Lessons Learned from Outbreaks: E. coli O157 Linked to Romaine Lettuce

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2018 Outbreak of *E. coli* O157:H7 Infections Linked to Romaine Lettuce from the Yuma Growing Region

Day 1: Outbreak Detection

- **NJ Department of Health notifies CDC of a cluster of *E. coli* O157 infections in NJ and PA**
  - Most ill people reported eating salads from the same restaurant chain

- **CDC Foodborne Outbreak Response Team begins coordinating the investigation**

Day 4: Confirming a Multistate Outbreak

- **PulseNet confirms 8 O157:H7 illnesses from 6 states with the same PFGE pattern**

- **Only common ingredient in the salads in NJ and PA appears to be romaine lettuce**
  - NJ collects records for romaine lettuce supplied to the restaurants

- **NJ releases a media statement about their investigation**

A Break in the Case: Not Just Pre-Chopped Romaine?

- **State and local health officials in AK identified a cluster of illnesses at a correctional facility**
  - Ill people report eating romaine lettuce

- **Traceback investigations showed the lettuce was whole heads of romaine from Yuma, AZ region**

FOR IMMEDIATE RELEASE

April 19, 2018 ANCHORAGE, AK - State officials are responding to an outbreak of acute gastroenteritis caused by Escherichia coli (E.coli) O157:H7 bacteria in the Anvil Mountain Correctional Center in Nome. Eight confirmed cases have been identified to date. The recently discovered cases appear to be connected to a nationwide E. coli outbreak affecting at least 53 persons in 16 states and linked to romaine lettuce grown in Yuma, Arizona.

Environmental Assessment Launched

- **Environmental assessment to determine possible routes of romaine contamination**
  - Observation and record collection
  - Soil, water, and other sampling

- **Outbreak strain identified in irrigation canal water adjacent to many fields identified in traceback**
  - How did the outbreak strain get in the water?
  - How did the water contaminate the romaine?

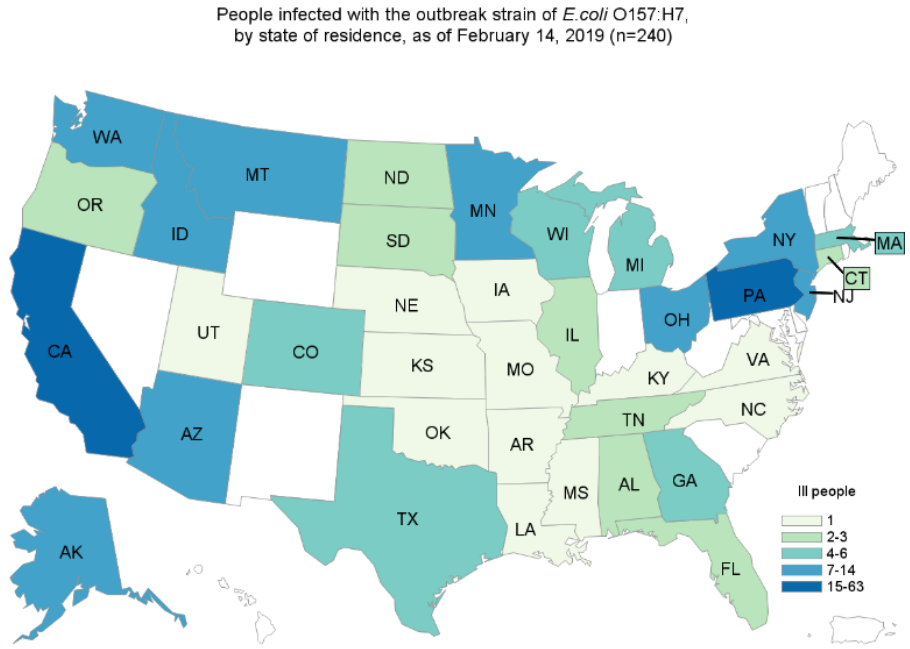
Romaine Exposures

- 152/179 (85%) reported romaine lettuce

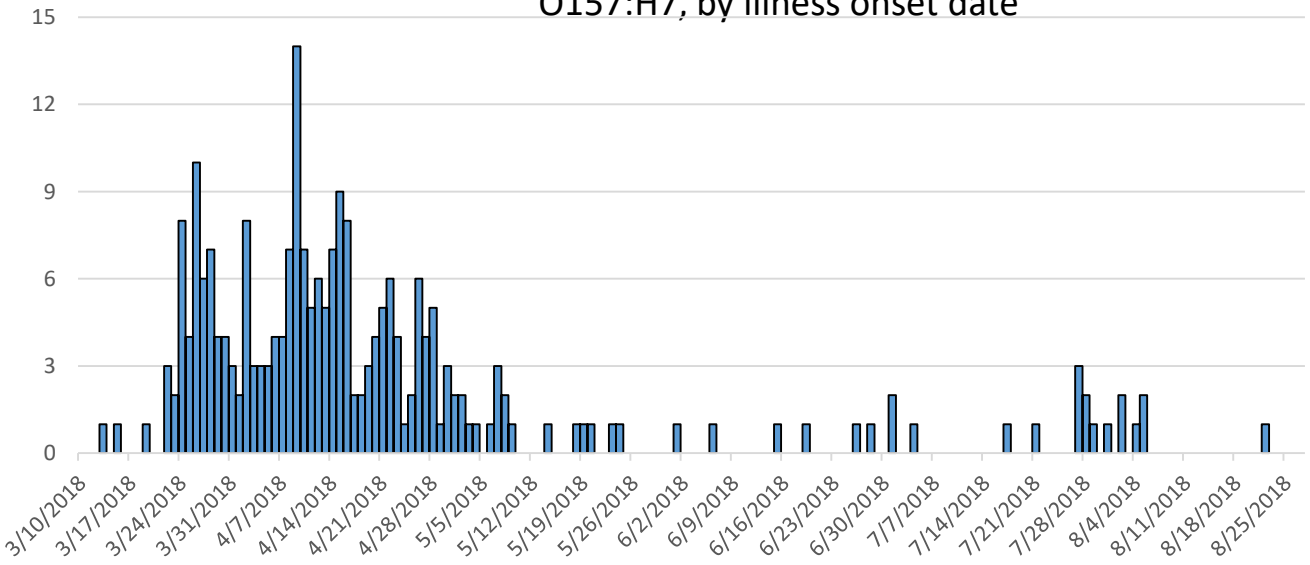
- 20 illness sub-clusters, encompassing >50% of cases
  - Includes restaurants, aforementioned AK correctional facility, and institutional cases in MN
  - Sub-cluster in OH from chain fast food with no romaine

