

Vibriosis

(*Vibrio* other, *Vibrio alginolyticus*, *Vibrio cholerae* type non-O1, *Vibrio cholerae* type non-O139, **non-toxigenic** *Vibrio cholerae* type O1 or O139, *Vibrio fluvialis*, *Grimontia hollisae*, *Vibrio mimicus*, *Vibrio parahaemolyticus*, *Vibrio vulnificus*)

Note: This guidance is intended for management of non-toxigenic strains of *V. cholerae* O1 and O139, toxigenic strains of non-O1 and non-O139 *V. cholerae* serogroups, and other *Vibrio* species.

For management of toxigenic *Vibrio cholerae* O1 or O139, refer to the guidance for Cholera. Only toxigenic strains of *Vibrio cholerae* serogroups O1 and O139 cause epidemics and are reportable as cholera.

PROTOCOL CHECKLIST

- Enter available information into Merlin upon receipt of initial report
- Review background on disease, case definition, and laboratory testing ([pages 3-9](#))
- Investigate case
 - Contact provider ([page 9](#))
 - Contact reporting laboratory and request that isolate be sent to the Bureau of Public Health Laboratories (BPHL)
 - Confirm diagnosis
 - Obtain available demographic and clinical information
 - Determine what information was provided to the patient
 - Ensure collection and submission of appropriate specimens ([pages 8-9](#))
 - Interview patient ([page 10](#))
 - Review disease facts ([pages 3-5](#))
 - Description of illness
 - Modes of transmission
 - Ask about exposure to relevant risk factors ([page 10](#))
 - Exposure to raw shellfish or undercooked seafood
 - Pre-existing conditions
 - Provide recommendations for patient management
 - Infection control ([pages 11-12](#))
 - Provide education on prevention ([pages 11-12](#))
 - Address patient's questions or concerns
 - If associated with seafood exposure in the United States
 - Determine source
 - Determine if an environmental investigation is warranted
 - Notify regulatory agency if commercial seafood facility is identified
 - Provide education on transmission and prevention ([pages 11-12](#))
 - Avoid consumption of raw oysters and other raw shellfish
 - Avoid cross-contamination of food with raw seafood or juices from raw seafood
 - Appropriate handling of shellfish and crustaceans
- Update Merlin case entry with any additional information
- Complete and submit the extended data form and the seafood investigation section, if applicable, in Merlin

Vibriosis

1. DISEASE REPORTING

A. Purpose of reporting and surveillance

1. To identify exposures and sources of transmission to take public health action to prevent additional infections and outbreaks.
2. To identify populations at risk (e.g., immunocompromised individuals and populations privately collecting shellfish) and provide health education to reduce risk of exposure.
3. To participate in the Cholera and Other *Vibrio* Illness Surveillance System (COVIS) to track vibriosis and assist in seafood tracebacks.

B. Legal reporting requirements

Laboratories and physicians are required to report vibriosis to the county health department (CHD) by the next business day.

Note: Cases of non-toxicogenic *Vibrio cholerae* are reported as vibriosis, **not** cholera.

C. County health department investigation responsibilities

1. Investigation should be started within one business day after receiving a report from a health care provider or laboratory (see [Section 5](#)).
2. If a patient has consumed shellfish, determine source of shellfish (including shellfish tags or copies) and report to your Regional Environmental Epidemiologist (REE). The Food and Waterborne Disease Program will notify the Florida Department of Agriculture and Consumer Services (FDACS) Molluscan Shellfish Program.
3. Ensure that laboratory specimens are submitted to the Bureau of Public Health Laboratories (BPHL) for confirmatory testing (see [Section 4](#)).

4. Enter patient information in Merlin within one business day of notification:

VIBRIO OTHER – 00193 (includes cases of *V. furnissii*, *P. damsela*, and all culture independent diagnostic testing [CIDT] indicating a *Vibrio* infection)

VIBRIO FLUVIALIS – 00194

VIBRIO ALGINOLYTICUS – 00195

GRIMONTIA HOLLISAE – 00196

VIBRIO MIMICUS – 00197

VIBRIO CHOLERAЕ TYPE NON-O1 – 00198

VIBRIO VULNIFICUS – 00199

VIBRIO PARAHAEMOLYTICUS – 00540

5. For all cases, complete the extended data form in Merlin. The extended data in Merlin collects information for the Centers for Disease Control and Prevention (CDC) COVIS Report form which can be accessed at www.cdc.gov/nationalsurveillance/pdfs/cdc5279-covis-vibriosis-508c.pdf

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic agents

Vibriosis is caused by non-cholera species found in the *Vibrionaceae* family. These organisms are facultatively anaerobic, non-spore forming, motile, halophilic Gram-negative bacilli. Species include *V. fluvialis*, *V. alginolyticus*, *G. hollisae*, *V. mimicus*, *V. cholera* (non-O1, non-O139), *V. vulnificus*, and pathogenic strains of *V. parahaemolyticus*.

