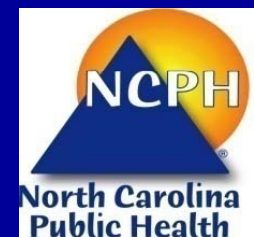


Better Investigations Better Outcomes

David Sweat, MPH
Lead Foodborne Disease Epidemiologist
North Carolina Division of Public Health

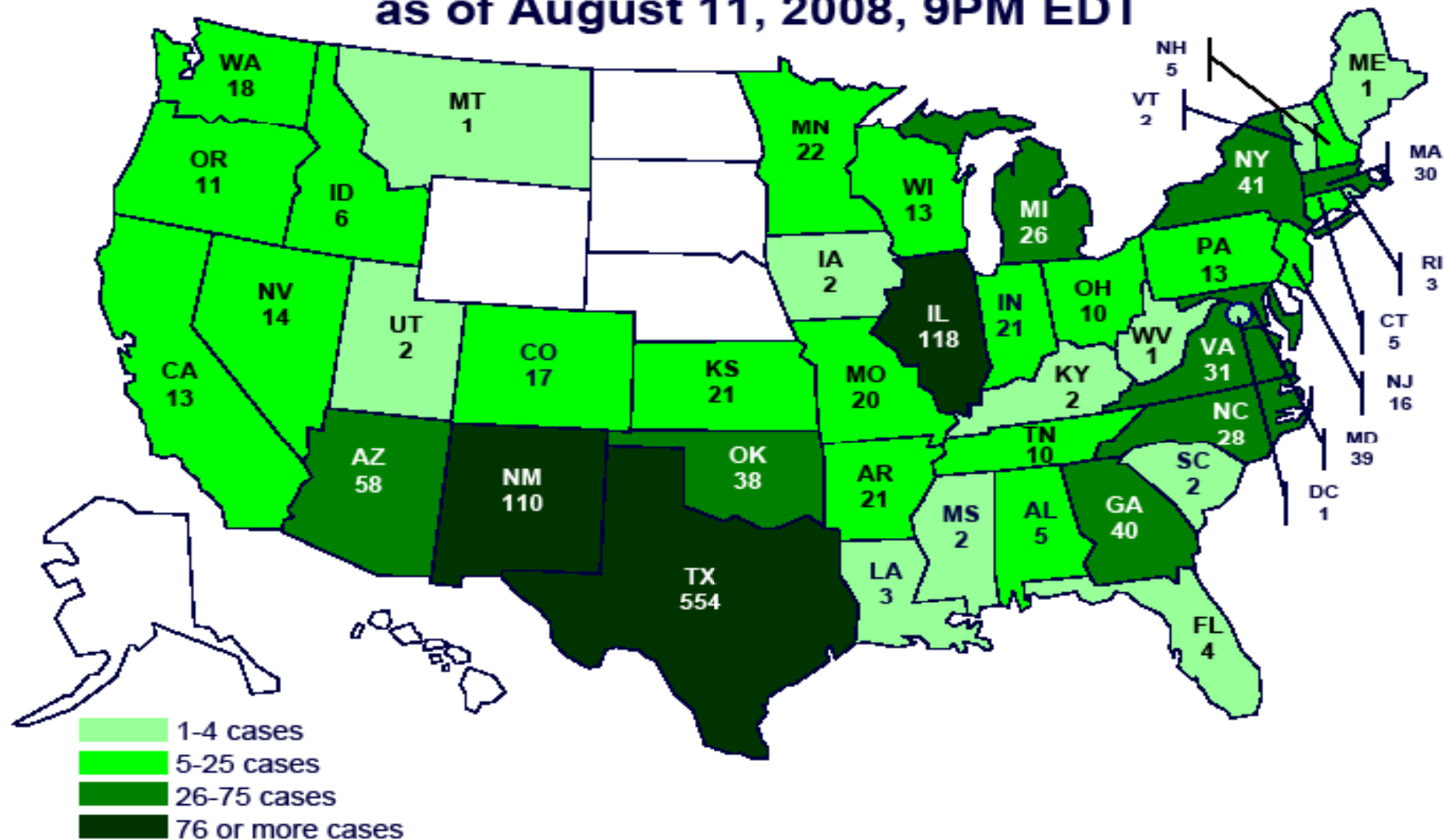


Estimated Foodborne Illness Statistics – Revised and Updated

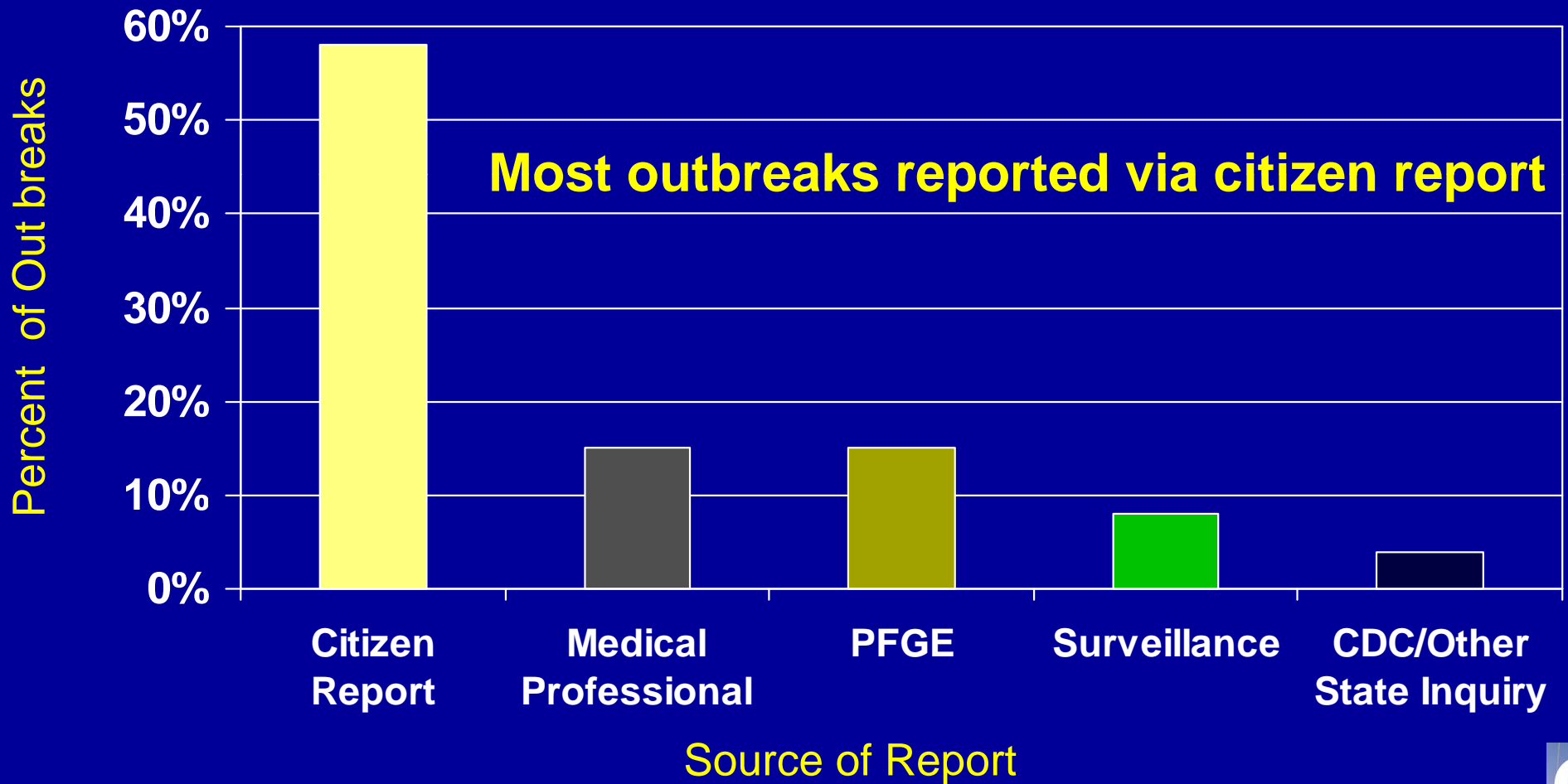
- 47.8 million cases
- 127,839 hospitalizations
- 3,037 deaths

