Vibriosis

1. DISEASE REPORTING

1. Purpose of Reporting and Surveillance

1. To determine if there is a source of infection of public health (e.g., a food handler or commercially distributed food product) and to stop transmission from such a source.

2. To assess the risk of the case transmitting infection to others, and to prevent such transmission.

3. To identify other cases.

1.2 Laboratory and Physician Reporting Requirements

Laboratories and physicians are required to report all cases or suspected cases within one working day of identification/diagnosis. Reports should not be delayed for serotyping or final laboratory confirmation. Note that isolation of any Vibrio species (not just V. parahaemolyticus) from any site is reportable. Suspected or confirmed cases of infection by Vibrio cholerae strains O1 or O139 are immediately reportable.

1.3 Local Health Department Reporting and Follow-Up Responsibilities

1. Report all confirmed and presumptive (but not suspect) cases to the Public Health Division by the end of the calendar week of initial report. Begin follow-up investigation within one working day. ACDP epidemiologists will typically be involved, as will the Shellfish Program within the Oregon Department of Agriculture's Food Safety Program, in all Vibriosis case investigations and outbreaks. See Section 7. Vibrio Investigation Process for guidance on typical investigation responsibilities.

2. Complete case investigation, entering data into Orpheus, and filling out a CDC “COVIS” (Cholera and Other Vibrio Illness Surveillance) form, which is available at http://public.health.oregon.gov/DiseaseConditions/CommunicableDisease/ReportingCommunicableDisease/ReportingForms/Pages/index.aspx.

3. Ensure that labs forward the first isolate from each patient to OSPHL for serotyping (this step is important as there are some microbial imposters [e.g., Aeromonas] that are difficult to distinguish from Vibrio).

2. THE DISEASE AND ITS EPIDEMIOLOGY

2.1 Etiologic Agent

Vibrio spp. are Gram-negative bacilli best known because of V. cholerae serogroups O1 and O139 — the causative agents of cholera. CDC carefully distinguishes cholera from “noncholera vibriosis,” the other group of disease caused by pathogenic members of the Vibrionaceae family. The strains that cause cholera are not endemic in the United States; but those that cause noncholera vibriosis are: most commonly V. parahaemolyticus and V. vulnificus. Vibrio spp. naturally inhabit coastal waters (saltwater or brackish waters [where fresh- and saltwaters meet]) in the United States and Canada and are present in higher concentrations during summer and during periods of ocean warming (meaning they are likewise found in higher-than-normal concentrations in the filter feeders living in those waters); they are halophilic, or salt-requiring organisms. Illness may occur either after eating raw or undercooked molluscan shellfish contaminated with Vibrio (the most common culprit in Oregon being V. parahaemolyticus) or after ocean or estuary water infects an exposed cut or wound (the route V. alginolyticus prefers to take). Importantly, Vibrio infections in shellfish are colorless and tasteless.

2.2 Description of Illness

The illness associated with vibriosis or cholera depends upon the route of infection. Foodborne vibriosis is an acute bacterial enteric disease characterized by watery diarrhea, abdominal cramping, nausea, vomiting, fever and chills. Non-foodborne vibriosis typically consists of wound infections, that may be characterized by bullae, cellulitis, fever and muscle pain; in immunocompromised patients — especially those with cirrhosis — sepsis and death may ensue rapidly. Cholera is characterized by profuse, painless diarrhea (up to
Vibriosis

20 L/dl) and occasional vomiting and, in untreated cases, rapid dehydration, acidosis, circulatory collapse, hypoglycemia in children, and renal failure. In severe, untreated cases of cholera, death may occur within a few hours, and the case-fatality rate may exceed 50%; with proper treatment, the rate is <1%.

2.3 Reservoirs

Marine coastal waters (and the fish and shellfish living in these coastal waters) are the reservoir for the pathogenic species of Vibrio found in the Pacific Northwest. The amount of Vibrio in these waters increases with temperature. In cooler weather, when infections are uncommon, Vibrio typically lives in marine silt; in warmer weather, the bacteria are found in the waters themselves. The reservoir for V. cholerae serogroups O1 and O139 is generally thought to be humans, although environmental reservoirs, such as brackish water or estuaries are another known source. Food has also been associated with spread of cholera, often through contaminated waters at some point in the preparation process.

2.4 Sources and Routes of Transmission

In Oregon, most cases of vibriosis are from V. parahaemolyticus and almost always follow the ingestion of raw or inadequately cooked seafood. Commonly recognized vehicles or mechanisms of transmission for enteric vibriosis include:

1. Inadequately cooked or raw molluscan shellfish;
2. Contact with infected ocean water; and
3. Other foods cross-contaminated with any of the above.

