for submitting COVIS section 5 forms, and update web links.
- June 19, 2018: Updated to change the FDB fax number and add email address.

- March 5, 2020: Updated the laboratory section to reflect the exclusive use of WGS; corrected website links; minor formatting and content updates.
- June 15, 2023: Updated to correct website links; added Appendices A and B; minor formatting and content updates.

VIII. SUMMARY OF LHD ACTION STEPS: NON-CHOLERA VIBRIO INFECTIONS

Action	Specific Steps
<input type="checkbox"/> Begin case investigation as soon as vibriosis is reported from a clinical laboratory or healthcare provider.	<ul style="list-style-type: none"> • Obtain and review clinical documentation, medical records, and lab reports as applicable. • Specify species. • If <i>V. cholerae</i> is detected by CIDT or isolated from culture, ask the clinical laboratory to forward the specimen or isolate to a local PHL for additional testing. A local PHL that cultures <i>V. cholerae</i> from a specimen or receives isolates from clinical laboratories should subsequently submit isolates to the CDPH MDL for serogrouping and cholera toxin testing (e.g., testing for the presence of the cholera toxin gene). • Contact patient for interview.
<input type="checkbox"/> Confirm case definition	<ul style="list-style-type: none"> • To count as a confirmed case of non-cholera vibriosis, only isolation of a species of the family <i>Vibrionaceae</i> from a clinical specimen is necessary. • A probable case is a case with specimens that are CIDT positive for a species of the family <i>Vibrionaceae</i> without culture confirmation (i.e., culture negative or not done) OR a clinically compatible case that is epidemiologically linked to a confirmed or probable case. (Note: A negative culture result does not negate the CIDT result.) • Please refer to Appendix A: Non-Cholera <i>Vibrio</i> Infections Diagram for CDPH Case Classification and Reporting.
<input type="checkbox"/> Attempt to identify source of exposure	<ul style="list-style-type: none"> • Use the Vibrio Infections (Non-Cholera) case report form in CalREDIE or the CDPH Cholera and Other <i>Vibrio</i> Illness Case Report form (CDPH 8587) to guide your interview. • Include as many details as possible that may trigger memory, including any receipts or records that may help identify location of seafood or water exposure. • If the patient appears to be part of a point-source outbreak, follow your protocol for foodborne outbreak investigations.

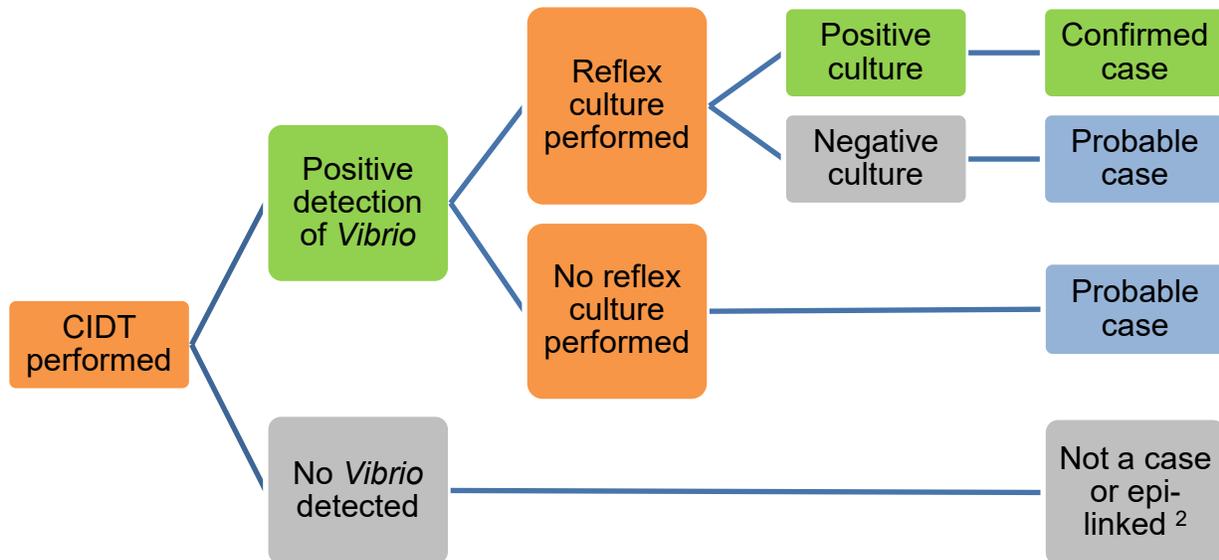
Action	Specific Steps
	<p>This should include notifying CDPH about the outbreak. Suspected outbreaks should be reported immediately to CDPH.</p>
<p>☐ Submit CDC Cholera and Other <i>Vibrio</i> Illness Seafood Investigation Report Form (Section 5 of COVIS, CDC OMB 0920-0728)</p>	<ul style="list-style-type: none"> • If the case appears to be associated with bivalve shellfish consumption, work with your environmental health to complete the CDC Cholera and Other <i>Vibrio</i> Illness Seafood Investigation Report Form (Section 5 of COVIS, CDC OMB 0920-0728). • Please refer to Appendix B: CDC Prioritization Guidance for Seafood Investigations. • CalREDIE jurisdictions: Please complete the CDC Cholera and Other <i>Vibrio</i> Illness Seafood Investigation Report Form (Section 5 of COVIS, CDC OMB 0920-0728), scan, and upload into the Electronic Filing Cabinet for the corresponding CalREDIE <i>Vibrio</i> incident. Upload any available shellfish tags, invoices, labels, and inspection reports. • EDEJs: Email the completed Vibriosis Preliminary Report Sheet to the recipient email addresses located in the first row of the sheet. Once the case report form is completed, submit to the CDPH IDB Surveillance and Statistics Section (SSS) through your communicable disease reporting staff. When the CDC Cholera and Other <i>Vibrio</i> Illness Seafood Investigation Report Form (Section 5 of COVIS, CDC OMB 0920-0728) is completed by environmental health, submit the form and a duplicate copy of the corresponding CDPH case report form, to the CDPH IDB SSS. Include any available shellfish tags, invoices, labels, and inspection reports. • Local environmental health investigators should send the completed CDC Cholera and Other <i>Vibrio</i> Illness Seafood Investigation Report Form (Section 5 of COVIS, CDC OMB 0920-0728) and shellfish tags, invoices, labels, and inspection reports to Food and Drug Branch Shellfish Program Specialist via fax at 916-636-6498 or email at SeafoodReporting@cdph.ca.gov.

