



Why is *Vibrio vulnificus* so prevalent in Florida?

A routine statistical update has highlighted the startling number of cases and the impact on public health of *Vibrio vulnificus* in the US state of Florida. Since 2008, Florida state officials have reported 471 cases and 124 deaths, including 36 cases and 7 deaths in 2020, and to date there have been 19 cases and a further 7 fatalities reported in 2021.

Figures show that only approximately 200 people a year suffer from *V vulnificus* across the whole of the United States, so why is there such a disproportionate number of cases in Florida?

The answer lies in the geography of the region and the fact that *V vulnificus* is usually found in warm, shallow, coastal salt water in temperate climates which is exactly the conditions in the Gulf of Mexico.

V vulnificus (and *Vibrio parahaemolyticus*) are most commonly found in brackish environments (areas in which freshwater and saltwater mix), so they are typically found in estuaries and bays, rather than the beach or open ocean. Although *V vulnificus* is present in Florida waters all year-round, it is most abundant from April to November, when temperatures are the warmest. These natural peaks correspond with an increase in human infections, which are usually highest during the summer months.

Like *Vibrio parahaemolyticus*, *V vulnificus* can be acquired by the consumption of contaminated raw seafood such as oysters with symptoms of vomiting, diarrhoea and abdominal pain. However, the majority of *V vulnificus* infections occur through infection via open wounds which have direct contact with seawater which cause blistering skin lesions and pyrexia and septic shock when the bacterium enters the bloodstream.

Invasive *V vulnificus* bloodstream infections have a 50% mortality rate and people with pre-existing medical conditions are 80 times more likely to develop a systemic infection than healthy people.

All of which begs the inevitable question, with climate change very much on the agenda at the moment. If global warming increases and sea temperatures rise, are we likely to see an increase in the incidence of this organism in areas which hitherto have been too cold for the bacterium's survival?

UK Salmonella outbreak linked to Meat Skin Snacks

Nearly 200 people across the UK have been affected by a Salmonella outbreak linked to meat skin snack products which has led to worldwide recalls affecting the USA, Canada, Hong Kong, Australia and New Zealand.

The Food Standards Agency and Food Standards Scotland have reported that there have been 179 cases of *Salmonella infantis* in the last 12 months linked to the consumption of this product.

Many companies recalled their products because of the link to the outbreak was established by whole genome sequencing and epidemiological investigations.

STEC outbreak in Finland

Health authorities in Finland are trying to establish the cause of a E coli O103 outbreak which has to date affected 57 people and caused 2 fatalities.

E. coli O103 is one of the more common Shiga toxin serotypes found in patients in Finland. It has previously been detected in cattle and raw milk and caused an outbreak in 2014 which was traced to contaminated water.

STEC outbreak in Ireland

There has been a confirmed STEC outbreak linked to the consumption of contaminated drinking water in the coastal county of Wexford in the south east of Ireland. A power cut at the local water treatment works led to a malfunction in the chlorination of the drinking water supply and to date there has been 52 confirmed illnesses linked to the incident. It has been reported that delays in reporting the chlorination issues meant that there was no opportunity to issue boil water notices to consumers, which would have helped protect public health until the problems at the water treatment plants were resolved.

US Salmonella oranienburg outbreak linked to coriander

In the United States, an outbreak caused by *Salmonella oranienburg* which has affected 279 people across 29 states has been linked to the consumption of coriander, or cilantro as it is known as in America. Samples of coriander have tested positive for the Salmonella serotype, but as yet it is not clear if the coriander itself became contaminated from other products such as onions.

Study finds that salad leaves were the likely source of 2019 STEC outbreak

A study published in *Epidemiology and Infection* has revealed that a 2019 STEC outbreak in the UK was possibly linked to the consumption of salad in sandwiches. It was the first UK-wide foodborne outbreak of Shiga toxin-producing *E. coli* (STEC) O26.

32 cases of STEC serotype O26:H11 were identified from early October to mid-November 2019, and six people required hospital treatment.