Morris JG Jr. How safe is our food? *Emerg Infect Dis* [serial on the Internet]. 2011 Jan [Jan. 12 2011]. <http://www.cdc.gov/EID/content/17/1/126.htm>

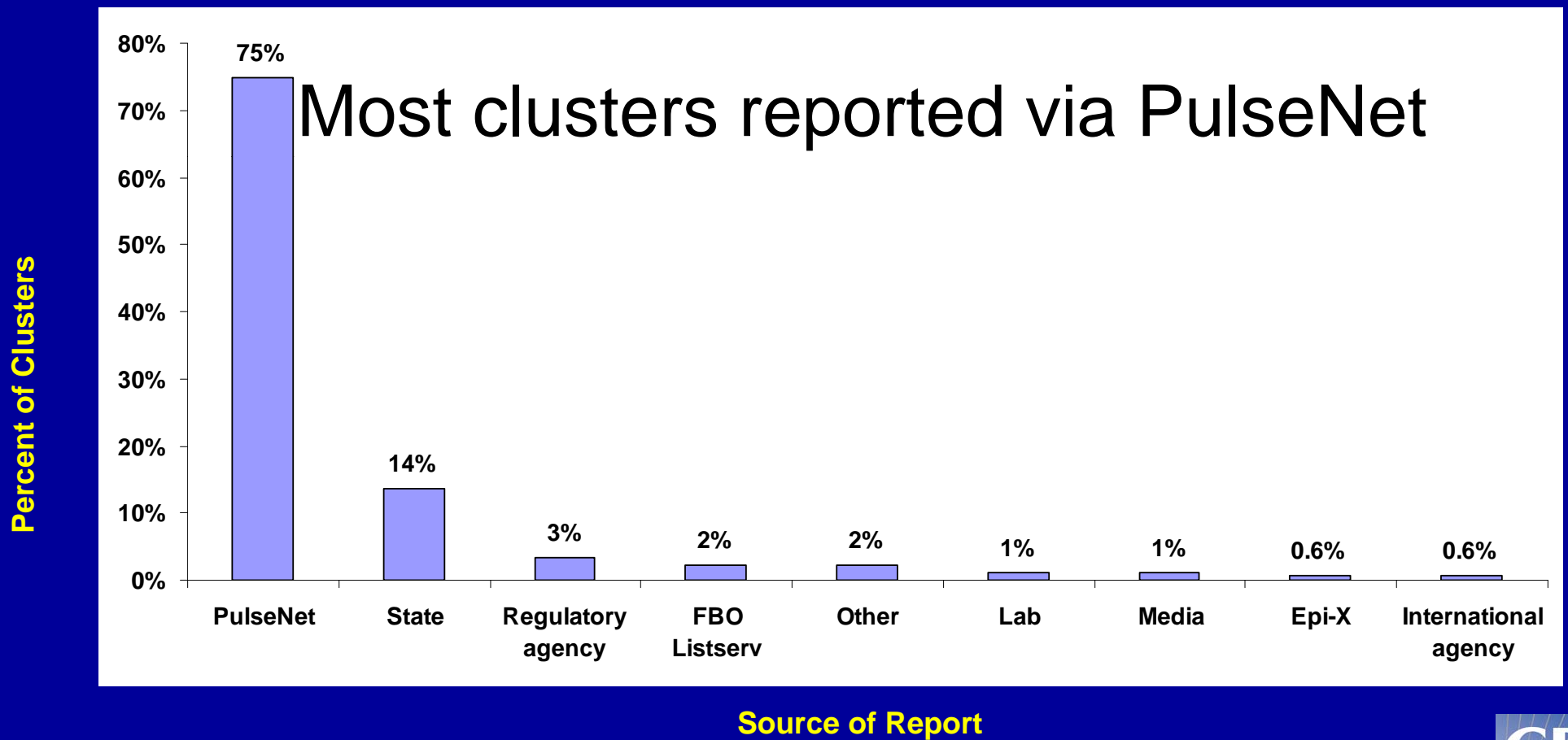
Cases infected with the outbreak strain of *Salmonella* Saintpaul, United States, by state, as of August 11, 2008, 9PM EDT



