

# Modernizing Outbreak Detection Through Teamwork

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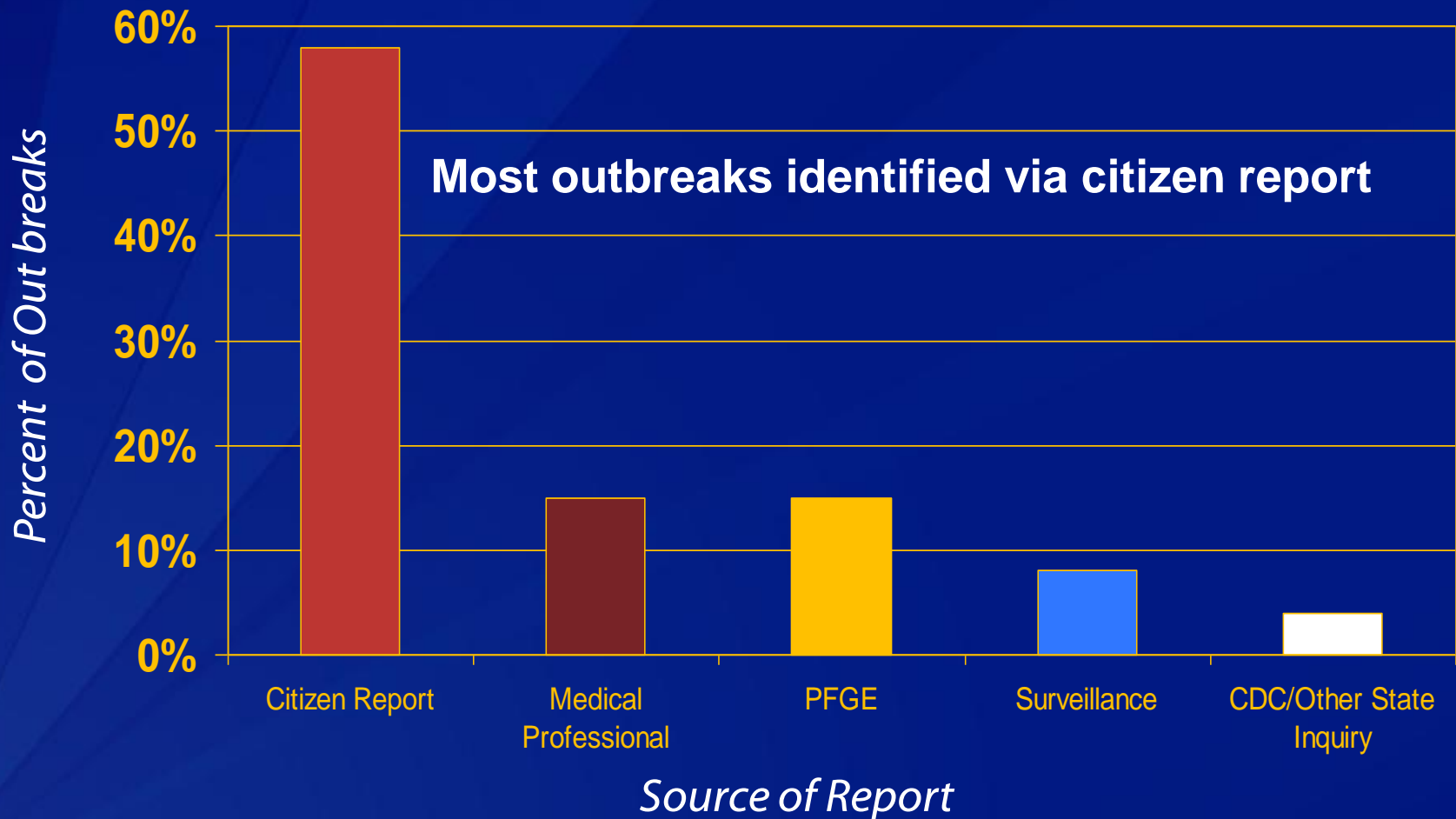
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*The findings and conclusions in this presentation are those of the presenters and do not necessarily represent the views of the Centers for Disease Control and Prevention*

