Norovirus Outbreaks Associated with Consumption of Raw Oysters

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Norovirus

- Small round structured virus
- Single stranded RNA
- *Caliciviridae* virus family
  - *Vesivirus*-animal
  - *Lagovirus*-animal
  - *Norovirus*-human
  - *Sapovirus*-human
- *Norovirus*-
  - Five genogroups GI-GV

- Very stable in the environment
Norovirus

- **Symptoms**: nausea, vomiting, diarrhea & abdominal pain

- **Incubation period**: 12-48 hours (up to 72 hrs)

- **Illness is self limiting**

- **Treatment**: Oral fluid and electrolyte replacement

![Image of a water bottle]
Norovirus

• Norovirus is not a reportable disease

• Outbreaks are reportable

• ID Epi follows up on all reported outbreaks

• Numerous person-to-person Norovirus outbreaks January-March 2010
Norovirus

- CDC estimates >21 million cases of acute gastroenteritis each year are due to norovirus

- 1997-2000- 232 norovirus outbreaks reported to CDC:
  - 57% foodborne
  - 16% person-to-person
  - 3% waterborne
  - 23% unknown
Norovirus

• 2006-54% of all reported foodborne disease outbreaks with a confirmed etiology were caused by norovirus.*

• Most common settings: restaurants, catered meals, nursing homes, schools, vacation settings, and cruises

*MMWR June 12, 2009/58(22); 609-615
Foodborne Norovirus

- Cold foods, salads, sandwiches, bakery products, liquid items
- Fruits/vegetables irrigated with contaminated water
- Oysters from contaminated waters
Norovirus

- Person
- Soil
- Produce
- Shellfish
- Food contact surfaces
- Water
- RTE Foods
- Floor
- Air

*Food Microbiology Fundamentals and Frontiers M. Doyle*
Norovirus

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Norovirus

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Norovirus

*Food Microbiology Fundamentals and Frontiers M. Doyle
Norovirus 2010

Mississippi outbreak with La oysters

• GI outbreak among Conference attendees in Mississippi March 8-12, 2010
Mississippi conference
Raw oyster dinner
Mississippi conference
Norovirus 2010

Mississippi outbreak with La oysters

• ~ 60 people attended from 19 states and 1 U.S. territory
• Illness onset: Thursday March 11
• Symptoms: nausea, vomiting, diarrhea, abdominal cramps.
• Menus, attendee lists were obtained by MS DOH
• Questionnaires were completed on 49 of the 60 attendees.
• Oyster samples + tags collected
• Stool samples collected
Norovirus 2010
Mississippi outbreak with La oysters-

Results:
• OR raw oysters (dinner Wednesday, March 10) was 20.31 (2.21-469.46)
• The incubation period was 22-33.9 hours with a mean of 28 hours.
• 2 stool samples were positive for Norovirus GII.
• Oysters were from Louisiana harvest Area 7
Norovirus 2010

Mississippi outbreak with La oysters

- Oyster meat was tested at the Gulf Coast Seafood lab:
  - Subsample A tested negative for norovirus GI and GII

- Harvest area 7 was closed on March 24th and oysters were recalled.

- Subsample B tested positive for norovirus GII
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- Mississippi conference
- Raw oyster dinner
- LA Area 7 Closed
Norovirus 2010

La. Restaurant Outbreak with La. Oysters

• March 23, 2010 the IDES was notified that restaurant patrons were getting sick after eating oysters on March 21st and 22nd.
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Norovirus 2010

La. Restaurant Outbreak with La. Oysters

- Restaurant was contacted
- Names and numbers of the patrons who reported getting sick provided by restaurant
- The diners were called immediately.
Norovirus 2010

La. Restaurant Outbreak with La. Oysters

• Food history questionnaire and details of their symptoms were collected
Norovirus 2010

La. Restaurant Outbreak with La. Oysters

• Diners were asked to provide names and numbers of other diners-ill/not ill.

• Patrons were asked to provide a stool sample.

• Sanitarians did an inspection and obtained oyster tags.
Norovirus 2010
La. Restaurant Outbreak with La. Oysters

• The molluscan shellfish program was notified of the possible illnesses associated with oysters.

• FDA was notified of the potential problem.

• The Oyster Task Force was contacted and informed about the spread of norovirus throughout the state.
Norovirus 2010
La. Restaurant Outbreak with La. Oysters

**Cases**: those who ate at the restaurant on March 21\textsuperscript{st} or 22\textsuperscript{nd} and experienced vomiting and/or diarrhea 12 to 72 hours after eating there. \textbf{N=14}

**Controls**: those who ate at the restaurant on March 21\textsuperscript{st} or 22\textsuperscript{nd} and did not experience vomiting and/or diarrhea 12 to 72 hours afterwards. \textbf{N=1}
Norovirus 2010

La. Restaurant Outbreak with La. Oysters

Symptoms:
Vomiting: 93%
Diarrhea: 100%
Cramps: 93%
Nausea: 100%

Incubation period: mean 25 hours (19-34)
Symptom duration: mean 17 hours (5 to 60)
0 hospitalizations.
Norovirus 2010

La. Restaurant Outbreak with La. Oysters

Results:

• 14 cases reported eating raw oysters
  • 6/14 ate only raw oysters
  • 8/14 cases ate raw oysters + other food items but there were no other common food items
Norovirus 2010

