Salmonella Typhimurium Associated with Unpasteurized Homemade Queso Fresco March-April, 2013

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- The Minnesota Department of Health (MDH) pulsed-field gel electrophoresis (PFGE) laboratory identified 2 *Salmonella* Typhimurium isolates indistinguishable PFGE
  - PulseNet PFGE pattern JPXX01.0954
  - Both cases were Hispanic
2:17 PM: Notified of new matching isolates; all cases Hispanic. Six more *Salmonella* cases in Hispanic persons reported.

S. Typhimurium Cluster Cases by Date of PFGE Result

- Case 1 interviewed
- Case 2 interviewed

Note: FRIDAY AFTERNOON
Minnesota Approach to Investigation of PFGE Clusters

• All reported *Salmonella* cases are interviewed even before a cluster is identified

• Collect details on specific exposures
  – Point of sale or service
  – Food brands, variety names

• Used in generating hypotheses for commercially distributed food outbreaks
Minnesota Approach to Investigation of PFGE Clusters:
Dynamic Cluster Investigation Model
Methods

- Case interviews were conducted by phone in Spanish or English by MDH staff
- Dynamic interviewing approach
Methods

• Case definition:
  – Confirmed case: a person with confirmed infection with S. Typhimurium PFGE pattern JPXX01.0954
  – Probable case: a person with diarrhea (≥3 loose stools in 24 hours) and fever from the same household as a confirmed case or identified from a list of customers of the implicated vendor
Methods

• City of Minneapolis Environmental Health led a joint investigation to identify the suspected vendor
  – MDH, Minnesota Department of Agriculture (MDA), and Minneapolis police participated

• Confiscated products were tested by MDA

• MDA conducted a farm investigation, including collection and testing of milk and environmental samples
2:17 PM: Notified of new matching isolates; all cases Hispanic. Six more *Salmonella* cases in Hispanic persons reported

6:30 PM: Unpasteurized queso fresco purchased from a private cheesemaker mentioned by 2 of 5 case-households

3rd case household reported unpasteurized queso fresco; expecting home delivery

**S. Typhimurium Cluster Cases by Date of PFGE Result**

- Case 1 interviewed
- Case 2 interviewed

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Number of Cases: 1, 2, 3, 4, 5, 6, 7
S. Typhimurium Outbreak Investigation
Initial Results

April 23

- 6 of 11 (55%) cases reported eating unpasteurized homemade queso fresco delivered to their home or purchased at a street corner

- 4.5% of Hispanics in Minnesota report consumption of any unpasteurized cheese (FoodNet population survey, 2007)

- P value <0.001
2:17 PM: Notified of new matching isolates; all cases Hispanic. Six more *Salmonella* cases in Hispanic persons reported.

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3rd case household reported unpasteurized queso fresco; expecting home delivery.

**S. Typhimurium Cases by Date of PFGE Result**

- Case 1 interviewed
- Case 2 interviewed

Surveillance operation

Number of Cases

April

Date of PFGE Result
Area Under Surveillance

Street corner where cheese was sold

Area where cheesemaker was expected to make a home delivery
Street Corner Under Surveillance
Minneapolis Street Under Surveillance
2:17 PM: Notified of new matching isolates; all cases Hispanic. Six more *Salmonella* cases in Hispanic persons reported.

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3rd case household reported unpasteurized queso fresco; expecting home delivery.

Surveillance operation.

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**S. Typhimurium Cases by Date of PFGE Result**

- Case 1 interviewed.
- Case 2 interviewed.

**Number of Cases**

- April 5: 1 case
- April 6: 2 cases
- April 7: 3 cases
- April 8: 3 cases
- April 9: 5 cases
- April 10: 5 cases
- April 11: 1 case
- April 12: 1 case
- April 13: 1 case
- April 14: 1 case
- April 15: 1 case
- April 16: 1 case
- April 17: 1 case
- April 18: 2 cases
- April 19: 2 cases
- April 20: 1 case
- April 21: 1 case
- April 22: 1 case
- April 23: 1 case
- April 24: 1 case
- April 25: 1 case
- April 26: 1 case
- April 27: 1 case
- April 28: 1 case

**Date of PFGE Result**
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3rd case household reported unpasteurized queso fresco; expecting home delivery

Cheesemaker identified, cheese confiscated

S. Typhimurium Cases by Date of PFGE Result

Case 1 interviewed

Case 2 interviewed

Number of Cases

April

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3rd case household reported unpasteurized queso fresco; expecting home delivery.