V. parahaemolyticus, *V. alginolyticus*, and *V. vulnificus* are the most commonly identified human pathogens causing non-cholera vibriosis in Florida. However, many other *Vibrio* species can act as opportunistic pathogens.

V. vulnificus is most commonly associated with severe *Vibrio* infections in North America.

B. Description of illness

Vibriosis is an infection of variable severity characterized by gastroenteritis, primary septicemia, bacteremia, or wound infection (Figure 1). Most gastroenteritis is mild and self-limited.

Asymptomatic infections may occur, and the organism may cause extra-intestinal infections.

Acute gastroenteritis with watery stools and abdominal cramps is most common. Low-grade fever, headache, chills, nausea, and vomiting can also be present.

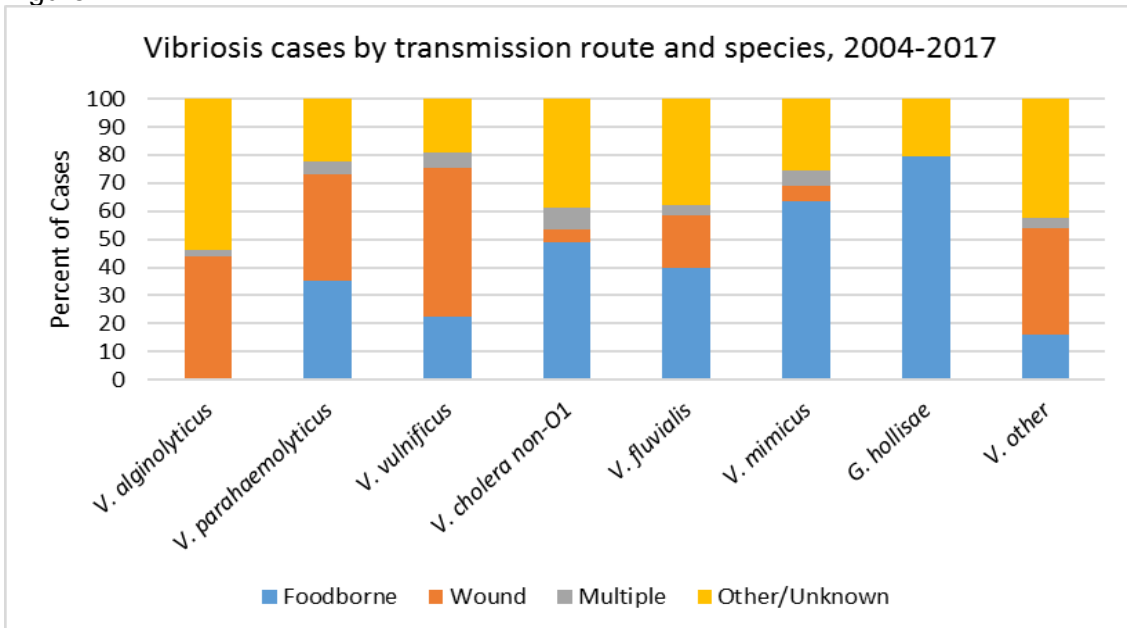
Primary septicemia can occur in immunocompromised people after gastroenteritis or wound infections, but is not common in immune-competent people.

Vibrio wound infections can result from either fresh or brackish water or saltwater exposure, particularly through the exposure of broken skin. These infections can involve both skin and soft tissue and is severe in high-risk individuals. Septicemia, cellulitis, abscesses, ecthyma gangrenosum, and hemorrhagic bullous/necrotic skin lesions can develop and lead to death.

- ***V. fluvialis*** - Associated with gastroenteritis and wound infections.
- ***V. alginolyticus*** - Associated with wound infections.
- ***G. hollisae*** - Associated with gastroenteritis; in rare cases, can cause septicemia in high-risk individuals.
- ***V. mimicus*** - Associated with gastroenteritis.