If you require assistance with your investigation, call IDB Disease Investigations Section at 510-620-3434.

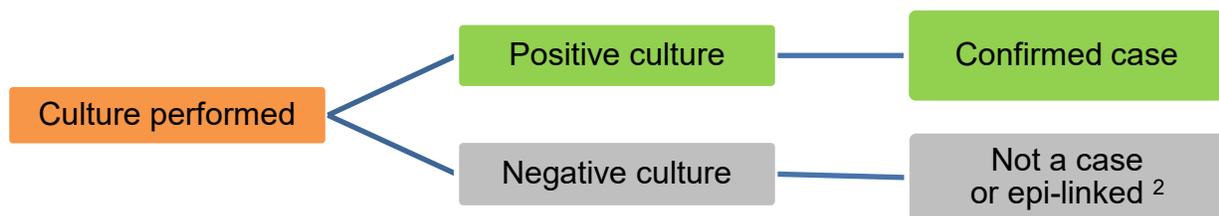
Appendix A: Non-Cholera *Vibrio* Infections Diagram for CDPH Case Classification and Reporting

Vibriosis (any species of the family *Vibrionaceae*¹, other than toxigenic *Vibrio cholerae* O1 or O139) 2017 Case Definition²

Case Classification Based on Culture-Independent Diagnostic Test (CIDT)³ Results



Case Classification Based on Culture Results (No CIDT³ Results)



¹ Genera in the family *Vibrionaceae* currently include *Vibrio*, *Aliivibrio*, *Allomonas*, *Catenococcus*, *Enterovibrio*, *Grimontia*, *Listonella*, *Photobacterium*, and *Salinivibrio*.

² For [CSTE 2017 case definition](https://ndc.services.cdc.gov/case-definitions/vibriosis-2017/), see <https://ndc.services.cdc.gov/case-definitions/vibriosis-2017/>

³ CIDTs include PCR-amplified, antigen-based and/or multi-analyte panel tests.

Appendix B: CDC Prioritization Guidance for Seafood Investigations

Source: [Washington Integrated Food Safety Center of Excellence Vibriosis Outbreak Management Toolkit](https://foodsafety.uw.edu/sites/foodsafety.uw.edu/files/documents/vibrio/WA-IFS-CoE-Vibrio-Toolkit.pdf)

(<https://foodsafety.uw.edu/sites/foodsafety.uw.edu/files/documents/vibrio/WA-IFS-CoE-Vibrio-Toolkit.pdf>)

This guidance document is intended to help state and local health departments prioritize seafood investigations in cases of vibriosis in which multiple seafood exposures are reported. CDC recommends that all reported seafood exposures are investigated when possible. If investigation of all seafood consumption is beyond the capacity or resources of the investigating agency, the following chart should be used to help determine which seafood investigations to prioritize. Seafood investigations for culture-confirmed vibriosis cases should be prioritized over probable cases.

This guidance takes into account single seafood exposure data from Cholera and Other *Vibrio* Illness Surveillance (COVIS) system and likelihood of successful traceback to identify sources of seafood. The table below lists the CDC's recommendation for priority of seafood investigations, with examples of each seafood category. The categories are based upon the type of seafood and the preparation method.

Prioritization Guidance for Seafood Investigations

Priority ranking	Type of seafood and method of preparation	Examples of seafood
First	Raw bivalve molluscan shellfish	Raw oysters, raw mussels, raw clams, raw whole scallops
Second	Cooked bivalve molluscan shellfish	Cooked oysters, cooked mussels, cooked clams, cooked scallops
Third	Other raw seafood, excluding bivalve molluscan shellfish	Raw tuna, raw salmon, raw shrimp, raw crab, raw octopus
Fourth	Cooked fish, excluding shellfish and crustaceans	Cooked tuna, cooked salmon, cooked octopus
Fifth	Cooked crustaceans	Cooked shrimp, cooked crab, cooked lobster, cooked crayfish/crawfish