



# **Sproutbreak at Jimmy John's**

**Steve Dietrich**

**Michigan Department of Community Health  
Bureau of Laboratories**



---

# Objectives

- Describe outbreak of E. coli O26
- Explain how agencies in Michigan responded to this outbreak
- Describe lessons learned during the outbreak
- Describe the teamwork within and between agencies which allowed a rapid response



# Patients

- **Case count: 29 (11 MI)**
- **Number of states: 11**
- **Hospitalizations: 7 (24%): 6 in MI (55%)**
- **89% female**
- **Median age: 26**
- **No HUS**
- **No deaths**

---

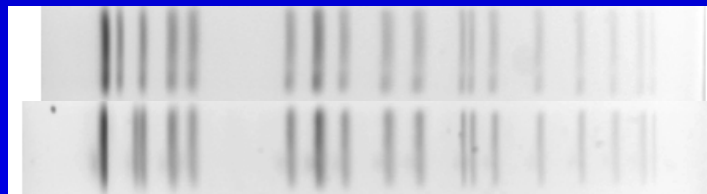
# Isolates

- **Stx 1**
- **Serotype O26, the most common serotype**
- **Cluster code 1201KSEVC-1**
- **PFGE patterns are rare: pattern combination twice before outbreak, Xbal 6 other times**
- **One MI isolate had variant pattern, patient had outbreak exposure**

