

SLIDE 1- TITLE

SLIDE 2

Hello, my name is Carl Williams and I am here to talk about surveillance for *Vibrio* spp in NC. There are many pathogenic species of vibrios and this presentation will focus on the non-toxigenic cholera species, all of which have an estuarine water reservoir and are classically transmitted through contact with brackish water or consumption of improperly cooked seafood.

Toxigenic cholera is the cause of “cholera” and does not occur in the United States, though we do have imported cases from time to time. Cholera is different in that the reservoir is humans and not estuarine water.

SLIDE 3

As stated with the previous slide it will be important to understand the differences between the various species of vibrios, how they are transmitted, and the clinical presentation of each so that you can implement appropriate control measures and provide proper education.

SLIDE 4

Vibriosis, in general, is a reportable event but there are three categories of reportable infection due to *Vibrio* spp in NC.

Cholera is a severe illness with tremendous outbreak potential but is not currently circulating in the United States. Note that there are over 200 serogroups of *Vibrio cholera*, but only two of those serogroups cause the illness “cholera” and those are O1 and O139. These serogroups have humans as a reservoir. All other serogroups have an estuarine water reservoir and do occasionally occur in NC. Just remember that because you see a lab report indicating a positive culture for *V. cholera* does NOT mean the patient has the disease cholera. They may, but in all likelihood it is simply an infection with a non-toxigenic serogroup. Nonetheless, all positive cultures for *V cholera* should be sent to the SLPH for serogroup determination.

SLIDE 5

Infection due to *V. vulnificus* is the most serious illness due to *Vibrio* spp in NC and has a 25% case fatality rate. The key is to provide education of immunocompromised persons, especially those with underlying liver disease, to use caution when spending time in a marine water environment.

SLIDE 6

Infection with all other *Vibrio* spp is recorded in the “other” category and is most often associated with consumption of improperly cooked seafood.

SLIDE 7

The focus of this presentation is on:

- Illness due to *Vibrio* spp other than *V. cholerae* O1/O139
- Cholera is not endemic to NC or the US and cases are always associated with travel
- Questions about *V. cholerae* O1/O139 should be referred directly to the Medical Consultation Unit (MCU) at 919-733-3419

SLIDE 8

Now let's discuss the vibrio cases that actually occur in NC. As you can see infection with *V. vulnificus* is relatively rare but can have serious consequences.

SLIDE 9

Vibrio vulnificus is a naturally occurring halophilic (salt requiring) gram-negative rod that is ubiquitous in coastal waters. *V. vulnificus*, with a case-fatality rate exceeding 50% is the leading cause of seafood consumption-related deaths in the United States. However, the slight majority of illness caused by *Vv* is due to wound contamination.

V. vulnificus, similar to other seafood-borne bacteria and viruses, lodges in the tissues of filter-feeding mollusks, such as oysters, clams, mussels, and crab and causes a septicemia following ingestion.

SLIDE 10

The referenced article is freely available from Clinical Infectious Diseases and I recommend everyone read it to learn more detail about Vv. The data presented are national and reflect disease presentations where the illness primarily occurs; the Atlantic coast of the SE United states and the US gulf coast.

V. vulnificus Clinical Illness/Daniels. CID. 2011; 52(6)788-792

Three Distinct Syndromes

Wound infection (45% of cases)

- Often necrotizing, occur following wound exposure to contaminated seawater

Septicemia (43% of cases)

- 96% of these cases reported consumption of raw or undercooked oysters in 7 days preceding illness onset
- Nearly all cases have chronic underlying liver disease
- Organism crosses intestinal mucosa rapidly causing systemic illness
- Bullous skin lesions an early manifestation of sepsis

GI tract limited infections (5% of cases)

SLIDE 11

As you can see by this graph infections with *Vibrio* spp other than *vulnificus* are much more numerous and, while there is somewhat of a seasonal distribution, cases are much more distributed throughout the year. Also note there are no fatalities associated with these species, they tend to be much less pathogenic than Vv.

SLIDE 12

Infections with this Vp tend to be the most commonly identified *Vibrio* infection in NC.

Vibrio parahaemolyticus is a gram-negative, halophilic bacterium that naturally inhabits marine and estuarine environments and causes 3 major syndromes of clinical illness—gastroenteritis (the most common syndrome), wound infections, and septicemia. *V. parahaemolyticus* was first

NC Communicable Disease Manual/ Communicable Disease Course

Waterborne Disease II/*Vibrio*

Jan. 2014

Page 3 of 7

identified as a cause of foodborne illness in Japan in 1950. At that time an outbreak investigation confirmed that infection was associated with eating sardines; 272 persons became ill, and 20 died. Since then, *V. parahaemolyticus* has been recognized as a common cause of foodborne illness in Japan and throughout Asia. Recently in the United States, *V. parahaemolyticus* has been the most common *Vibrio* species isolated from humans, as well as the most frequent cause of *Vibrio*-associated gastroenteritis. Recent *V. parahaemolyticus* outbreaks in the United States have been associated with consumption of raw or undercooked shellfish.