Cheesemaker identified, cheese confiscated.

Press release.

**S. Typhimurium Cases by Date of PFGE Result**

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Case 1 interviewed.

Case 2 interviewed.

Date of PFGE Result.
Cheese-making Operation

• Unpasteurized milk purchased by cheesemaker directly from a farm
  – 5 gallons at a time
• Milk collected from the line, not the bulk tank - still warm, not chilled
• Cheese made in cheesemaker’s rented apartment in Bloomington, MN
• Delivered to his customers’ homes and sold on a street corner in South Minneapolis
  – Delivered every 7 to 8 days
2:17 PM: Notified of new matching isolates; all cases Hispanic. Six more Salmonella cases in Hispanic persons reported.

6:30 PM: Unpasteurized queso fresco purchased from a private cheesemaker mentioned by 2 of 5 case-households.

3rd case household reported unpasteurized queso fresco expecting home delivery.

Cheesemaker identified, cheese confiscated.

Press release.

Farm identified.

Presumptive positive Salmonella from cheese.

Case 1 interviewed.

Case 2 interviewed.

S. Typhimurium Cases by Date of PFGE Result.
Food Testing Results

• Final results for the cheese samples were available on April 30
  – 8 of 8 samples tested positive for S. Typhimurium of the outbreak PFGE pattern
Food and Environmental Testing Results

• Raw milk samples collected from the bulk tank at the farm on April 30
  – 3 of 3 tested positive for S. Typhimurium of the outbreak PFGE pattern

• Cow manure samples
  – 5 of 5 tested negative for Salmonella
Case Summary

• 26 cases in 14 households
  – 19 confirmed
  – 7 probable
    • 6 were household members of confirmed cases, 5 had onset on the same day as confirmed case
    • 1 from cheesemaker customer list
    • Additional illnesses reported
• 15 (58%) hospitalized
• No deaths
S. Typhimurium Outbreak Cases by Date of Illness Onset (N=26)

- **Confirmed case**
- **Probable case**

**March**
- Cheesemaker identified, cheese confiscated
- Unpasteurized queso fresco first suspected
- Case 1 interviewed
- Case 2 interviewed
- Press release

**April**
- Number of Cases
- 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Unpasteurized Queso Fresco Consumption at Initial Interview

Ate unpasteurized queso fresco?
- Yes (n=13)
- No (n=12)
- Maybe/Unknown (n=1)

Number of Cases

March  April

28 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Unpasteurized Queso Fresco Consumption at Re-interview

Ate unpasteurized queso fresco?

- Yes (n=15)
- No (n=7)
- Maybe/Unknown (n=4)

Number of Cases

March  |  April
---     |  ---
28     |  1
1      |  2
1      |  3
1      |  4
1      |  5
1      |  6
1      |  7
8      |  8
9      |  9
10     | 10
11     | 11
12     | 12
13     | 13
14     | 14
15     | 15
16     | 16
17     | 17
18     | 18
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Crime and Punishment

• The City of Minneapolis waived a $600 fine in exchange for the cheesemaker’s cooperation during the investigation

• MDA issued
  – A notice of warning
  – $4,000 assessment for investigation costs

• City of Bloomington inspected the home
  – No additional cheese or cheese-making equipment found on the premises
  – Was not fined for housing and zoning violations
Conclusions

• Outbreak of salmonellosis associated with unpasteurized homemade queso fresco purchased directly from a cheesemaker

• Early mention of specific food detail by one case-household led to asking all subsequent cases about this exposure

• Risky exposures warrant suspicion even when a small proportion of cases mention it
Conclusions

• Dynamic interviewing approach was essential in rapidly confirming the vehicle

• Simultaneous investigation steps rather than the more traditional sequential steps

• Environmental health/regulatory agencies involvement with early “signals”

• Press release and interventions before food testing results
Conclusions

• Despite asking specifically about this food, many cases initially denied eating it
  – Concerned that the cheesemaker would get in trouble

• Aggressive efforts to identify the cheesemaker led to rapid removal of the cheese from the “market”
Acknowledgments

Minneapolis Health Department
- Ryan Krick
- Investigation team

City of Minneapolis Police Department

City of Bloomington, Environmental Health Division
- Lynn Moore
- Jeff Luedeman
- Doug Dyer

Hennepin County Medical Center

Minnesota Department of Health
- Team Diarrhea
- Epidemiology and laboratory investigation team

Minnesota Department of Agriculture
- Valerie Gamble
- Kathy Jorgensen
- Todd Whalen
- Investigation team