Listeria monocytogenes outbreak
Associated with Caramel Apples

2015 InFORM Conference
First reported outbreak associated with whole apples coordinated by CORE

- 35 cases reported from 12 states
  - 4 of 5 FDA Regions involved

- 2 cases reported in Canada
  - One with reported Caramel Apple consumption
Listeria monocytogenes /Caramel Apples
Coordinated National Response

• 11/21/14
  ★ FDA CORE Signals began evaluating 2 clusters of *Listeria Monocytogenes*

• 12/15/14 – 12/16/14
  ★ CDC: 9/9 cases reported caramel apple consumption

• 12/18/14
  ★ Inspections at firms initiated

• 12/22/14
  ★ First of numerous voluntary recalls initiated
Listeria monocytogenes /Caramel Apples
Coordinated National Response
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- Inspectional Observations
  - **Caramel Apple Production**
    - Mostly Seasonal
    - Granny Smith Apples
    - Commercially Processed
    - Potential processing issues
    - Smaller apples

- **Caramel Apple Distribution**
  - Nationwide
Environmental and Product samples

- Sampling conducted at multiple points along distribution chain
- Samples from Bidart facility are PFGE and WGS match to clinical cases
Listeria monocytogenes /Caramel Apples
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- Recalls
  - Bidart Bros. Granny Smith and Gala Apples
    - December 22, December 24, January 6
  - Multiple Caramel Apple manufacturers
    - Happy Apple Company of Washington, Missouri
    - California Snack Foods, of El Monte, California
    - Merb’s Candies of St. Louis, Missouri
  - Canadian recalls
Next Steps

1. Implicated product removed from market
2. FDA will continue to work with Industry
3. Transition to Post Response/Prevention
Prevention Efforts

• Outbreak strain found in supplier and manufacturing environment
• Federal and Non-Federal entities continue to conduct studies
  ★ Whole unprocessed apples vs. caramel apples
• Upcoming FDA assignments to determine how caramel apples processing environment may contribute to a contaminated product
Listeria monocytogenes /Caramel Apples
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• Conducted at the Institute for Food Safety and Health | Illinois Institute of Technology | Moffett Campus
• Characterized the behavior of LM in caramel and fresh apples
• Findings:
  ★ LM survived but did not grow on fresh apples
  ★ Growth significant for caramel apples if contamination at the stick end
  ★ Growth in caramel apples was slower at 5°C than at 25°C
  ★ Both low and high level contamination resulted in approx $10^{11}$ pathogen cells per apple
• Submitted for publication in Journal of Food Protection
Upcoming FDA Assignment Purpose

• To observe and document practices that may increase the risk of *Listeria monocytogenes* introduction, growth, or contamination in caramel apples

• To provide and give insight into the prevalence of *Listeria monocytogenes* in the environment and how contamination occurs

• To develop strategies for reducing the environmental contamination
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Upcoming FDA Assignment Objectives

- Conduct GMP inspections of firms that produce caramel apples as identified
- Collect and analyze environmental samples at each firm
- Collect evidence necessary to support the appropriate regulatory action when significant violations are observed.
- Upon confirmation of *L. monocytogenes* positive samples from environmental sampling, determine if *L. monocytogenes* is linked to reported outbreaks utilizing whole genome sequencing (WGS)
Success factors

• Professionals dedicated to promoting public health
  • Astute epidemiological work to identify vehicle
  • Prompt federal and local response
  • Prevention efforts in progress