Modes of transmission for cholera include modes 1–3, but also:

4. Contaminated produce;
5. Contaminated and inadequately treated drinking water;
6. Person-to-person spread, when an infected person fails to wash hands thoroughly after defecation, though this is surprisingly uncommon (reflecting high infectious dose). It is more likely to occur when the infected person has diarrhea, rather than during the carrier state.

The mode of transmission for Vibrio wound infections is contact with Vibrio-contaminated water.

2.5 Incubation Period

For V. parahaemolyticus, usually 12–24 (range, 4–96) hours. The incubation periods of infections by other Vibrio spp. are shorter: up to 72 hours for V. vulnificus and up to 36 hours for V. cholerae O1 or O139.

2.6 Period of Communicability

No cases of person-to-person transmission have been identified for noncholera vibriosis, but the cholera is communicable person-to-person.

2.7 Treatment

Treatment depends on the pathogen (making it difficult to generalize for the entire family). There is no evidence that antibiotic treatment decreases the severity or the length of illness associated with V. parahaemolyticus (although antibiotics such as tetracycline, ampicillin or ciprofloxacin can be used in severe cases). However, antibiotic treatment is recommended for infection with V. vulnificus and V. cholerae O1 and O139. (The choice of antibiotics should be based on antimicrobial susceptibilities of the organism.)

3. CASE DEFINITIONS, DIAGNOSIS, AND LABORATORY SERVICES

3.1 Confirmed Case Definition(s)

Person from whom any Vibrio sp. (not just V. parahaemolyticus) is cultured (again, from any site).

3.2 Presumptive Case Definition

Diarrhea and fever in someone epidemiologically linked to a confirmed case.

3.3 Suspect Case

Anyone with an undiagnosed, non epi-linked, febrile diarrheal illness. A physician should suspect Vibrio infection if a patient has watery diarrhea and has eaten raw or undercooked seafood, especially oysters, or when a wound infection occurs after exposure to natural bodies of water.
3.4 **Services Available at the Oregon State Public Health Laboratories**

The OSPHL provides confirmation of organism identification and serotyping for all submitted isolates. The OSPHL also cultures all appropriately submitted stool, wound or blood specimens for detection of *Vibrio*.

*N.B.* specimens will only be cultured if obtained before initiation of antimicrobials, or after 48 hours post discontinuation of antimicrobials.

Please contact the laboratory, at (503) 693-4100, for additional guidance as needed.

### 4. ROUTINE CASE INVESTIGATION

Interview the case and others who may be able to provide pertinent information.

#### 4.1 Identify the Potential Sources of Infection

Ask about potential exposures during the 7 days before onset (for noncholera vibriosis) or 4 days before onset (for cholera), including:

1. Name, diagnosis, and telephone number or address of any acquaintances or household members with similar illnesses (*N.B.*—anyone meeting the presumptive case definition should be reported and investigated in the same manner as a confirmed case);
2. Enteric illness only: Consumption of any seafood, especially raw or undercooked shellfish;
3. Enteric illness only: Description of the seafood consumed (name of dish, type of menu, describe how prepared [e.g., for oysters, shucked or served on the half shell]);
4. Contact with bodies of water;
5. Date, location, and sponsor of any public gathering where food was consumed;
6. Travel outside the United States or contact with others known to have traveled outside the United States.

#### 4.2 Identify Potentially Exposed Persons (Contacts)

If a putative shellfish vehicle is identified, interview others who partook of the same item.

#### 4.3 Environmental Evaluation

If the source of infection appears to be associated with a restaurant or other commercial facility, environmental health and Oregon Department of Agriculture (ODA) investigations are warranted (refer to Section 7 for a description of the investigation process). Ideally, an EH investigation should yield the following:

- A copy of a sole shellfish tag (triangulated through a description of the meal along with documentation about when each batch of shellfish was consumed); and
- An inspection report (to determine whether there were temperature or other food-safety violations at the food facility).

Depending on the locale, county environmental health inspectors or ODA Shellfish Program inspectors will conduct the environmental health inspection. Finalized EH reports should be sent to the ODA Shellfish Program so they may conduct their own inspection, document any violations, measure physical characteristics of harvest sites and in some cases close implicated shellfish beds. A copy of the report should also be sent to ACDP. Outbreaks (as defined by ODA) result in Food and Drug Administration involvement. Bed closure and product recall may also result from a formal declaration of an outbreak.

