2010 Outbreak of Vibriosis linked to Chesapeake Bay Oysters with a Novel Strain of *Vibrio parahaemolyticus*

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Chesapeake Bay - Overview

Images provided by Google Image
Oyster Industry in Maryland

• Oysters are among the most valuable fisheries in the Chesapeake Bay ($15.7 Million in 2013-2014)

• The oyster population is rebounding after a major decline and increasing this population is a high priority in Maryland

• An oyster can filter 50 gallons of water in a single day

• Aquaculture is one of the key’s to the restoration. Oysters grow faster, mortality rate lower than bottom cultured oysters.

2014 – 14,693 Summer Harvest bushels
2015 – 23,768 Summer Harvest bushels
2016 – 27,999 Summer Harvest bushels
Vibriosis Cases in Maryland 2010 - 2016

- **V. parahemolyticus**
- **Other Vibrio spp.**
Vibrio parahaemolyticus

• Leading cause of bacterial infections associated with consumption of seafood.
• Most people become infected by eating raw oysters, but infections can occur in wounds exposed to salt water.
• Estimate of 45,000 illnesses each year in the US
• Bloodstream infections can occur and in most cases are fatal.

• Hot sauce, Lemon juice, and drinking alcohol does not prevent Vibrio infections!

www.cdc.gov/vibrio
Vibrio Surveillance by Whole Genome Sequencing

- MD DHMH started WGS in 2012 with the Ion Torrent. Currently we have 4 MiSeqs and 2 Ion Torrent

- GenomeTrakr participant

- Collaborated with FDA-CFSAN on sequencing *Vibrio parahaemolyticus*

- Currently, we have sequenced 121 *Vibrio sp.* isolates
2010 Outbreak of *Vibrio parahaemolyticus*
2010 Outbreak of *Vibrio parahaemolyticus*
Outbreak Investigation

- Invoices and Oyster Tags were collected from the restaurants
- A single source for the oysters was identified
- The harvest site was inspected and oysters were collected for further testing
• With the help from Dauphin Island FDA Lab - 479 strains of *V. parahaemolyticus* were isolated from the oysters collected.

• 9 strains were considered potentially pathogenic based on toxin profiles

• PFGE was done on the recovered isolates.

In 2010, this is as far as we could go for characterization of these isolates.
2012 – Whole Genome Sequencing!

• Rarely causative strains of *V. parahaemolyticus* are isolated from food sources.

• WGS provides us with new insights in Outbreak investigations

• Questions – How related are all of these strains? Where did this Outbreak strain originate?
wgMLST Analysis
wgMLST Analysis
How did this strain get here?
Thank You!

• Molecular Epi Staff
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