The report stated that there was an association with eating pre-packed sandwiches purchased at outlets belonging to an unnamed national food chain. The common ingredient in the sandwiches was a mixed salad of arugula and iceberg lettuce and spinach leaves.

The product was no longer available for recall because of the time delay between sampling and test results. However, follow-up investigations by the business investigated the source of STEC contamination and HACCP-based food safety processes were reviewed.

The report concluded that there should be a shift in focus from testing the microbiological quality of the produce to investigating the processes and practices through the supply chain and sampling the farm environment. The report's authors stated that this was essential to identify the root cause of outbreaks linked to salad and raw vegetables, and to establish an evidence-based system for improving guidance and policy.

Salmonella coeln outbreak investigated in Sweden

In the last couple of months in Sweden there has been 31 confirmed cases of *Salmonella coeln*. Whole genome sequencing has shown that the disease cases carry the same strain and are therefore suspected of having been infected by a common source of infection. The cases are distributed across twelve different regions suggesting that the source of infection is possibly a food with a wide distribution in Sweden.

How *Salmonella enteritidis* emerged to become the dominant *Salmonella* serotype

An article published in last month's *Nature* journal offers an explanation as to why *Salmonella enteritidis* emerged in the 1980s to become the dominant *Salmonella* serotype in many countries. The article suggests that the international trade of infected breeding poultry stocks caused global spread of the pathogen.

By investigating over 30,000 *Salmonella enteritidis* genomes from 98 countries the authors claim to have established a link between the international trade of live poultry breeding stocks in the 1980s to the late 2010s, and the widespread dissemination of the *Salmonella enteritidis* serotype across many countries.

The report claims to have quantitatively established a driving role of the trade in the geographic dispersal of *Salmonella enteritidis*, suggesting that the centralised origins were infected poultry breeding stocks.

Salmonella outbreak caused by feeder mice for pet reptiles

Public Health England has reiterated advice to reptile owners after they revealed that almost 850 people have fallen ill with *Salmonella* infections in recent years as part of an outbreak linked to feeder rodents.

The outbreak was first investigated in 2015 and most of the people who were affected lived in households with one or more pet reptiles.

Officials from PHE stated "Epidemiological investigations and whole genome sequencing have again confirmed the link between a *Salmonella* outbreak in people who have become unwell and feeder rodents used to feed reptiles and some other animals distributed in the UK by a specific Lithuanian importer,"

The feeder rodents are considered as animal by-products and not pet food so are not required to be free from *Salmonella* or other human pathogens.

US also report a reduction in foodborne illnesses in 2020

Following the trend seen in many European countries, a recent report showed that foodborne illnesses in the United States decreased by 26 percent in 2020 compared with the average from 2017-19.

The report stated that pandemic-related behaviors, such as more handwashing, less international travel, and restaurant closures, may have contributed to the decrease in foodborne illnesses, but they note that changes in healthcare delivery and healthcare-seeking behaviors may also have caused underreporting.

As in recent years *Campylobacter* had the highest incidence with 14.4 infections per 100,000 people, followed by *Salmonella* with 13.3, and Shiga toxin-producing *Escherichia coli* (STEC) with 3.6.

Salmonella in livestock in the UK on the increase

Although (as linked to the article above) *Salmonella* detections in humans in the UK were reduced by 45% in 2020 compared to 2019 and were 48% down from the 2018 figures, findings of *Salmonella* in livestock increased by 7.3% in 2020.

The data covered *Salmonella* reports from livestock in England, Wales and Scotland collected by the Animal and Plant Health Agency (APHA) during 2020. Samples were taken from premises including farms, hatcheries, veterinary practices, zoos, and slaughterhouses. Only 23% of the isolations of *Salmonella* reported to APHA resulted from samples taken because of clinical disease in livestock, with the rest being detected through routine surveillance.

There were 756 isolations of *Salmonella* from animal feeding stuffs associated with testing under animal by-products regulations which was an increase of 6% compared with 2019.