# Pattern variant

PFGE-XbaI

PFGE-BlnI



CL12-167520

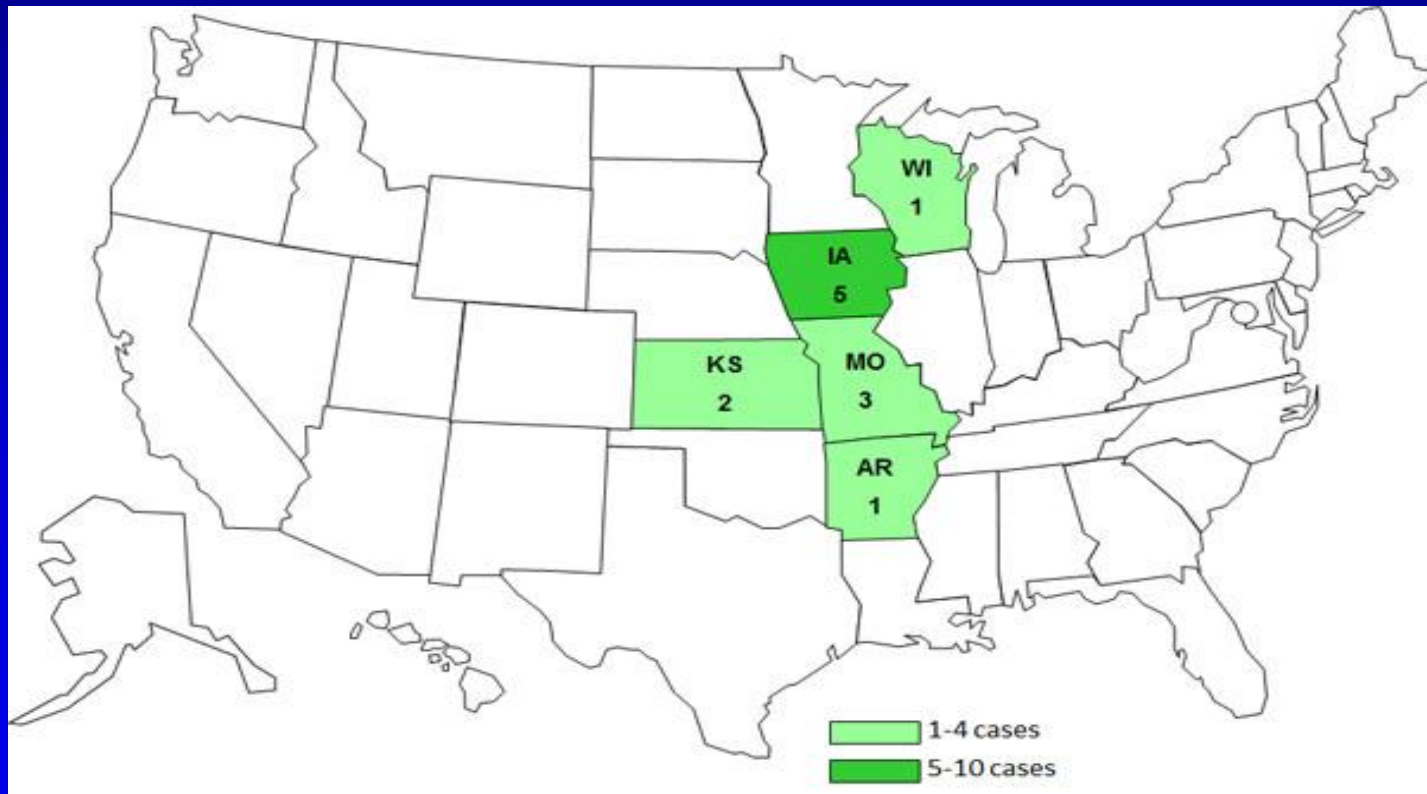
CL12-167523

---

# Epidemiology

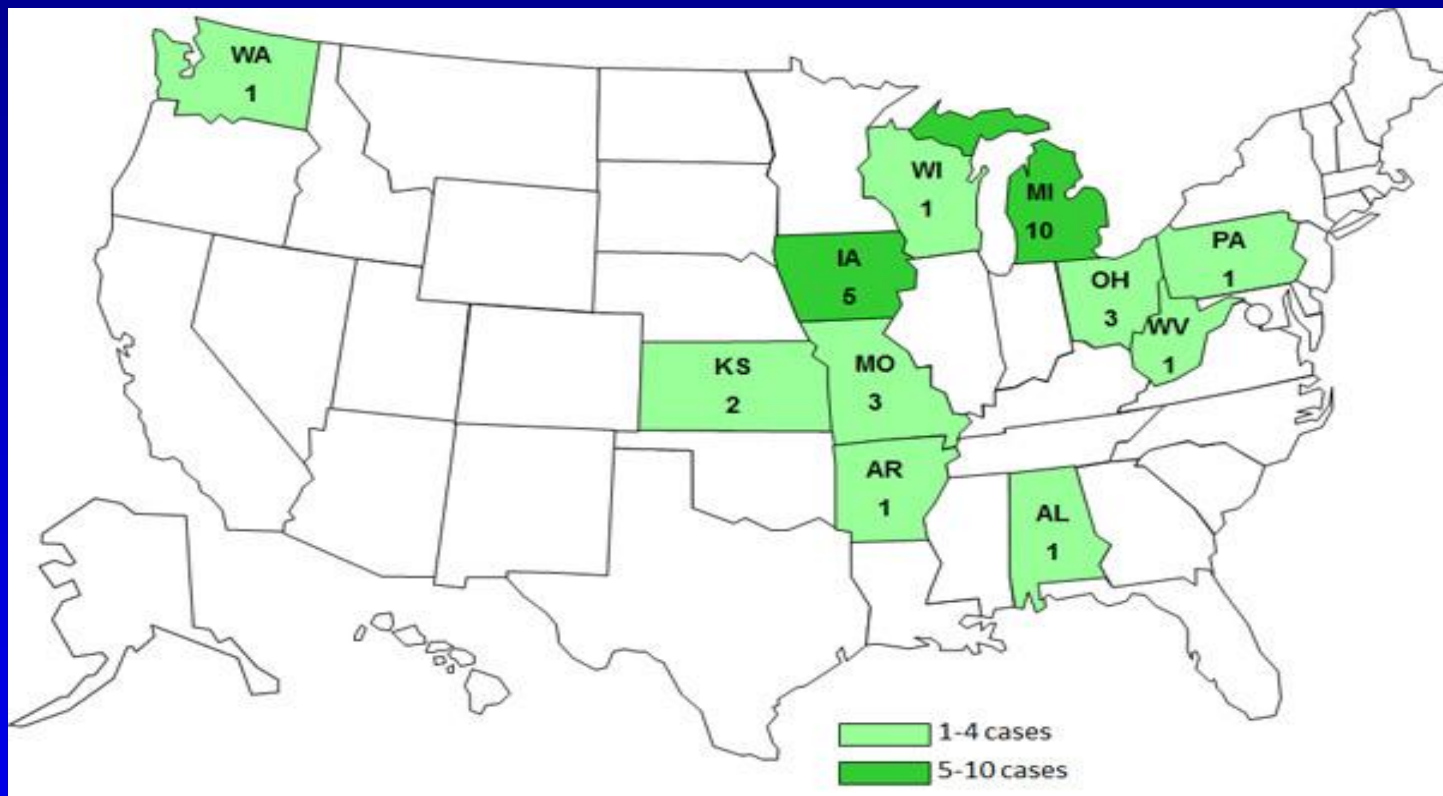
- **Onset dates: December 25-March 3**
- **MI onset dates: February 6-17**
- **5 states initially involved: No more cases after 1/15 onset**
- **6 more states later became involved**

