Vibrio Fact Sheet

What are Vibrio?

Vibrio are naturally occurring marine bacteria that are 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. cholerae.* 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. damsel, 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, septicaemic infection and wound infections. The latter is not associated with consumption of seafood.

What outbreaks have occurred in Australia?

- Illnesses associated with *Vibrio* contaminated seafood are rare in Australia.
- Two large outbreaks (>157 cases and 1 death) of *V. parahaemolyticus* (1990 and 1992) were associated with imported prawns.
- Two outbreaks (5 cases) occurred in Australian between 2005 and 2015 associated with seafood (origin/species not reported).
- In 2016 an outbreak of *V. parahaemolyticus* occurred associated with Tasmanian oysters, resulting in 11 cases across multiple states.
- Since 2016 further small outbreaks of *V. parahaemolyticus* have been reported associated with oysters from WA, SA, NSW and Tasmania.
- A series of outbreaks of *V. parahaemolyticus* in 2021 have been associated with SA oysters (>60 cases).

How much *Vibrio* is a harmful dose?

- Approximately 10^6 cells of *V. cholerae* in healthy adults.
- Pathogenicity of *V. parahaemolyticus* varies according to the strain and is not well understood.
- 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 septicaemic infection, rarely associated with mortality.

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

- Primary septicaemia 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. cholerae* (Non O1/O139) associated with the consumption of seafood?

- Diarrhoea (bloody) and abdominal cramps

- Fever, and although rarer in occurrence, septicaemia 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 higher water temperature and 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.
- Industry vibrio control plans for at-risk areas include harvest curfews based on temperature, time and/or tide; harvesting from deeper zones; and rapid chilling after 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 always effective in removing *Vibrio* from bivalve shellfish.

How can we test for *Vibrio*?

- Microbiological analysis using semi-selective media and identification of biochemical phenotypes
- Species specific molecular (Polymerase Chain Reaction) detection direct from enrichment cultures

Regulatory standards

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

Where can I access more information?

SafeFish vibrio webinars. https://www.safefish.com.au/technical-program/vibrio-webinar-series

WHO/FAO 2020. Risk assessment tools for *Vibrio parahaemolyticus* and *Vibrio vulnificus* associated with seafood. *Microbiological Risk Assessment Series* No. 20. Rome: Food and Agricultural Organisation and the World Health Organisation.

WHO/FAO 2011. Risk assessment of *Vibrio parahaemolyticus* in seafood. Interpretative summary and technical report. Microbiological Risk Assessment Series No. 16. Rome. 193pp