### 5. CONTROLLING FURTHER SPREAD

#### 5.1 Patient/Household Education

As indicated, provide basic instruction to cases and potentially exposed persons about the importance of proper food handling and adequate cooking of shellfish; and avoidance of cross-contamination of other foods by raw shellfish or contaminated seawater. Debunking the myth about hot sauce making shellfish safe to eat is, or can be, a highlight of this conversation (hot sauce, no matter how tasty, is not effective in killing *Vibrio* in shellfish — or anywhere else). A lowlight of any such conversation can include an expla-
nation of why vomiting might have occurred shortly after meals wherein both oysters and alcohol were consumed. Explain to the patient that the oyster is off the hook for the emesis.

5.2 Isolation of Cases
Cases should be cared for using standard precautions. Isolation: Strict isolation is not necessary. Less severe cases can be managed on an outpatient basis with oral rehydration and an appropriate antimicrobial agent. Effective hand washing and basic procedures of cleanliness must be practiced.

5.3 Occupational Restrictions
None.

5.5 Environmental Measures
Although oysters can be harvested legally only from waters free from fecal contamination, even legally harvested oysters can be contaminated with Vibrio spp. because these bacteria are naturally present in marine environments. Vibrio does not alter the appearance, taste, or odor of oysters.

6. MANAGING SPECIAL SITUATIONS

6.1 Case is a Food Handler
Absent particularly suspicious circumstances, no special follow-up is warranted. Consult with ACDP epidemiologists if you have concerns.

6.2 Food Served at a Public Gathering is Implicated
Determine the source of shellfish.

6.3 Case Works at a Health Care or Residential Care Facility
Determine a) whether shellfish had been served in the facility within the 7 days before the case’s illness onset, and b) whether there has been any unusual incidence of diarrheal illness within a week of the case’s illness. If other potential cases are identified, investigate these reports, too with an eye towards identifying common vehicles and any continuing sources of exposure. If indicated, arrange for a sanitary inspection of the facility. The extent of further investigation depends on circumstances. Consult with ACDP epidemiologists.

6.4 Prevention
1. Do not eat raw oysters or other raw shellfish;
2. Cook shellfish (oysters, clams, mussels) thoroughly. For shellfish in the shell, either: (a) boil until the shells open and continue boiling for 3-5 more minutes, or (b) steam until the shells open and then continue cooking for 9 more minutes. Do not eat those shellfish that do not open during cooking. Boil shucked oysters at least 3 minutes, or fry them in oil at least 3 minutes at 375°F. See www.foodsafety.gov/poisoning/causes/bacteriaviruses/vibrio_infections.
3. Avoid cross-contamination of cooked seafood and other foods with raw seafood and juices from raw seafood;
4. Eat shellfish promptly after cooking and refrigerate leftovers;
5. Avoid exposure of open wounds or broken skin to warm salt or brackish water, or to raw shellfish harvested from such waters;
6. Wear gloves when handling raw shellfish.

UPDATE LOG
October 2014. Additional guidance and flow chart. (Boyd)
2003. Original version (ACDP)
7. **VIBRIO INVESTIGATION PROCESS**

<table>
<thead>
<tr>
<th>Time from initial report</th>
<th>County CD</th>
<th>County EH</th>
<th>ACDP Epi</th>
<th>ODA</th>
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<tbody>
<tr>
<td>(1 day)</td>
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<tr>
<td>1.a. Report of diarrheal illness for Oregon resident. For <em>Vibrio</em> wound reports, do steps 2-3 and 7. ACDP to do steps 4, 6 and 12.</td>
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<td>2. Interview patient and identify exposure.</td>
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<td>3. Enter info in Orpheus or call ACDP; fill out pages 1-3 of COVIS form (ACDP does step 4).</td>
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<td>7. Monitor illness reports; coordinate any additional investigation with ACDP.</td>
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<tr>
<td>1.b. Report of diarrheal illness for non-Oregon resident. For <em>Vibrio</em> wound reports, do steps 4, 6 and 12. Make sure appropriate jurisdiction has been alerted about their case.</td>
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<td>4. Alert ODA.</td>
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<tr>
<td>6.a. Call the county of exposure and speak with a CD nurse to notify them of request.</td>
<td>6.b. Request ODA investigation (environmental and agricultural reports, shellfish tags) and page 4 of COVIS form.</td>
<td>8. ACDP Epi requests EH investigation (cc’s ODA and CD nurse on email request).</td>
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<tr>
<td>Share findings</td>
<td>10. Request agricultural investigation</td>
<td>11. Investigate and finalize page 4 of COVIS form</td>
<td>Share findings</td>
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<tr>
<td>(1 week)</td>
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ACDP: Oregon Health Authority Acute and Communicable Disease Prevention  
CD: Communicable Disease  
COVIS: Center for Disease Control and Prevention supplemental form for *Vibrio* illness  
EH: Environmental Health  
ODA: Oregon Department of Agriculture