- ***V. cholera (non-O1, non-O139)*** - Associated with gastroenteritis.
- ***V. vulnificus*** - Associated with wound infections and septicemia and can cause severe infection in high-risk individuals. One out of three patients presenting for care are either in shock or hypotensive within 12 hours of admission. Septicemia often occurs in high-risk individuals. Over half with primary septicemia die, and the case-fatality rate exceeds 90% for those that are hypotensive. Wound infections can range from a self-limiting, mild infection to rapidly progressive cellulitis and myositis. Of the serious wound infections, about 75% will develop bullous skin lesions, thrombocytopenia, and disseminated intravascular coagulation.
- ***V. parahaemolyticus*** - Associated with gastroenteritis, septicemia, and wound infections. About 25% will have bloody/mucoid stools, high fever, and elevated white blood cell count. Death and systemic infection is rare; infection is usually moderately severe and lasts about one to seven days.

Figure 1:



Multiple = seafood consumption as well as exposure to seawater with or without presence of a wound

Other/unknown = reported only exposure to seawater, specimen was cultured from the ear or other body site, had a wound but no documented exposure, or exposure is unknown

C. Reservoirs

The main reservoirs are the marine and estuarine environment, where *Vibrio* spp. occur naturally. During the cold season, *Vibrio* spp. reside in the silt but become concentrated in seawater during the summer and fall when contamination of fish and shellfish commonly occurs. Molluscan shellfish are particularly susceptible to contamination due to filter feeding.

V. vulnificus is particularly abundant along the Gulf Coast and can be routinely isolated from shellfish during summer months.

Non-toxicogenic *V. cholerae* naturally occur in both fresh and brackish waters where reservoirs include shellfish and plankton.

D. Modes of transmission

With the exception of *V. parahaemolyticus**, vibriosis is not transmitted person-to-person.

Vibriosis transmission occurs by consuming raw or undercooked seafood, particularly shellfish such as oysters. It can also occur through the ingestion of other foods that are contaminated by seawater/raw seafood. Improper holding/cooking temperatures can greatly increase the risk of such cross-contaminated foods causing vibriosis. Exposure of cuts/wounds to contaminated seawater or seafood can also cause vibriosis.

Outbreaks of *Vibrio* infections have been documented worldwide and are often associated with undercooked seafood, particularly shellfish and crustaceans.

* Fecal-oral has been suggested as a possible transmission route for *V. parahaemolyticus* based on pathogen isolation from animal feces.

E. High-risk individuals

Liver disease, low gastric acidity, peptic ulcers, diabetes, thalassemia, malnourishment, and immunodeficiency increase the risk of contracting a *Vibrio* infection.

F. Incubation period

The incubation period for vibriosis ranges from 4–96 hours (72 maximum for *V. vulnificus*), usually 12–24 hours.

G. Period of communicability

Since *Vibrio* infection is not considered to be transmissible person-to-person, there is no carrier state and no defined period of communicability.

H. Treatment

Prompt and adequate oral rehydration is the cornerstone of treatment of gastroenteritis caused by vibriosis. Antimicrobial therapy is generally not indicated except for cases with severe diarrhea, wound infection, cellulitis, or septicemia. During outbreaks, and whenever possible, antibiotic choice should be based on antimicrobial susceptibility testing results.

I. Prophylaxis

None indicated

J. Vibriosis in Florida

Organisms that cause vibriosis occur naturally in Florida's coastal waters, including the Gulf Coast. The three most common agents in Florida are *V. vulnificus*, *V. parahaemolyticus*, and *V. alginolyticus*.

Vibriosis is most common when waters are warmest between April and October, and cases of foodborne vibriosis in Florida occur after consumption of raw or undercooked shellfish.

In Florida, the average number of confirmed and probable vibriosis cases reported in one year is 165.5 with a range of 94–277 (based on a ten-year average from 2008–2017).

3. CASE DEFINITIONS

A. Clinical description

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

B. Laboratory criteria for diagnosis

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

Presumptive: Detection of a species of the family *Vibrionaceae* (other than toxigenic *Vibrio cholerae* O1 or O139, which is reportable as cholera) from a clinical specimen using a CIDT.

C. Epidemiologic criteria for case classification

A person who is epidemiologically linked to a confirmed vibriosis case or a probable vibriosis case with laboratory evidence.

D. Case classification

Confirmed: A person with confirmatory laboratory evidence. Note that species identification and, if applicable, serotype designation (i.e., *Vibrio cholerae* non-O1 or non-O139 or *Grimontia hollisae*) should be reported.

