Epidemiology of Vibrio Infection in Texas, 2008-2017

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**Vibrio Infection**

- **Organism:** *Vibrio* species
  - Highly motile, curved, Gram-negative bacteria
  - Naturally lives in salty and brackish waters in the sediments and on the surface of Mollusks
  - Proliferate in warm (>15C) water
- **Seasonal, May-October**
- **80,000 illnesses and 100 deaths in the USA every year**
# Vibrio infection: Symptoms

## Shellfish exposure (GI symptoms)
- Diarrhea
- Vomiting & nausea
- Abdominal cramps
- Fever & headache

## Water exposure (wound)
- Localized swelling
- Red/purplish skin around wound area
- Fever & chills
- Sepsis, necrotizing fasciitis
Table 1. Association of *Vibrio* species with different clinical syndromes

<table>
<thead>
<tr>
<th>Organism</th>
<th>Gastroenteritis</th>
<th>Wound infection</th>
<th>Primary septicemia</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>V. alginolyticus</em></td>
<td>+</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td><em>V. cholera</em> non-O1</td>
<td>++</td>
<td>+</td>
<td>+</td>
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<tr>
<td><em>V. cholera</em> O1</td>
<td>++</td>
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<tr>
<td><em>V. fluvialis</em></td>
<td>++</td>
<td>(+)</td>
<td>(+)</td>
</tr>
<tr>
<td><em>V. mimicus</em></td>
<td>++</td>
<td>(+)</td>
<td>(+)</td>
</tr>
<tr>
<td><em>V. parahaemolyticus</em></td>
<td>++</td>
<td>+</td>
<td>(+)</td>
</tr>
<tr>
<td><em>V. vulnificus</em></td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
</tbody>
</table>

+ , less common; ++, common; (+), rare presentation

Necrotizing fasciitis/Flesh-eating bacteria

- A rapidly progressive inflammatory bacterial infection of the fascia, with secondary necrosis of the subcutaneous tissues.
- Existing infection, wounds
- *Not always caused by Vibrio!*
- *V. vulnificus, group A Streptococcus, Klebsiella, E. coli, etc.*
- **Symptoms:**
  - Swelling, red/purplish skin area (ulcers, blisters, black spots), +fever, chills, fatigue, vomiting. Sepsis. Multiorgan failure.
Who is at Risk

- People with compromised immune system (alcoholism, chronic liver disease, diabetes, cancer, etc.)

- Eating raw/undercooked seafood

- Exposing open wounds to brackish or salty water
Vibrio Reporting in Texas

- *Vibrio* infection should be reported within 1 day
- Confirmed & Probable cases*
- In 2017, **CIDTs** (Culture-Independent Diagnostic Tests) were added to case status definition
- All *Vibrio* species isolates must be submitted to the DSHS lab (TAC)

- Exposures are categorized by:
  - Shellfish
  - Water
  - Other/Unknown

*Confirmed cases* – culture confirmation
*Probable cases* - CIDT, epi-linked to a lab confirmed case
Vibrio Reporting in Texas, cont…

In TX, all reported Vibrio cases sub-classified as:
- **Vibrio parahaemolyticus**
- **Vibrio vulnificus**
- **Vibriosis, other or unspecified** (alginolyticus, v.cholera non-O1 non-139, mimicus, fluvialis, etc.)

Cholera
- Toxigenic **Vibrio cholera O1 or O139** ("true" Cholera) should be confirmed by DSHS & CDC labs
- Toxigenicity should be confirmed by CDC lab
Vibrio Reporting, cont...

- **COVIS** – Cholera and Other Vibrio Illness Surveillance Report
  - Clinical information
  - Exposure (water; shellfish)
  - Seafood investigation section

10/5/2018
Vibrio infection became nationally notifiable in 2007, but Gulf Coast states have been reporting Vibrio to CDC since 1988.

- National Shellfish Sanitation Program (NSSP)

- FDA and DSHS Seafood Aquatic Life group partnership
Quality Assurance, Shellfish tags

- Shellfish tags should be attached until container with oysters is empty
- Thereafter, should be kept on file for 90 days
**Vibrio Infections in Texas, 2008-2017**

- 897 cases (2008-2017)
- 90 cases per year, on average:
  - 57 in 2008
  - 183 in 2017
- Male – 70%

- *V. parahaemolyticus* – 22.4%
- *V. vulnificus* – 27.1%
- *V. other* – 50.5%
  - *V. alginolyticus* – 37.5%
  - *V. cholera non-O1* – 24.9%
  - *V. fluvialis* – 8.9%
**Reported *Vibrio* Cases by Species in Texas, 2008-2017 (n=897)**