National Center for Emerging and Zoonotic Infectious Diseases  
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# The State Perspective: Outbreaks by Reporting Source, Connecticut, 2004-2006



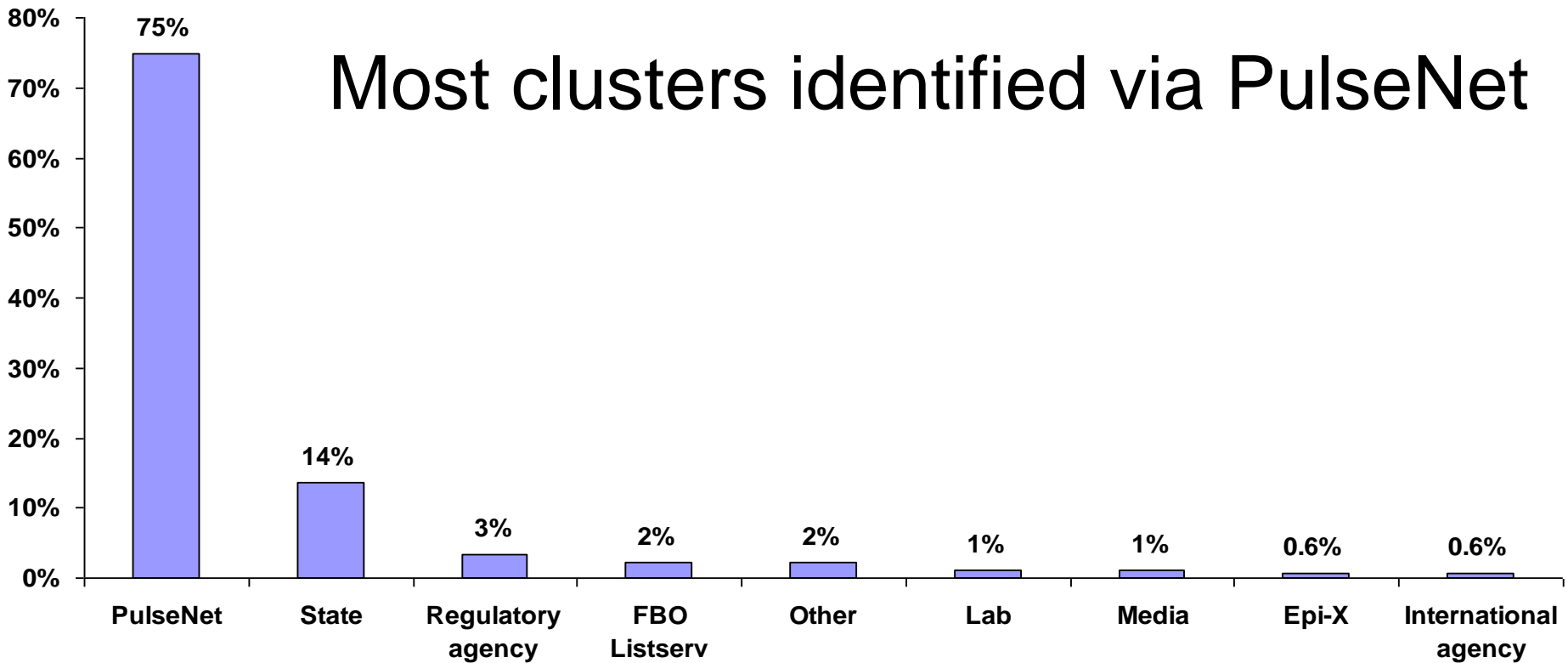
# Where do Outbreaks Occur?