The State Perspective: Foodborne Disease Outbreaks by Reporting Source, Connecticut, 2004-2006



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



PulseNet



Flow of PulseNet Multistate Cluster Investigations

Submission of PFGE patterns by state to CDC PulseNet



Cluster identification by CDC PulseNet



CDC PulseNet Epi Liaison



Epi Investigation



Food Vehicle Identified



Regulatory Activity

Analytic Epidemiology is the Testing of Hypotheses

- Axiomatic that:
 - If do not have the right hypothesis, then will not get the right answer
 - If do not have an hypothesis at all, just doing a blind study is fraught with failure
 - Major issue for enteric pathogens transmitted through food, as the number of possible vehicles and the number of control points is enormous

Hypothesis-Generating Interviews

- Typically need 10 to 20 completed interviews
- Strategies include
 - Interviews with structured questionnaire with many food items on it: “trolling, trawling, or shotgun”
 - Intensive open-ended interviews about everything that went into patient’s mouth in the last 5 days
 - In-depth interview with people in their homes, including refrigerator, pantry
 - Some combination of the two
 - Best if all done the same way
- Process may need to be iterative

Challenges to Conducting Initial Multistate Hypothesis-Generating Interviews

- **Many states do not routinely interview cases**
 - Some only do a brief interview
- **No standard national initial hypothesis-generating interview form or data collection system**
 - New questionnaire is developed for each new multistate cluster investigation
- **Interviews often conducted by a variety of people in a variety of states**
 - Limited ability to build hypotheses using the method of sequential, iterative interviews of patients

Core Elements Project - 2009

- Define a standard “core” set of data elements to be used for hypothesis generation during multistate foodborne disease outbreak investigations
 - Not meant to replace questionnaires currently in use by state/local health departments for interview of cases
 - Define the minimum set of information to be collected
 - Allow “pooling” of data from multiple states

Guiding Design Principles

- To be used when a multistate cluster of *salmonella* or STEC infections is identified
- Serves to ensure the same questions are ascertained among all cases across many states
- Meant to identify exposures that are “common” causes of outbreaks (i.e. horses not zebras)
- Designed to be used over the phone by multiple interviewers with minimal training

A Brave Attempt

- Summer 2009: Initial working group involving CDC, OR (Bill Keene) and MN (Kirk Smith)
 - Reviewed existing questionnaires from a number of states
 - Developed spreadsheet defining core elements
- Sept 2009 (5th OBNet Meeting): Reviewed initial elements and received comments
- Fall '09/Winter '10: CDC working group
 - Refined spreadsheet defining core elements
 - Developed draft questionnaire containing just core elements
 - Draft interviewer instructions
 - Explored options for multiuser web based data entry

Proposed Core Sections and Elements

Sections

	<u>Questions</u>	<u>SubQuestions</u>
•Interviewer information (6 questions)	8	
•Demographics (7 questions)	7	
•Clinical Information (5 questions, 2 subquestions)	5	2
•Travel (1 questions, 2 subquestions)	1	2
•Food allergies, special diet, vitamins, and supplements (6 questions, 3 subquestions)	6	3
•Sources of food at home (1 question)	1	
•Sources of food outside the home (1 question)	1	
•Meat and Poultry (26 questions, 26 subquestions)	26	26
•Fish and Seafood (9 questions, 1 subquestion)	9	1
•Eggs & Dairy/Cheese (20 questions, 14 subquestions)	20	14
•Fresh fruits (35 questions, 6 subquestions)	35	6
•Fresh vegetables (29 questions, 30 subquestions)	29	30
•Frozen Foods (10 questions, 1 subquestion)	10	1
•Nuts, cereals, processed & dried foods (27 questions, 9 subquestions)	27	9
•Open Comments/Misc.	1	
•Animal contact & pets (20 questions, 1 subquestion)	20	1

total main questions = 206, total subquestions = 95, both = 301

The Team Approach

- ❑ One national network of epidemiologists and other public health officials who investigate outbreaks of foodborne, waterborne, and other enteric illnesses in the United States
- ❑ Collaboration between CDC and
 - State and local health departments, USDA, FDA
- ❑ Close partnership with PulseNet
- ❑ Helps ensure
 - Rapid, coordinated detection & response to multi-state enteric disease outbreaks
 - Promotes comprehensive outbreak surveillance

