

What are Vibrio?

Vibrio are naturally occurring marine bacteria that is found in most aquatic environments. Some species of this bacterial group are known to cause human illness.

Which species are harmful to humans?

Although the majority of *Vibrio* species are considered non-pathogenic to humans, some have been associated with human illness. The three species widely regarded to be associated with human illness are: *Vibrio parahaemolyticus*, *V. vulnificus* and *V. cholera*. Several other species have also been associated with illness, either at a lower frequency or with less conclusive evidence: *V. alginolyticus*, *V. carchariae*, *V. cincinnatiensis*, *V. damsela*, *V. fluvialis*, *V. furnissii*, *V. hollisae*, *V. metschnikovii*, and *V. mimicus*.

What types of illness can occur?

There are three distinct syndromes that can occur from *Vibrio* infections: gastrointestinal illness, septicemic infection and wound infections. The latter is not associated with consumption of seafood.

What outbreaks have occurred?

- Illnesses associated with *Vibrio* contaminated seafood are rare in Australia.
- A total of 5 cases associated with bivalve shellfish have occurred between 1992 and 2013. One of these cases resulted in a mortality from *V. parahaemolyticus*. The remaining four cases were associated with *V. vulnificus* and two of these patients died.

- Two large outbreaks of *V. parahaemolyticus* (1990 and 1992) were associated with imported prawns.

How much Vibrio is a harmful dose?

- Approximately 10^6 cells of *V. cholera* in healthy adults
- Approximately 2×10^5 - 3×10^7 cells of *V. parahaemolyticus* in healthy adults
- The dose of *V. vulnificus* for healthy people is unknown, but in at risk groups (see susceptible individuals below) it may be less than 100 cells.

What are the symptoms of V. parahaemolyticus associated with the consumption of seafood?

- Severe gastrointestinal illness including diarrhoea, which can sometimes be bloody, abdominal pains, nausea and vomiting
- Occasional septicemic infection, only rarely associated with mortality

What are the symptoms of V. vulnificus associated with the consumption of seafood?

- Primary septicemia with symptoms of fever chills and nausea may occur in susceptible individuals e.g. immuno-compromised and can result in mortality
- Gastroenteritis, which presents as vomiting, diarrhoea and abdominal pains.

What are the symptoms of V. cholera (Non O1/O139) associated with the consumption of seafood?

- Diarrhoea (bloody) and abdominal cramps
- Fever, and although rarer in occurrence, septicemia can also develop in compromised individuals

Which seafood can be considered vectors?

- Bivalve shellfish (*V. parahaemolyticus* and *V. vulnificus*)
- Prawns/shrimp (*V. cholerae*)
- Finfish (*V. parahaemolyticus*)

What increases the risk?

- Post-harvest temperature abuse throughout the supply chain can allow the growth of these pathogens in the seafood to levels associated with illness.
- Susceptible individuals (the immuno-compromised, those who suffer from liver disease and/or have excess levels of iron in the blood serum) are at a greatly increased risk of septicaemia.
- Harvesting of seafood from areas of lower salinity can present a higher risk.
- In Australia, the prevalence of *Vibrio* species is not well understood, and the relationship between temperature and salinity has not been explored.

What decreases the risk?

- The Australian Shellfish Quality Assurance Program Operations Manual sets maximum storage temperatures for live bivalves post-harvest to control the growth of indigenous pathogens. Shell stock must be placed under ambient refrigeration at 10 °C or less within 24 hours of harvest or depuration. Under the

NSW Shellfish Industry Operations Manual, Sydney Rock Oysters must be stored at 25 °C or less within 24 hours of harvest and at 21 °C or less within 72 hours of harvest.

- *Vibrios* are highly susceptible to heat. Heating to greater than 65 °C will inactivate pathogenic strains.
- Appropriate adherence to regulatory temperature controls is the best preventative measure.
- Depuration is not effective in removing *Vibrio* from bivalve shellfish.

How can we test for *Vibrio*?

- Microbiological analysis using selective media
- Identification of isolates by biochemical phenotype or Polymerase Chain Reaction (PCR)
- PCR detection direct from enrichment cultures

Regulatory standards

There is no standard set for *Vibrio* in the Australia New Zealand Food Standards Code. Limits are set by several countries including (but not limited to) Canada, China, India, Japan, Thailand the United States of America.

International regulatory limits can be found in the Trade & Market Access Database, available at (<https://micor.agriculture.gov.au/Pages/default.aspx>).

Where can I access more information?

DESMARCHELIER, P. M. 2003. Pathogenic *Vibrios*. In: HOCKING, A. D. (ed.) *Foodborne Microorganisms of Public Health Significance*. Sixth ed. New South Wales: Australian Institute of Food Science and Technology Inc.

HUDSON, A. & LAKE, R. 2012. Risk profile: CLOSTRIDIUM BOTULINUM IN READY-TO-EAT SMOKED FISH AND SHELLFISH IN SEALED PACKAGING. Wellington, New Zealand: Ministry for Primary Industries.

Contact us:

<http://safefish.com.au>