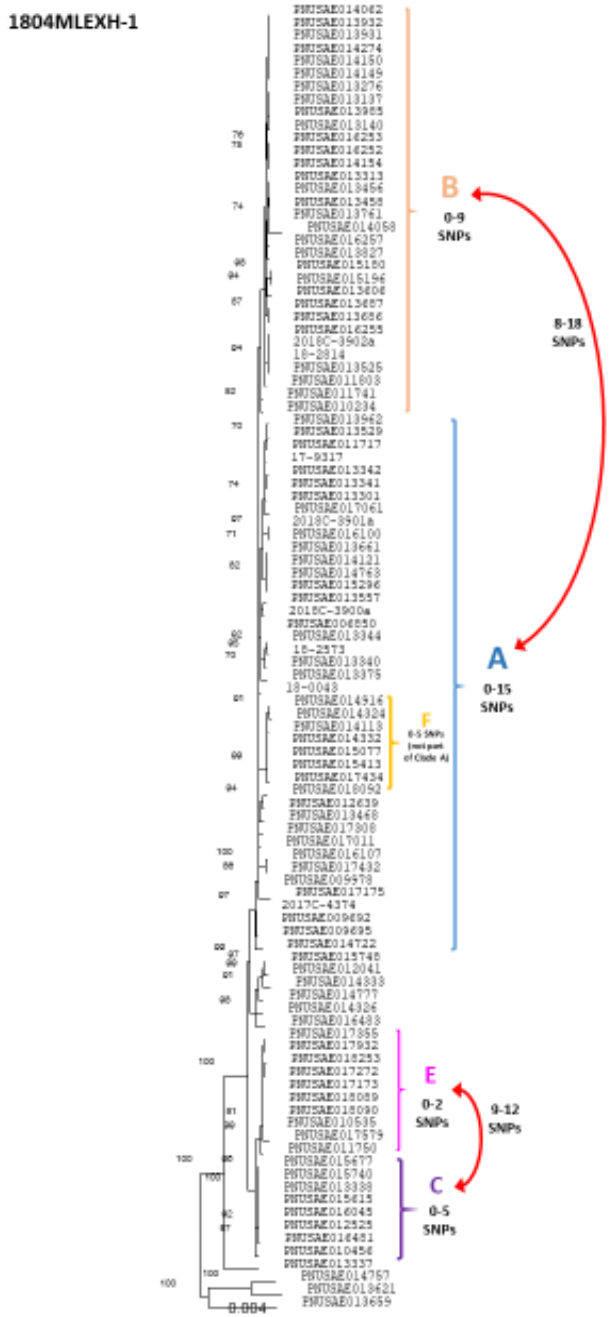
Epilogue

- **Outbreak declared over on June 28, 2018**
  - 21 day maximum shelf life for romaine
  - 2-4 week reporting delay in PulseNet
- **240 ill people from 37 states**
  - 46% hospitalized; 28 people developed HUS; 5 deaths



People infected with the outbreak strain of *E. coli* O157:H7, by illness onset date

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Outbreak Challenges

- **Challenges collecting epidemiologic data**
  - People who eat lettuce eat it often, and many have multiple exposures
  - Many people don’t remember what type of lettuce eaten
- **Challenges interpreting traceback data**
  - Romaine from multiple farms/ranches/lots comingled at processing
  - Common identifiers not always used to track through production/distribution
- **Challenges communicating clearly**
  - Labels on romaine lettuce do not typically list growing region
  - Sometimes conflicting advice from various outlets and agencies
  - Collateral damage to romaine producers outside of the Yuma growing region

Outbreak Conclusions

- **Largest multistate outbreak of *E. coli* O157:H7 infections in over a decade**

- **Providing clear messaging was challenging; however, we needed to provide rapid advice to the public**
  - Outbreak grew quickly and was severe

- **Moving forward, how might we do things differently if this happens again?**
  - **How can we use WGS going forward for this “clade of concern”?**

Acknowledgments

- State and local epi, lab, food safety, and agriculture partners
- FDA
- USDA
- CDC Waterborne Team
- CDC Enteric Lab
- CDC FORT