Gaps in Multistate Outbreak Investigation Methods

- ❑ Limited resources for health departments to conduct interviews
- ❑ Individual illnesses may appear “sporadic”
 - Patients not routinely interviewed
- ❑ Cluster and outbreak illnesses
 - Delays in
 - Patient interviews due to other priorities
 - Re-interviews to collect product information
 - Questionnaires often not standardized
 - Not all states enter questionnaire information to standard database
 - No electronic transmission of exposure information to CDC

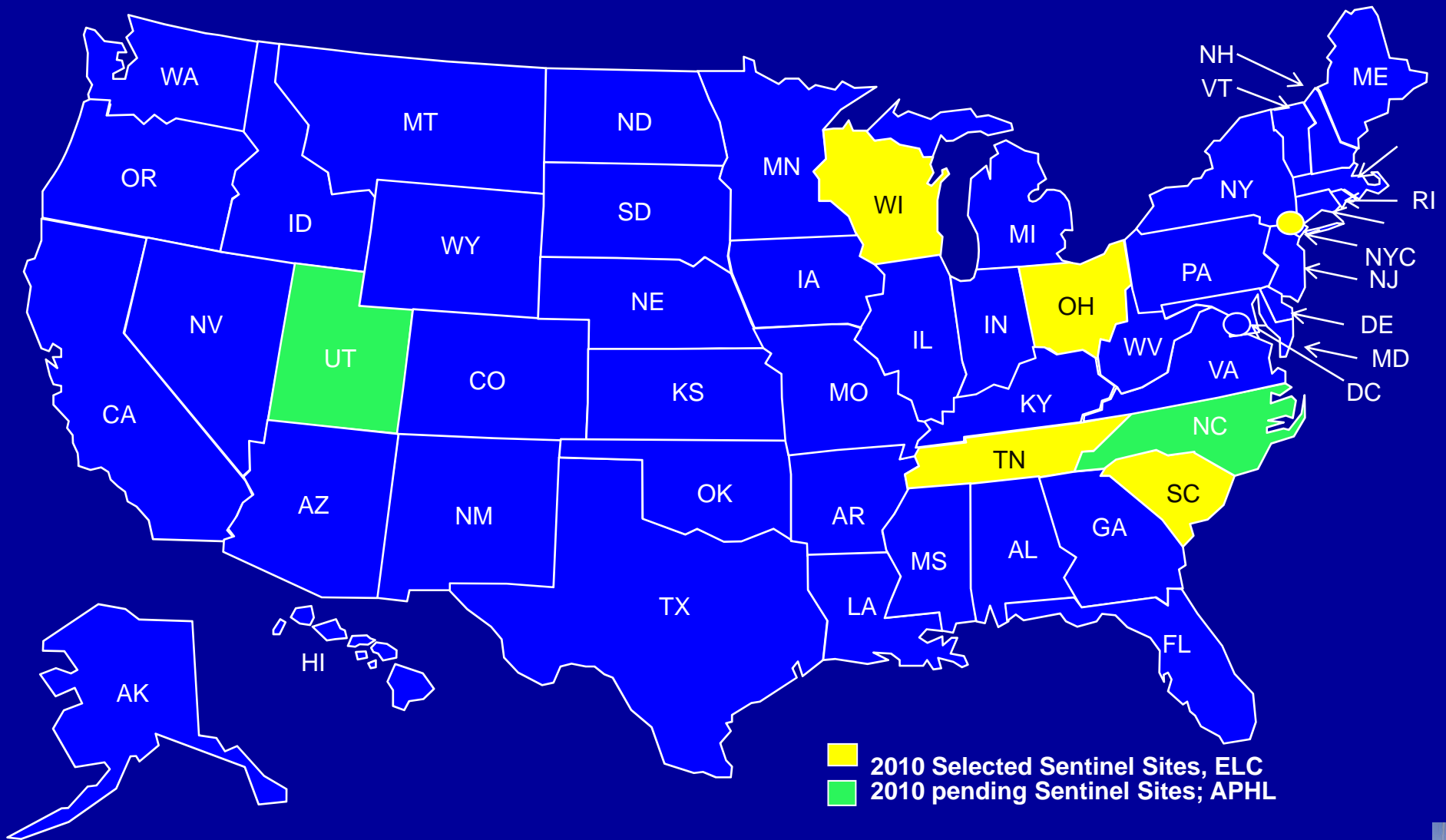
Contrast with PulseNet, in which lab information on every isolate is stored in a standard database at States, is rapidly transmitted to a national database at CDC, and summary information is available to all participants