# Initial cases: Onset 12/25-1/15



Source:  
CDC.gov

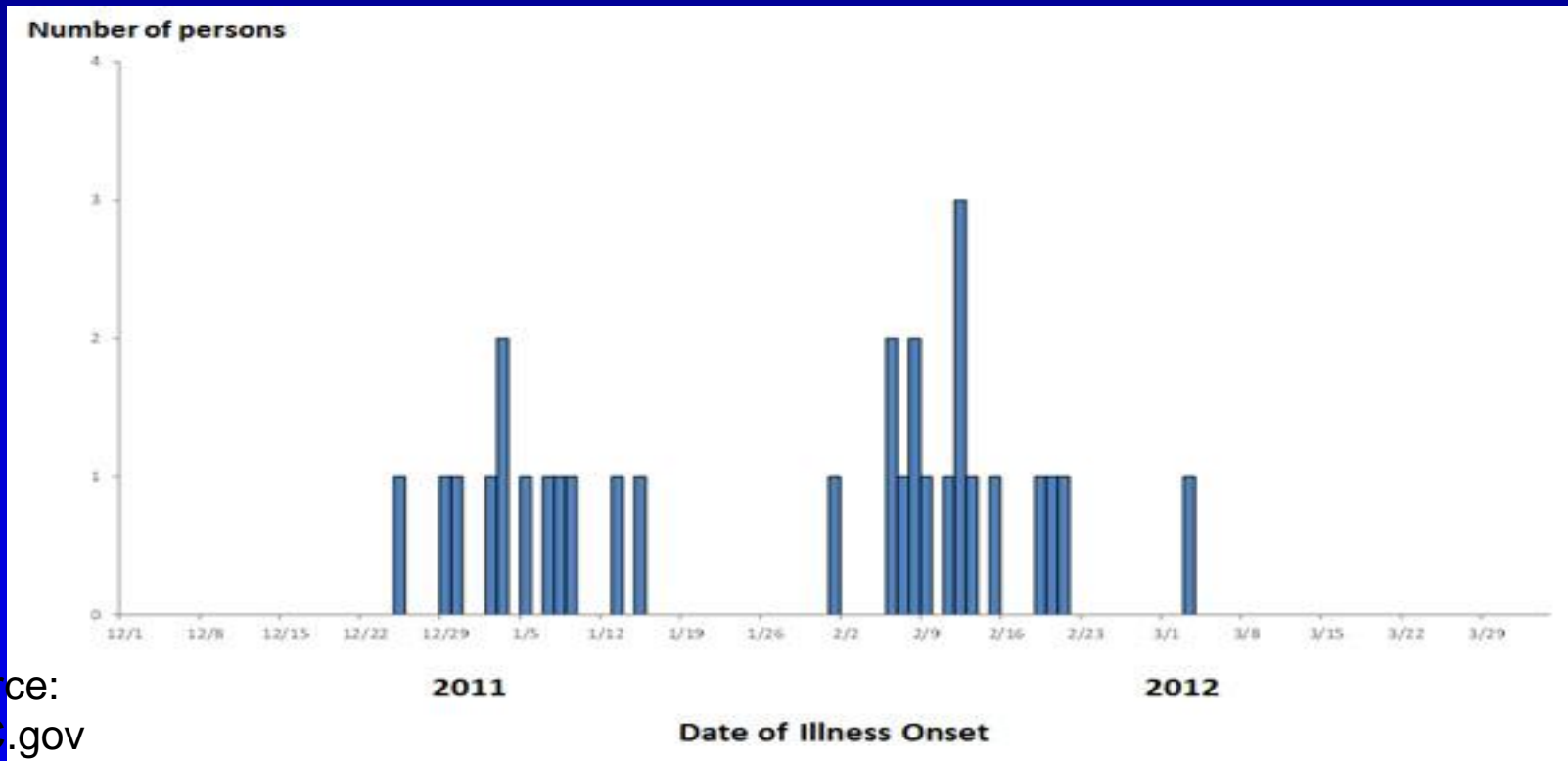
# Final cases: Onset 2/6-3/3



Source:  
CDC.gov



# Epi curve



Source:  
CDC.gov

# Investigation

- Investigation indicated source of outbreak to be raw clover sprouts served at Jimmy John's restaurants
- Many JJ restaurants involved



---

# Investigation

- **Seeds were contaminated, sprouts grown at two sprouting facilities**
- **Seeds were recalled on Feb. 10**
- **STEC was not recovered from seeds or sprouts**
- **Sprouts are no longer served at JJ: will “shoots” be served?**

## **Sproutbreaks:**

- **55 outbreaks in past 14 years\***
- **15,000 cases\***
- **Outbreaks caused by Salmonella, E. coli O157 and other serotypes, Listeria**

**\* Source: [Foodsafetynews.com](http://foodsafetynews.com)**

---

# Challenges

- **Detection of STEC**
  - Variable degree of testing in clinical labs
  - Do labs send all isolates/stools to PHL's?
  - Long and variable time to isolate STEC from stools in PHL
  - Real time PFGE?

# Challenges

- **Patient histories**
  - **Can be difficult to obtain, recall is imperfect**
  - **STEC are prioritized in MI**
  - **Local HD's are contacted to encourage timely interviews**

---

# Challenges

- **Sprout consumption can be difficult to detect:**
  - **patients might not knowingly consume sprouts**
  - **questionnaire targeting sprout consumption might be needed**

---

## Challenges

- **Contamination can occur in sprouts and seeds**
- **Sprouts are grown in conditions that are good for bacterial growth**
- **Sprouts are not typically cooked, washing seeds doesn't kill bacteria inside**
- **Seeds can be produced for agricultural use, not handled as for human consumption**





---

## Lessons\Opportunities

### Delayed involvement of MI and others:

- Might indicate incomplete recall of contaminated vehicle: Lack of awareness of/compliance with recall
- Might indicate other sources, seed lots, sprouters



---

## Lessons\Opportunities

- **MI has had similar delayed involvement in other outbreaks: 2009 S. Saintpaul sprout outbreak, 2012 E. coli O45 outbreak (no source found), 2012 O121 outbreak (no source found)**

---

## Lessons\Opportunities

- **Teamwork within lab**
  - **PFGE and E. coli/bacteriology testing staff not always the same**
  - **Don't let new isolates slip through the cracks: PFGE staff should talk often with E. coli testing staff to learn of new isolates, status of testing, when isolates will be available**



