

## FOODBORNE ILLNESS RELATED TO SEAFOOD

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Seafood, like most foods, have food safety concerns that are specific to their varieties, harvesting, handling, and preparation. Understanding the incidence of illness attributed to seafood can lower the chance of infection. When you are informed, understand the risks, and most important, learn how to prevent seafood-borne illness, your risk of illness will be reduced. When handled properly, finfish and shellfish are as safe to eat as any other source of protein.

For healthy individuals, the nutritional benefits of seafood far outweigh the safety concerns. People with compromised immune systems, such as those with liver disease, can also benefit from eating seafood but should follow a few precautionary measures when preparing seafood.

### Seafood Safety Tips

- Know your seafood seller
- Purchase seafood carefully
- Keep seafood cold
- Keep live shellfish alive
- Refrigerate live shellfish properly
- Don't cross-contaminate
- Cook seafood thoroughly

### Purchasing Strategies

- Always purchase seafood from a dealer that maintains high quality. Know the characteristics of high-quality seafood and avoid low-quality products. For information on selecting seafood, request the fact sheet [\*\*HGIC 3482, \*Safe Handling of Seafood.\*\*\*](#)
- Purchase raw shellfish carefully. Buy raw clams, oysters, and mussels only from reputable markets. When in doubt, ask the seafood market personnel to show you the certified shipper's tag that accompanies "shell-on" products or check the shipper number on shucked oyster containers.
- When you leave the seafood market, keep your seafood cold. Leaving groceries in the car on a hot day speeds spoilage and may make seafood unsafe to eat.

### Storing Fresh Seafood

- Place seafood immediately in the refrigerator when you get home from the seafood market.
- Wrap fresh seafood in "cling wrap" or store in airtight containers. Store fresh, pasteurized, or smoked seafood products at 32 to 38 °F.

- Refrigerate live clams, oysters, mussels, crabs, lobsters, and crayfish in well-ventilated containers. Cover the container with a damp cloth or paper towel.
- Do not store live shellfish in airtight bags or containers. Storing live shellfish in salt water shortens their shelf life. Storing them in fresh water kills them.
- Keep live shellfish alive. Do not cook or eat shellfish such as clams, oysters, mussels, crabs, lobsters, and crayfish that have died during storage. Live clams, oysters, and mussels have tightly closed shells, or the shells will close when tapped. Live crabs, lobsters, and crayfish move their legs. Dead shellfish spoil rapidly and develop off-flavor and off-odors.

## Storing Frozen Seafood

- Store frozen seafood products immediately in the freezer when you get home from the seafood market.
- If packaged in moisture- and vapor-proof packages, store frozen seafood in its original package.
- If frozen seafood is packaged in over-wrapped trays, repackage in plastic “freezer” wrap, freezer paper, or other moisture- and vapor-proof material before you store in freezer.
- Keep frozen seafood products at 0 °F or below until ready to use.

## Thawing Frozen Seafood

- Many frozen seafood products do not need to thaw before being cooked. Follow the processor’s directions for preparing frozen seafood.
- Thaw frozen seafood in the refrigerator (about 18 hours per pound) or under cold running water (about one hour per pound).
- Do not thaw frozen seafood at room temperature or under warm running water. This is an especially important food safety concern when thawing seafood that is packaged in modified air packaging (reduced oxygen/vacuum packed). When thawing frozen seafood in modified air packaging, strictly follow the manufacturer’s directions. Additionally, thawing at room temperature or under warm running water can affect quality because the thinner parts of the seafood thaw faster than thicker parts, and the outer edges may start to spoil before the center has thawed.

## Handling & Preparation

- Do not cross-contaminate! Food poisoning and spoilage bacteria can spread from live and raw seafood to cooked seafood. Handle raw and cooked seafood products separately.
- Thoroughly wash and rinse knives, containers, and cutting boards between handling raw and cooked seafood. Keep raw and cooked seafood from coming in contact with each other.
- Cook fish and shellfish thoroughly. Fish is cooked when it begins to flake and reaches an internal temperature of 145 °F.
- All raw foods contain bacteria. Handle seafood as you would any perishable food. Keep seafood properly refrigerated, cook adequately, and handle with safety in mind.