Sentinel Site Vision

- A national foodborne investigation network
 - Facilitate collection of exposure data to more rapidly develop hypotheses and implicate vehicles
 - Facilitate collection of specific product information (e.g., lot numbers) for traceback investigations
 - More rapidly collate and analyze epidemiologic and product information from multiple states
 - Routinely join epidemiologic and PulseNet data
 - Improve the quality and speed of product data provided to regulatory agencies for traceback
 - Share information in real time with regulatory agencies

Decrease time to identify how and where contamination occurred

FoodCORE Sites



■ 2010 Selected Sentinel Sites, ELC
■ 2010 pending Sentinel Sites; APHL

3 Core Areas

- ❑ Enhancement of public health laboratory surveillance
- ❑ Epidemiological interviews and investigations
- ❑ Environmental health assessments

1. Enhanced Laboratory Surveillance

- ❑ Ensure routine transport from clinical lab to PH lab
- ❑ Real-time serotyping/PFGE - within 4 days of receipt
- ❑ Link via PulseNet
- ❑ If uncertain diagnosis, transport to PH lab
- ❑ Transport Shiga toxin positive broths
- ❑ Link PulseNet data with epidemiology offices – facilitate interview process
- ❑ Real-time DPDx and Calicivirus testing
- ❑ Serologic samples during Hepatitis A investigation

2. Interviews and Investigations

- ❑ Centralized, rapid interviews prior to subtype of all diagnosed *Salmonella*, STEC, *Listeria* cases
 - Collect demographic, clinical, risk factor, et c
 - Use standard form
- ❑ With CDC and other grantees, develop/implement standard core questionnaire
- ❑ Real-time review of subtyping results; evaluate cluster-associated cases together
- ❑ Conduct investigations when cluster/local outbreak detected