Probable:

- A clinically compatible illness in a person with epidemiological criteria.

OR

- A person with presumptive laboratory evidence

E. Criteria to distinguish a new case from previous reports

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.

F. Comments

Infections due to **toxigenic** *Vibrio cholerae* O1 or O139 should **not** be reported as vibriosis, but **should** be reported as *Vibrio cholerae* type O1 (reporting code=00190).

If no species is reported, the case should be reported as other *Vibrio* species (Merlin reporting code = 00193). If species information subsequently becomes available, the case should be updated to the appropriate disease reporting code.

Additional information: All cases that are reported as probable due to the CIDT should be reported as *Vibrio* Other species (Merlin reporting code = 00193). If the case is subsequently culture confirmed, the case should be updated to confirmed and use the appropriate disease reporting code.

Genera in the family *Vibrionaceae* (not all have been recognized to cause human illness) currently include *Aliivibrio*, *Allomonas*, *Catenococcus*, *Enterovibrio*, *Grimontia*, *Listonella*, *Photobacterium*, *Salinivibrio*, *Vibrio*.

For paper laboratory results, please create a Merlin lab result and attach a scanned copy of the paper laboratory result. A copy of shellfish tags (where appropriate) should also be scanned and attached to the Merlin case.

Isolates or specimens from all cases must be submitted to the Bureau of Public Health Laboratories (BPHL) for confirmation. The Florida Department of Agriculture and Consumer Services (FDACS) Molluscan Shellfish Program should be notified through your Regional Environmental Epidemiologist of any *Vibrio* infections thought to be associated with shellfish consumption.

Contact your REE for any needed additional guidance.

4. LABORATORY TESTING

A. Criteria for diagnosis

Isolation of *Vibrio* spp. from a clinical specimen, excluding toxigenic *V. cholerae* O1 or O139.

Stool culture or serology can be used to investigate a possible infection among persons exposed to a common source. Serologic testing is only available at CDC.

Any available isolates of the organism must be sent to the BPHL for confirmation.

For cases that were reported using CIDT, ask the reporting facility to attempt a culture of the organism. If they are able to culture *Vibrio*, then an isolate may be sent to BPHL for confirmation.

B. Specimens for laboratory testing

1. Stool: Isolation of *Vibrio* spp. from stool is the preferred method of diagnosis for vibriosis cases that have gastrointestinal symptoms.
2. Wound: Isolation of *Vibrio* spp. from a wound site is the preferred method of diagnosis for vibriosis cases that have wound infections.
3. Serum: Please consult with your REE prior to the collection and submission of sera for testing. Serology may be performed by CDC under select circumstances, such as an outbreak. For optimal results, three serum specimens (S1-S3) should be collected for each case according to the following time schedule:
 - a. Serum 1 (S1): Collect as soon as possible following onset of symptoms; ideally within the first three days.
 - b. Serum 2 (S2): Collect 10–14 days after illness onset, but no later than three weeks after illness onset.
 - c. Serum 3 (S3): Collect about two weeks after S2, but no later than six weeks after illness onset.
 - d. If the optimal time for collection of S1 has passed, collect S2 and S3 specimens. If more than three weeks has elapsed from illness onset then collect S3 only.

C. Services available at BPHL

1. Submitting specimens/isolates to BPHL
 - a. All submissions should be accompanied by Clinical Lab Submission Form 1847. Available at www.floridahealth.gov/programs-and-services/public-health-laboratories/forms-publications/documents/DH1847--rev-5-13.pdf
 - b. Electronic Laboratory Ordering (ELO) may also be used by entering requests into the HMS State Laboratory System, placing bar coded label on the Cary-Blair vial, and writing the date of stool collection on the vial.
2. Specimen collection and storage

Note: all specimens/isolates must be labeled with the patient's name, date of birth, and collection date.

 - a. Stool or rectal swabs should be transported in Cary Blair medium at ambient temperature (not refrigerated or frozen). Cary Blair medium should be at room temperature before stool is placed in the media.
 - i. Isolates should be submitted in a screw-top agar slant that will support growth (e.g., blood agar).
 - ii. Storage of stool specimens and isolates prior to shipping should be at ambient temperature. Prolonged storage in the refrigerator may adversely affect the laboratory's ability to culture the organism.
 - b. Wound swabs should be transported on agar-based growth medium at ambient temperature (not refrigerated or frozen).