## Raw & Lightly Marinated Seafood

Many consumers enjoy raw or lightly marinated seafood products such as sashimi, sushi, ceviche, gravlax, cold-smoked fish, tuna, and raw shellfish. Eating raw seafood (and raw meat, poultry, or dairy products) has a greater food safety risk than eating properly cooked products. Follow these tips to reduce the risk of illness:

- Use commercially frozen fish for sashimi, sushi, ceviche, gravlax, or cold-smoked fish. Commercially frozen fish are usually held at temperatures cold enough to kill the parasites that are present in raw fish. However, since bacteria that cause illness may still be present, individuals in the high-risk groups listed above should avoid raw seafood of any kind.
- Be certain clams, oysters, and mussels come from certified shellfish-growing waters.
- Refrigerate until use.

## Raw Seafood & *Vibrio vulnificus*

About 80,000 people get vibriosis—and 100 people die from it—in the United States every year. Most of these illnesses happen from May through October when water temperatures are warmer. What causes this? How do you know if you are at risk? What can you do about it?



Tuna Sashimi. People with a compromised immune system should avoid eating raw seafood of any kind. Adair P. Hoover ©2020 HGIC, Clemson University



For some people, eating raw oysters can cause serious illness or even death. Adair Hoover, ©2020 HGIC, Clemson University

**The Cause:** *Vibrio vulnificus* is a bacterium that occurs naturally in warm marine waters. *V.*

*vulnificus* infections are transmitted to humans either through open wounds in contact with seawater or by eating certain improperly cooked or raw shellfish. *V. vulnificus* is most likely to be present during warm months. In South Carolina, shellfish harvesting (both commercial and recreational) is generally not permitted between April and October. The harvest season will vary depending on environmental conditions.

While not a threat to most healthy people, *V. vulnificus* can cause sudden chills, fever, nausea, vomiting, blood poisoning, and death within two days in people with certain medical conditions. The bacteria are not a result of pollution; so, although oysters should always be obtained from reputable sources, eating oysters from “clean” waters or in reputable restaurants with high turnover does not provide protection. Eating raw oysters with hot sauce or while drinking alcohol does not kill the bacteria, either.

**High-Risk Factors:** All individuals who eat foods contaminated with this organism are susceptible to gastroenteritis, which usually develops within 16 hours of eating the contaminated food. However, certain health conditions put you at risk for serious illness or death from *V. vulnificus* infection. Some of these conditions have no signs or symptoms so you may not know you are at risk. If you are an older adult, you also may be at increased risk because older people more often have these risk conditions than younger people. Check with your doctor if you are unsure of your risk. These high-risk conditions include:

- Liver disease, either from excessive alcohol intake, viral hepatitis, or other causes
- Hemochromatosis, an iron disorder
- Diabetes

- Stomach problems, including previous stomach surgery and low stomach acid (for example, from antacid use)
- Cancer
- Immune disorders, including HIV infection
- Long-term steroid use (as for asthma and arthritis).

**IF YOU ARE OR THINK YOU MAY BE IN ANY OF THESE RISK CATEGORIES, YOU SHOULD NOT EAT RAW OYSTERS.**

## **How can “High Risk” Individuals Avoid *Vibrio vulnificus*?**

Avoid exposure of recent or healing wounds, cuts, punctures, or burns, to warm seawater. When swimming or wading, temporarily cover wounds with watertight wrap. The *V. vulnificus* lives naturally in warm seawater, can enter a person’s wound and, in some cases extend to the bloodstream and cause a potentially fatal illness. The highly invasive nature of this bacterium is cause for special concern.

People in high-risk categories should avoid consumption of raw shellfish, particularly oysters. Oysters are filter-feeding animals that can concentrate *Vibrio* bacteria from the water into their system. This concern exists for any raw oysters regardless of harvest from approved or questionable waters.

When eating shellfish, particularly oysters, be sure they are properly and thoroughly cooked. Fully cooking oysters completely kills the bacteria, so you can continue to enjoy oysters in many cooked preparations. However, steaming oysters as is done at an oyster roast may not be sufficient to destroy the bacteria.