- ❑ **Of 4,924 foodborne outbreaks in 2006-2010:**
  - ❑ **84 or ~2% were multistate ones**
  - ❑ **186 or ~4% were multicounty within a state**
  - ❑ **The rest or 94% were single county**
- ❑ **Conclusion: All public health is local**

# The CDC Perspective: Clusters by Reporting Source, 2008 (n=175)

Percent of Clusters

Most clusters identified via PulseNet

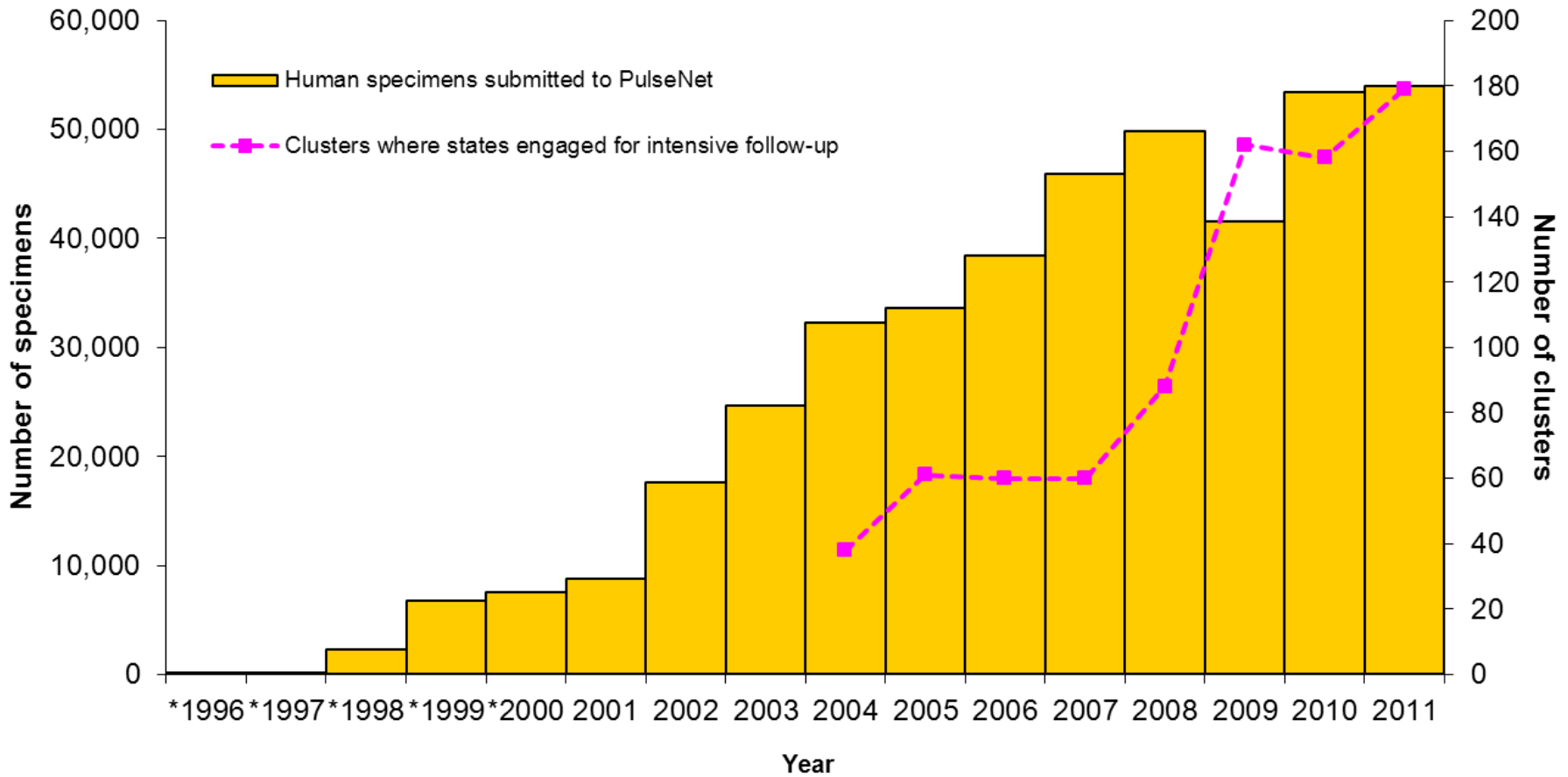


Source of Report

# Significance of Multistate Outbreaks

- ❑ While only ~2 % of 4,924 reported foodborne outbreaks in 2006–2010 were multistate, they contributed:
  - ❑ ~7% of outbreak illnesses
  - ❑ ~31% of outbreak hospitalizations
  - ❑ ~34% of outbreak deaths

# Human Specimen Isolates Uploaded to PulseNet USA and Identified Clusters, 1996-2011<sup>†</sup>



<sup>†</sup> Data are preliminary and subject to change

\* data type information may not be complete for these years

# 15 New Food Vehicles Identified in US Multistate Outbreaks since 2006

- *bagged spinach*
- *carrot juice*
- *peanut butter*
- *broccoli powder on a snack food*
- *dog food*
- *pot pies/frozen meals*
- *canned chili sauce*
- *hot peppers*
- *pepper*
- *raw cookie dough*
- *hazelnuts*
- *whole fresh papayas*
- *pine nuts*
- *kosher broiled chicken livers*
- *scraped tuna product*



Data Sources: Foodborne Disease Outbreak Surveillance System, CDC Web postings

# **Impact of Multistate Outbreaks**

- ❑ Often reveal important gaps in food safety systems**
- ❑ Major implications for food safety policy in government and industry**
- ❑ Many require national-level response**
- ❑ Conclusion- Public health is local, national and international**



# **Types of Evidence for Hypothesis Generation and Testing**

## **Exposure Information**

### **❑ Case exposure data**

- **Interviews (structured and open ended)**
- **Loyalty card, credit card and receipt data**
- **Restaurant recipe data**

### **❑ Comparison data**

- **Historical survey (FoodNet Population Survey)**