- i. Isolates should be submitted in a tube or plated agar that will support growth (e.g., blood agar).
 - ii. Storage of wound specimens and isolates prior to shipping should be at ambient temperature. Prolonged storage in the refrigerator may adversely affect the laboratory's ability to culture the organism.
 - c. Serum should be separated from the clot or packed cells in a serum separator tube within one hour of collection and transferred to a separate sterile tube for storage and shipment. Storage should be at four degrees Celsius or frozen if stored for more than two weeks.
3. Packaging and shipping
- a. Contact BPHL prior to shipment: Standard enteric submission protocols should be followed (see guidelines given under section 4.C.2. *Specimen collection and storage* above), but *Vibrio* testing **must** be specifically requested by phone and on a [Clinical Lab Submission Form 1847](#).
 - b. Stool specimens and isolates should be shipped in a cooler without cool-packs.
 - c. Serum: If refrigerated, specimens should be shipped in a cooler with cool-packs. If frozen, specimens should be shipped using dry ice. Specimens should be shipped to the State laboratory in Jacksonville, Florida, for transfer to CDC for testing as necessary. Specify the type of testing requested and that the specimen should be forwarded to CDC for testing on the submission form.
 - d. Contact BPHL for packaging and shipping training dates. BPHL conducts approximately 20 face-to-face trainings per year all over Florida, free of charge. DOH employees must register for the classes in the DOH online training system, TRAIN. For shipping guidance, contact BPHL. Additional shipping trainings are also available commercially through vendors.
4. Contact the regional laboratory with questions: www.floridahealth.gov/programs-and-services/public-health-laboratories/locations/index.html

5. CASE INVESTIGATION

A. Contact the physician or hospital

1. Verify diagnosis of a vibriosis infection.
2. Obtain and review available medical records and note the following:
 - a. Date of onset
 - b. Signs and symptoms
 - c. Predisposing conditions (e.g., liver disease)
 - d. Request available test results
 - e. Treatment (especially antimicrobials, acid blockers/ulcer medications)
 - f. Current clinical status

3. Ensure collection and submission of required clinical specimens for the diagnosis and speciation of vibriosis, if necessary.
4. Determine if the patient is aware of the diagnosis and ascertain what information has been provided. Reinforce preventative measures that their health care provider may have given.
5. Obtain demographic information, including contact information (home, cellular, pager, and work numbers). Determine current location of the patient (i.e., hospital or home) and the preferred method of contact.
6. Notify the physician that you may contact the patient as the Florida Department of Health (FDOH) follows up on vibriosis infections to assess risks factors, to better characterize the occurrence of vibriosis infections in Florida, and to identify potential environmental threats. It may also be appropriate at this point to determine if the physician has any concerns about the CHD contacting the patient.

B. Interview the patient

1. Contact the patient by telephone, home visit, or visit to the hospital. Interviews should be completed as soon as possible after being reported to optimize recall.
2. Complete the extended data in Merlin or use the CDC COVIS form (www.cdc.gov/nationalsurveillance/pdfs/cdc5279-covis-vibriosis-508c.pdf) to complete the interview.
3. Items to cover during interview include:
 - a. Briefly review general information for this disease.
 - b. Exposures during exposure period (up to seven days prior to onset), including a detailed food history:
 - i. Travel outside Florida or the U.S. Determine dates and locations of travel.
 - ii. Exposure to seawater or brackish water.
 - iii. Handling of raw shellfish and crustaceans.
 - iv. Consumption of seafood, particularly raw or undercooked seafood. If a shellfish vehicle is identified, interview others who ate the same item.
 - v. If a restaurant, grocery or seafood market is identified, obtain the name and address of the facility, dates of exposure, and common seafood items consumed.
 - vi. Consumption of untreated water.
 - c. Determine if others (e.g., family, friends, travel companions etc.) are known or thought to be ill with similar symptoms. If so, inquire about possible common source exposures. Obtain the name, phone number or address, and clinical information of the ill person and follow up, if appropriate.
 - d. Provide basic instruction to patients regarding measures for future prevention.

C. Environmental evaluation

A joint environmental field visit with the appropriate regulatory agency is indicated if a commercial food service or market facility is suspected as the source of infection. The shellfish and crustaceans consumed should be recorded. Preparation and handling practices should also be emphasized, as *Vibrio* spp. exponentially multiply

at ambient temperature. Special emphasis should be placed on proper temperature management and avoidance of cross contamination.

Take a picture of or scan the shellfish labeling tags and collect information on the supplier and harvest site. Do not remove the shellfish labeling tags from the facility.