Avoid cross-contamination of previously cooked shellfish with raw shellfish. A common cause of cross-contamination is storing cooked shellfish in the original container used for raw shellfish, or storing raw and cooked shellfish in the same area.

**Drinking Alcoholic Beverages Regularly & Liver Disease:** If you drink alcoholic beverages regularly, you may be at risk for liver disease, and, as a result, at risk for serious illness or death from raw oysters. Even drinking two to three drinks each day can cause liver disease, which may have no symptoms. Liver disease will put you at increased risk for *V. vulnificus* infection from raw oysters. The risk of death is almost 200 times greater in those with liver disease than those without liver disease.

**What are the chances for an infection?** Rare! No major outbreaks of illness have been attributed to this organism. Sporadic cases have occurred in South Carolina, becoming more prevalent during the warmer months. To date no fatalities have been related to eating oysters harvested in S.C. waters. Extensive federal and state regulatory programs monitor the production and marketing of raw shellfish to assure product safety. Most healthy individuals are not troubled by *V. vulnificus* infections from water or food. Thus, the *V. vulnificus* problem is primarily restricted to individuals in the risk categories. These individuals are advised not to eat raw shellfish.

## **Oyster Safety – What You Can Do**

**At Restaurants:** Order oysters fully cooked. Some states display notices for those at risk. Use them as reminders of how to avoid illness.

### **Cooking at Home:**

**In the Shell:** Cook live oysters in boiling water for three to five minutes after shells open. Use small pots to boil or steam oysters. Do not cook too many oysters in the same pot, because the ones in the middle may not get fully cooked. Discard any oysters that do not open during cooking. Steam live oysters four to nine minutes in a steamer that’s already steaming.

**Shucked:** Boil or simmer for at least three minutes or until edges curl. Fry in oil for at least three minutes at 375 °F. Broil 3 inches from heat for three minutes. Bake (as in Oysters Rockefeller) for 10 minutes at 450 °F.

## Norovirus

Ingestion of raw or insufficiently steamed clams and oysters also poses a high risk for infection from Norovirus, a cause of viral gastroenteritis or the stomach “bug.” (Foods other than shellfish are contaminated by the Norwalk virus by ill food handlers.)

It is estimated that Norwalk viruses are responsible for about one-third of the cases of viral gastroenteritis not involving the 6- to 24-month age group. Approximately 181,000 cases occur annually, with no known associated deaths.

Norovirus has been associated with outbreaks on cruise ships, in communities, camps, schools, institutions, and families. Foods such as raw oysters, cake frosting, and salads, as well as drinking water, have been implicated as a common source of viral infection in several outbreaks.

A mild and brief illness usually develops 24 to 48 hours after contaminated food or water is consumed and lasts for 24 to 60 hours. Norwalk virus infection symptoms include nausea, vomiting, diarrhea, and abdominal cramps. Symptoms experienced less often include headache, fever, chills, and muscle pain. Fluid replacement is the common therapy. For further information on Norwalk virus request **HGIC 3720, Foodborne Illnesses: Viruses.**

For further information on other specific illnesses related to seafood you may request the following fact sheets: **HGIC 3661, Ciguatera,** and **HGIC 3662, Scombroid Poisoning.**

### Sources:

1. Centers for Disease Control and Prevention. Oysters and Vibriosis. June 10, 2019.
2. US Food & Drug Administration. If You Eat Raw Oysters, You Need to Know... July 1995.
3. U.S. FDA/CFSAN. The Norwalk Virus Family [WWW document. URL <http://vm.cfsan.fda.gov/~mow/chap34.html>
4. US FDA. “Vibrio vulnificus.” Bad Bug Book. January 1992.
5. National Food Safety Database. Consumer Tips for Handling Seafood Safely. Prepared by Robert J. Price, August 1990.
6. National Food Safety Database. Vibrio vulnificus. Prepared by Southeastern Fisheries Association, December 1989.
7. New England Fisheries Development Association. Seafood Safety. 1990.

If this document didn’t answer your questions, please contact HGIC at [hgic@clemsn.edu](mailto:hgic@clemsn.edu) or 1-888-656-9988.

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For safety, live oysters should be steamed for 4-9 minutes in a steamer that is already steaming.  
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