- **Historical case data (Case-Case Study)**
- **Concurrent control data (Case-Control and Cohort Study)**

### **❑ Environmental Assessment**

- **Cross-contamination**
- **Pathogen proliferation**
- **Ill food handler**

# **Types of Evidence for Hypothesis Generation and Testing**

## **Product Distribution Information**

- ❑ **Common items among places of exposure**
  - **Brands and lots among associated food service facilities**
  - **Market share**
  
- ❑ **Trace back and trace forward**
  - **Source convergence for suspect item**
  - **Distribution to case locations**
  
- ❑ **Industry food distribution information**
  - **Distribution patterns matching time and location of cases**

# **Types of Evidence for Hypothesis Generation and Testing**

## **Microbiologic Information**

- ❑ **Targeted food testing**
  - **Case refrigerators**
  - **Specific lots, times of production**
  - **Retained samples**
- ❑ **Targeted environmental testing**
  - **Food contact surfaces**
  - **Built structures (floors, drains, etc)**
  - **Water**
- ❑ **Pathogen characterization**
  - **Virulence factors**
  - **Antimicrobial resistance**

# **Team Work in Outbreak Detection and Investigation**

- ❑ Need to find opportunities to pursue each type of evidence**
  - ❑ To be collected concurrently if possible, for the fastest results**
  - ❑ To bring at least two types of evidence to bear in the implication of a food vehicle**
- Which**
- ❑ Requires close team work and communication**

**All levels- Across Disciplines -Across Departments**

## **Modernizing Methods**

- ❑ Explore DNA sequence technology**
- ❑ Determine data standards**
- ❑ Identify new data sources**
- ❑ Develop tools to better manage and share data**
- ❑ Implement performance measurement**



**Get to know your colleagues  
Learn from them  
Have fun!**

*Thank you*

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