---

## Lessons\Opportunities

- **Communication can improve TAT, especially useful during known outbreaks**
- **TAT:**
  - **Isolation date-date received: 3 d, range 2-5 d**
  - **Date received-date received for PFGE: 8 d, range 5-21 d**



---

## Lessons\Opportunities

- **PFGE staff should stay on top of national events for rapid detection of outbreak related isolates:**
  - **Put posted bundles in local database for matching to new patterns**
  - **If new local cluster occurs, be sure to check with posted clusters**
  - **Each Pulsenut should be in the loop**



---

## Lessons\Opportunities

- **Teamwork between lab and epidemiology**
  - **Epis match case reports with isolate submissions to determine if isolates have not been submitted to PHL**
  - **Epis often notice if PFGE is incomplete on isolates or if they have not been submitted for PFGE**



---

# Lessons\Opportunities

- **Teamwork between lab and epidemiology**
  - **Spreadsheet is maintained on common drive with patient, isolate data and dates received for PFGE and PFGE rundate**
  - **Detect possible problems with testing: do patterns correlate with epidemiology?**



---

## Lessons\Opportunities

- **Teamwork between lab and epidemiology**
  - Lab should do real-time reporting to epi: notify of new STEC and PFGE results
  - Inform epi of matches to posted clusters





---

## Lessons\Opportunities

- **Teamwork with local health departments**
  - LHD's enters patient info into epi statewide database and conduct patient interviews
  - State PH informs LHD's of clusters and outbreaks, provide supplemental questionnaires



---

## Lessons\Opportunities

- **Teamwork with local health departments:**
  - PH epidemiologists sent sprout-specific questionnaire to LHD's, asked for 24 hour TAT
  - HAN alert sent about outbreak and implicated seed lot



---

## Lessons\Opportunities

- **Teamwork with local health departments**
  - **TAT: case report-initial interview: median 1 day (range 0-26 d)**
  - **TAT: case report-outbreak (sprout-specific) questionnaire: median 5 days (range 0-26 d)**



---

## Lessons\Opportunities

- **Teamwork with state Agriculture Department:**
  - **MI Agriculture Dept. has Rapid Response Team (RRT)**
  - **Ag epidemiologist shares time and office with PH epidemiology**



---

## Lessons\Opportunities

- **Teamwork with state Agriculture Department:**
  - Ag epidemiologists perform tracebacks
  - Knowledge of their needs helps PH design questionnaires to capture necessary information
  - Quarterly debriefing meetings with PH lab, epi, and agriculture epi



---

## Lessons\Opportunities

- **Teamwork with state Agriculture Department:**
  - PH epidemiologists asked Ag about presence of contaminated seed lot in MI
  - PH epi shared patient food histories with Ag for traceback
  - Joint PH/Ag press release

## Summary

- **PulseNet detected another important outbreak: Small number of cases temporally and geographically diverse were linked with PFGE**
- **Sprouts will no longer be served at Jimmy John's**

# Summary

## In Michigan:

- Good lab-lab interaction expedited PFGE
- Awareness of match to outbreak pattern allowed epidemiologists to immediately administer sprout-specific questionnaire
- Relationship with agriculture dept. facilitated traceback investigation



---

# Summary

## In Michigan:

- Lab-lab and lab-epi communication cleared up mistake in toxin testing
- Lab-epi communication clarified association of patient with variant pattern with outbreak source



---

# Acknowledgements

**Laboratory                      Epidemiology                      Agriculture Dept.**

**Ben Hutton**

**Katie Arends**

**John Tilden**

**Kathy Russell**

**Sally Bidol**

**Lisa Hainstock**

**Kelly Scott**

**Susan Bohm**

**James Rudrik**

**County health departments of Genesee, Kent,  
Macomb, Washtenaw, Oakland, and Wayne**