La. Restaurant Outbreak with La. Oysters

Results:
• 1/1 stool sample + Norovirus GII -to CDC further testing.
• FDA did not test the oysters
• On March 25th, there was a precautionary closure of Louisiana Growing Area 3
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Norovirus 2010
La. Restaurant Outbreak with La. Oysters

• **Conclusion**: Confirmed norovirus outbreak associated with the consumption of raw oysters at a restaurant harvested from Area 3.
Norovirus 2010

La. Outbreak Wedding #1 - La. Oysters

- Monday, March 29\textsuperscript{th} IDES was notified of a possible GI outbreak associated with a wedding held on the night of March 27\textsuperscript{th}.
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Norovirus 2010
La. Outbreak Wedding #1 - La. Oysters

- Raw oysters were served at the reception.
- The catering company was contacted, menu was obtained.
- A sanitarian inspected catering company, collected the oyster tags.
-IDES was given a list of names and phone numbers of people who attended the wedding reception.
Norovirus 2010

La. Outbreak Wedding #1 - La. Oysters

• Food history questionnaire was completed on the guests

• Guests were asked to provide names and numbers of other people who attended the reception.

• Food history questionnaires were completed on 47 people who attended the reception, 6 of these people were part of the catering staff.

• Guests were also asked to provide a stool sample.
Norovirus 2010
La. Outbreak Wedding #1 - La. Oysters

**Cases:** those who ate food served at the wedding reception and experienced vomiting and/or diarrhea 12-72 hours after eating at the reception.  \( N=19 \)

**Controls:** those who ate food served at the wedding reception and did not experience vomiting and/or diarrhea 12-72 hours afterwards.  \( N=28 \)
Norovirus 2010
La. Outbreak with La. Oysters Wedding #1

Symptoms:
Vomiting: 74%
Diarrhea: 84%
Cramps: 74%
Nausea: 84%
Headache: 74%

Incubation period: mean 30 hours (12 to 41)
Symptom duration: mean 18 hours (4-48)
3 ER/physician visits
0 hospitalizations.
Results:
• Significant association between becoming sick and eating raw oysters P–value: 0.0000012
• 3/3 stool samples Norovirus GII + to CDC for further testing.
• Oysters were not tested at FDA.
• On March 30th Louisiana Harvest Area 13 was closed.
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**Norovirus 2010**

La. Outbreak Wedding #1 - La. Oysters

**Conclusion**: Confirmed norovirus outbreak associated with the consumption of raw oysters harvested from Area 13 at a wedding reception.
Norovirus 2010
La. Outbreak Wedding #2 - La. Oysters

• Thursday, April 1st,IDES was notified by a sanitarian about a possible GI outbreak associated with a wedding and reception that was held at a Hotel on March 20th.

• Late reporting makes follow up difficult!
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A chef in the restaurant was contacted that evening - he could not provide details about the outbreak.

On Friday, April 2nd, the catering staff, the executive chef and the director of operations were contacted - more details about the outbreak were obtained.
The wedding took place at the hotel on March 20th and the reception was catered for and took place at the hotel.

Oysters were served at the reception.
Norovirus 2010

La. Outbreak Wedding #2 - La. Oysters

• The Restaurant and Beverage department had received complaints from some of the wedding/reception attendees after it was aired on the news that some oyster beds had been closed due to illnesses related to oyster consumption.
Norovirus 2010
La. Outbreak Wedding #2 - La. Oysters

• Oysters were from Area 7 which was later closed (on 3/24 and recalled) due to the norovirus outbreak in Mississippi.

• Currently serving TX oysters until the La. beds were safe again.

• Menu, contact information for the wedding was obtained.
Norovirus 2010

La. Outbreak Wedding #2 - La. Oysters

• Monday, April 5th, the contact person was called, IDES obtained a list of wedding attendees to contact.

• A food history questionnaire was administered to the guests (13 were collected).

• Due to the late report of this outbreak, guests were not asked to submit stool samples.
Norovirus 2010

La. Outbreak with La. Oysters Wedding #2

**Cases:** attended the wedding reception and experienced vomiting and/or diarrhea 12-72 hours after eating at the reception. \( N=9 \)

**Controls:** attended the wedding reception and did not experience vomiting and/or diarrhea 12-72 hours afterwards. \( N=4 \)
Norovirus 2010
La. Outbreak Wedding #2 - La. Oysters

Symptoms:
Vomiting: 67%
Diarrhea: 100%
Cramps: 100%
Nausea: 67%
Headache: 67%

Incubation period: mean 27 hours (14 to 40)
Symptom duration: mean 57 hours (15 hrs to 6 dys)
1 ER/physician visit
0 hospitalizations.
Norovirus 2010

La. Outbreak Wedding #2 - La. Oysters

Results:
• 9 cases—all 9 ate raw oysters.
  4 controls—all 4 did not eat oysters.

• Due to the late reporting of this outbreak, no stool samples were collected.

• Conclusion: Based on incubation period, signs and symptoms, duration of illness: Suspect norovirus outbreak associated with the consumption of raw oysters.
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<td>LA Restaurant Raw Oysters Consumed</td>
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Norovirus 2010

- DHH press releases
- Media coverage of Harvest Area closures due to illnesses

- Numerous complaints from people who consumed raw oysters at restaurants and became ill.
- Small parties (1 or 2 people) at a single restaurant

- Complaints to Molluscan Shellfish Program & Sanitarians
- ID Epi worked with Molluscan Shellfish Program & Sanitarians to follow up on all complaints.
Questions?
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