SLIDE 13

V. parahaemolyticus Clinical Illness

Three Distinct Syndromes

- GI tract limited infections 88% of these cases reported consumption of raw or undercooked oysters in 7 days preceding illness onset
- Wound infection (34% of cases)
 - Occur following wound exposure to contaminated seawater, may cause necrotizing fasciitis
- Septicemia (5% of cases)
 - Cases were more likely than GI cases to have a history of alcoholism or liver disease
 - *Commonly associated with foodborne illness outbreaks attributable to seafood*

SLIDE 14

Vibrio parahaemolyticus infections in the United States, as reported to the Centers for Disease Control and Prevention, by month of culture date, 1988–1997.

SLIDE 15

Vv more likely to cause wound infections and septicemia. *Vp* more likely to cause GI symptoms and be associated with outbreaks.

SLIDE 16

The NC DENR Shellfish Sanitation Program is conducted in accordance with the guidelines set by the Interstate Shellfish Sanitation Conference. The NSSP is administered by the U.S. Food and Drug Administration and is based on public health principles and is designed to prevent human

illness associated with the consumption of molluscan shellfish. Sanitary controls are established over all phases of the growing, harvesting, shucking, packing and distribution of fresh and fresh-frozen shellfish. The Shellfish Sanitation Section is responsible for monitoring and classifying coastal waters as to their suitability for shellfish harvesting for human consumption.

Recommendations are made to the Division of Marine Fisheries to close those waters that have the potential for causing illness and opening those that are assured of having clean, healthy shellfish.

All shellfish growing areas are surveyed every three years to document all existing or potential pollution sources, to assess the bacteriological quality of the water, and to determine the hydrographic and meteorological factors that could affect water quality. Water samples are collected at least six times a year from each growing area and tested for fecal coliform bacteria, which are an indicator that human or animal wastes are present in the water. In addition, reviews of bacteriological data and pollution sources are conducted annually. This information is then used to classify each shellfish growing area as either approved, conditionally approved, restricted or prohibited. Approved areas are consistently open to shell fishing, while prohibited areas are permanently closed. Conditional areas are generally open to shell fishing, but can be closed after a significant rainfall event due to the resultant runoff. The area will then remain closed until water sampling indicates a return to acceptable bacteria levels. An area's status can change quickly due to temporary closures after rainfall, high results during bacteriological sampling or unexpected pollution events.

SLIDE 17

This is a relatively frequently identified *Vibrio* species in NC but has not been associated with serious illness.

SLIDE 18

Why Conduct Surveillance?

Surveillance is needed to better define

- the burden of disease,
- identify and control outbreaks,
- provide information on the temporal, geographic, and demographic features of vibriosis,

- define and evaluate prevention strategies

CSTE position statement 11 – ID – 12

SLIDE 19

Case Definition

- Clinical Description

An infection of variable severity characterized by watery diarrhea, primary septicemia, or wound infection. Asymptomatic infections may occur, and the organism may cause extra-intestinal infection.

- Laboratory Criteria for Diagnosis

Isolation of a species of the family *Vibrionaceae* (other than toxigenic *Vibrio cholerae* O1 or O139, which are reportable as cholera) from a clinical specimen.

- Case Classification

Probable: A clinically compatible case that is epi linked to a confirmed case.

Confirmed: A case that meets the laboratory criteria for diagnosis.

SLIDE 20

CDC initiated COVIS in collaboration with the Food and Drug Administration and the Gulf Coast states (Alabama, Florida, Louisiana, Mississippi, and Texas) in 1988. Using the COVIS report form available at:

http://www.cdc.gov/NationalSurveillance/PDFs/CDC5279_COVISvibriosis.pdf),

participating health officials report cases of vibriosis and cholera. The case report includes clinical data, including information about underlying illness; detailed history of seafood consumption; detailed history of exposure to bodies of water, raw or live seafood or their drippings, or contact with marine life in the seven days before illness onset; and traceback information on implicated seafood.

Before 2007, only cholera, which by definition is caused by infection with toxigenic *Vibrio cholerae* serogroup O1 or O139, was nationally notifiable. In January 2007, infection with other serogroups of *V. cholerae* and other species from the family *Vibrionaceae* also became nationally notifiable, as vibriosis.

SLIDE 21

Using the COVIS report form, participating health officials report clinical data, including information about underlying illness; detailed history of seafood consumption, exposure to a body of water, exposure to drippings from raw or live seafood, or other contact with marine life in the 7 days before illness onset; and traceback information on implicated seafood. This information is used to develop information to educate consumers about the health risks of seafood, as well as to help determine host, food, and environmental risk factors.

SLIDE 22

Risk factors for illness include consumption of shellfish, particularly raw oysters, and contact with natural bodies of waters, especially marine or estuarine waters. Therefore it is important to collect this information.

SLIDE 23-NO TEXT

SLIDE 24

If food is implicated as a source this information will help direct recall and traceback activities.

SLIDE 25

Reporting Forms

- Complete the COVIS form for Vibrio Cases
- Fax completed form to 919-733-9555
- You or MCU staff can enter data from COVIS form into NC EDSS

SLIDE 26-NO TEXT