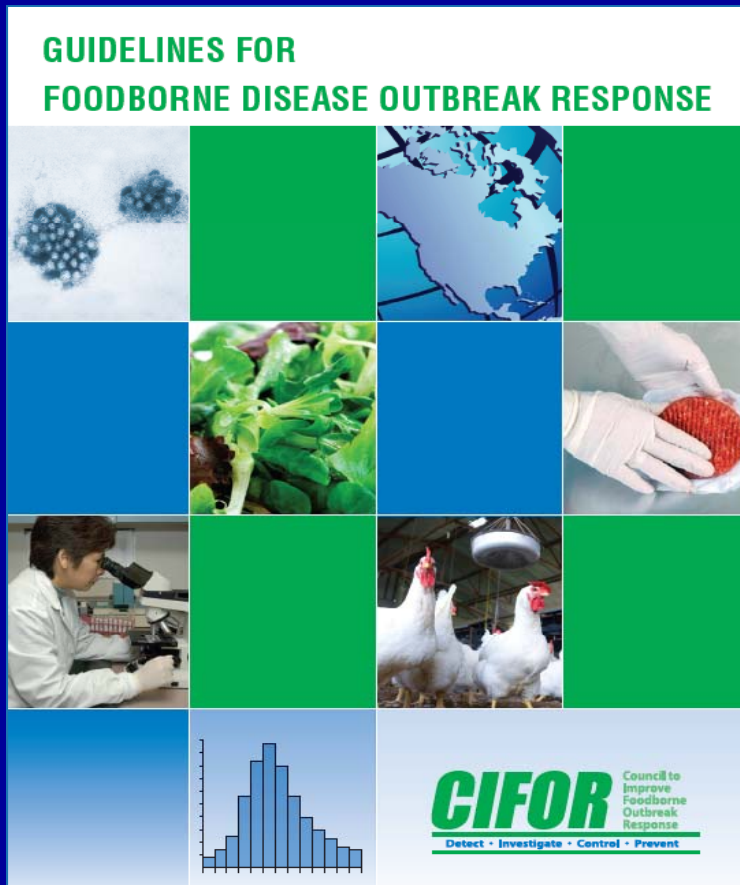
2. Interviews and Investigations

- ❑ Participate in analytic studies during multistate investigations
- ❑ Obtain product information when PFGE match to outbreak strain
- ❑ Complete NORS and supplemental NORS forms
- ❑ Participate in local HD training
- ❑ Develop measurable indicators in concert with CDC and other grantees

3. Environmental Health

- ❑ Local environmental assessments
- ❑ Gather information to trace food sources
- ❑ Obtain implicated/suspect products & lot information
 - Primarily for interstate products
- ❑ Provide training to local specialists

CIFOR Guidelines



Metrics

- ❑ Developed in conjunction with pilot sites
- ❑ Based on CIFOR guidelines
- ❑ Lab and epi criteria
- ❑ Evaluate critical points
- ❑ Develop new metrics
 - Based on original set
- ❑ Working with sites to develop new set of metrics

OutbreakNet Sentinel Site Project Performance Metrics	
Metric	
No. isolates submitted to PHL	
median days from isolation to receipt	
% of isolates with serotype complete	
median days from receipt to serotype complete	
% of isolates with PFGE complete	
median days from receipt to PFGE complete	
No. cases reported to epidemiology staff	
% of interviews completed	
% of interviews completed by students	
No. hours logged by students (total)	
Student-hours to complete case interview	
median days from notification to completed interview	
% of interviews with complete demographic data	
% of interviews with food history obtained	
No. clusters* identified	
% of clusters investigated	
% of clusters with epidemiologic study (controls enrolled, etc.)	
% where environmental or food samples were collected	
% of clusters with SUSPECT vehicle/source identified	
% of clusters with CONFIRMED vehicle/source identified	
% of investigations resulting in PHA (announcement, recall, etc.)	

Engaging Other Partners/Programs*

- FDA Rapid Response Teams (RRT)
 - Develop and implement integrated all-hazards food response capability; strengthen state food program infrastructure using national standards
 - \$500,000 award each year for 3 years; 9 pilot RRTs
- FoodNet
 - Determine and attribute the burden of foodborne illness in US
 - Monitor trends of specific foodborne illness over time
 - Improve public health practice, develop interventions
- CDC EHS-Net
 - Research environmental factors associated with food- and waterborne safety/illness
 - Translate research to develop, implement and evaluate the project impact
- Others; State and local

Overlapping Sites

OSS Site	FDA-RRT	FoodNet	EHS-Net
Ohio			
New York City			X
North Carolina	X		
South Carolina			
Tennessee		X	X
Utah			
Wisconsin			

Future Growth

- ❑ Funding dependent
- ❑ Maybe integrate with existing programs such as FoodNet to leverage existing resources
- ❑ Propose to increase to 15 sites by 2012
- ❑ Eventually nationwide

Acknowledgments

- FSIS
- APHL
- Pilot sites
 - WI, NYC, UT
- CDC
 - Ian Williams, Gwen Ewald, Jennifer Wright and Ali Dennard
- New Sites
 - OH, TN, SC, NC

Thank you

For more information, please contact the CDC Outbreak Response and Prevention Branch

1600 Clifton Road NE, MS-A38, Atlanta, Georgia 30333, USA

Web: <http://www.cdc.gov/outbreaknet/>

Email: OutbreakResponse@cdc.gov

Tel. 404.639.2214 / Fax. 404.639.3535

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.