D. Merlin data entry

Create a case in Merlin within one business day of notification under the appropriate disease code:

VIBRIO OTHER – 00193 (includes cases of *V. furnissii*, *P. damsela*, and all CIDs indicating a *Vibrio* infection)
VIBRIO FLUVIALIS – 00194
VIBRIO ALGINOLYTICUS – 00195
GRIMONTIA HOLLISAE – 00196
VIBRIO MIMICUS – 00197
VIBRIO CHOLERAЕ TYPE NON-O1 – 00198
VIBRIO VULNIFICUS – 00199
VIBRIO PARAHAEMOLYTICUS – 00540

Enter the data collected into Merlin, being sure to include all required fields on the Basic Data screen. Complete the Case Symptoms screen, travel screen, and extended data screen, and associate all relevant laboratory results with the Merlin profile. Please associate all labs received via electronic laboratory reporting (ELR) to the profile and include serogroup (if appropriate), biotype, and toxigenicity, information as available.

6. CONTROLLING FURTHER SPREAD

A. Infection control recommendations

Although vibriosis is not transmitted person-to-person*, basic personal hygiene precautions for enteric illnesses should be followed.

Standard precautions are recommended for hospitalized patients. Contact precautions should be used for diapered or incontinent persons for the duration of the illness.

People sharing the same exposure as the patient should be educated about vibriosis symptoms and encouraged to alert their health care provider should they become ill.

* Fecal-oral has been suggested as a possible transmission route for *V. parahaemolyticus* based on pathogen isolation from animal feces.

B. Patient/household education on prevention recommendations

1. Education for the patient and caregivers should include the importance of effective hand washing, particularly after using the toilet or changing diapers and before preparing or eating food. Persons with diarrhea should not be involved in food preparation.

2. Avoid consumption of raw oysters or other raw shellfish, particularly if a predisposing factor for infection exists. Persons at increased risk for infection and more severe disease include persons with immunocompromising conditions, persons with chronic liver disease, and persons using antacids, histamine receptor blockers, and proton pump inhibitors.
3. Wear gloves when handling or preparing uncooked shellfish or crustaceans.
4. Shellfish should be obtained from approved sources and should be adequately boiled or steamed (at least 15 minutes) prior to consumption.
5. Avoid cross-contamination of ready-to-eat food with raw seafood or juices from raw seafood.
6. Ensure proper temperature control of shellfish and crustaceans prior to preparation and consumption and for all leftovers.
7. Eat shellfish promptly after cooking and immediately refrigerate leftovers.
8. Avoid wound/broken skin exposure to salt water and raw shellfish, especially in patients with increased risk for infection.

C. Isolation of patients

Patients in non-sensitive situations should be counseled regarding disease transmission, food preparation, and hand washing practices. Follow-up or release from isolation based on stool culture results is not required.

D. Management of contacts

Since person-to-person transmission is not likely, household and other close contacts are not considered to be at risk for acquiring vibriosis infection.

E. Food or water is implicated as the source of an outbreak

Contact your Regional Environmental Epidemiologist for investigation guidance: www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/surveillance-and-investigation-guidance/documents/environmental-epi-map.pdf.

F. Immunization recommendations

None

7. IMPORTANT LINKS

A. Vibrio FAQs

www.cdc.gov/vibrio/index.html

B. Cholera and Other *Vibrio* Illness Case Report Form

www.cdc.gov/nationalsurveillance/pdfs/cdc5279-covis-vibriosis-508c.pdf

C. Surveillance Case Definitions

www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-

[management/disease-reporting-and-surveillance/index.html](http://www.floridahealth.gov/management/disease-reporting-and-surveillance/index.html)

D. *Vibrio parahaemolyticus* – Reference Document

www.floridahealth.gov/diseases-and-conditions/vibrio-infections/documents/vibrio-parahaemolyticus-summary-final.pdf

E. *Vibrio vulnificus* – Reference Document

www.floridahealth.gov/diseases-and-conditions/vibrio-infections/documents/vibrio-vulnificus-summary-final.pdf

F. Food and Waterborne Disease Program – Contact List

www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/surveillance-and-investigation-guidance/documents/environmental-epi-map.pdf

G. County Health Department - Contact Information

www.floridahealth.gov/public-health-in-your-life/county-health-departments/CHDlisting.html

H. FDOH Bureau of Laboratory - Contact Information

www.floridahealth.gov/programs-and-services/public-health-laboratories/locations/index.html

8. REFERENCES

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