**Total (2008-2017):** V.p. - 22.4%; V.v. - 27.1%; V.other - 50.5%
Reported *Vibrio* Cases by Exposure in Texas, 2008-2017

- **Water contact**: 41%
- **Shellfish**: 24%
- **Other/Unknown**: 35%
Reported *Vibrio* Cases by Month in Texas, 2008-2017
Reported *Vibrio* Infection Deaths in Texas, 2008-2017

- **66 deaths**
  - Health status: alcoholism, cirrhosis, diabetes, cancer

  - *V. vulnificus* – 86%
  - *V. parahaemolyticus* – 3%
  - *V. other* – 11% (*V. cholera non-O1*)
Reported *V. vulnificus* Deaths by Exposure in Texas, 2008-2017 (n=66)

- Shellfish: 49%
- Water contact: 26%
- Other/Unknown: 25%

Water contact: 26%

Other/Unknown: 25%
Case #1. *V. vulnificus*, (Crab bite)

- 80yo, female
- Bitten by live crab (R arm) at seafood market: 06/17/17
  - Ate cooked oysters: 06/18/17
- Symptoms onset: 6/18/17
- Necrotizing fasciitis
- No GI symptoms
- Hospitalization: 06/19/2017
- *V. vulnificus* (wound, R arm): 06/20/17
- Death: 06/20/17
- Underlying condition: heart disease

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Case #2. 
V. vulnificus, (pedicure)

- 56yo, female
- Ate raw oysters: 08/05/17
- Pedicure (feet massage): 08/06/17 (2pm)
- Walk on the beach (Biloxi, MS): 08/06/17
- Symptoms (ache, feet): 08/06/17 (5pm) later night pain progressed in calves
- No GI symptoms
- Hospitalization: 08/07/2017
- V. vulnificus (wound), date collected: 08/07/17
- Necrotizing fasciitis. Cellulitis, bullae (Bil.LE)
- Amputation (bilateral LE)
- Death – 08/10/17
- Underlying condition: myelogenous leukemia, stem cell transplantation, liver disease

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• 3 reported confirmed *Vibrio* cases (+1 OOS case) linked to HH & post-hurricane flooding, clean up in TX
Case #1, *V. vulnificus*, Rescue case, Hurricane Harvey

- 74yo, male, Aransas Co
- Search & rescue team found him on 08/29/17
- Muscle pain, cellulitis (left foot), septic shock, acute kidney injury
- Onset date unk (pt. was non-verbal)
- *V. vulnificus* (blood), -08/29/17
  - +*Klebsiella pneumonia*
- Amputation, left leg below the knee
- Discharged 09/14/17 to LTC facility
- Underlying conditions: cancer, alcoholism

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Vibrio & Hurricane Harvey, cont...

Case #2
- *V. vulnificus*
  - 65yo male, Calhoun Co
  - 08/26/17 – evacuated to Rockwall, TX (RV park)
  - 08/31/17 – returned home & began to clean up his property. Injured leg. Went to fishing.
  - 09/04/17 – fever, pain, swelling in injured leg.
  - Underlying conditions: hypertension

Case #3
- *V. parahaemolyticus*
  - 11yo male, Houston
  - 09/16/17 - Fell off on backyard w/stagnant water, injured knee
  - 09/18/2017 – date collection (wound)
  - Underlying conditions: none
• Case #4 (OOS), *V. vulnificus*

- 55yo male, MS resident
- Helped with post HH clean up (Galveston Co) since 09/01/17
- 09/21/2017 – developed severe sunburn, wound
- Hospitalized, survived, no sequelae
- Underlying conditions: none
Vibrio Prevention: Shellfish Exposure

- Cook shellfish
- Do not eat shellfish that do not open during cooking
- Shellfish in the shell, - boil until the shell open and cont...for 5 min
- Shucked oysters, - boil at least 3 min or fry at least 10 min.
- Immediately refrigerate leftover (eat refrigerated cooked left over within 2 days)

- Avoid cross contamination!
- Wear gloves while handling raw shellfish

DON’T EAT RAW OYSTERS!
Vibrio Prevention:
Water exposure

- Avoid marine, salty, brackish water if you have a pre-existing wound

- Wear protective water shoes while fishing, walking in water, etc.

- If you sustain a wound/injury while exposed to salty seawater or handling raw seafood, wash, clean, and disinfect area immediately and seek medical help if the area becomes inflamed.
Vibrio infection information, data, reporting

- https://www.dshs.texas.gov/idcu/disease/vibrio/default/

(Google “DSHS Vibrio”)
Thank you!

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