

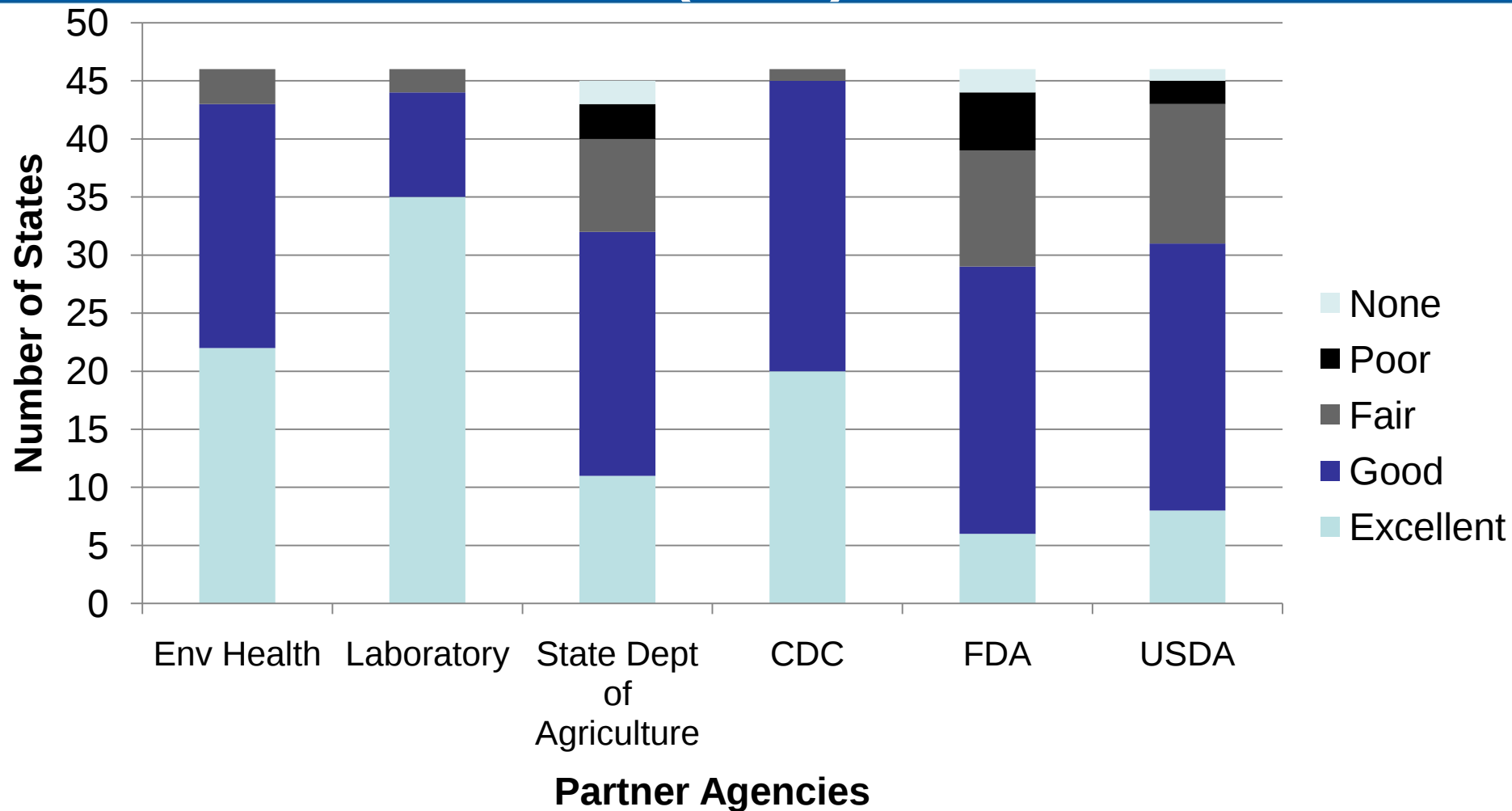
Council of State & Territorial Epidemiologists
Portland, Oregon
June 6-10, 2010

Foodborne Diseases: Better Prevention through Partnership

RADM Ali S. Khan, MD MPH
Assistant Surgeon General, USPHS
Deputy Director, National Center for Emerging
and Zoonotic Infectious Diseases



Level of Interaction Between State Agency and Partners During Foodborne/enteric Investigations (n=46)



CSTE 2010 Food Safety

Epidemiology Capacity Assessment. Courtesy of Bela Matyas, 8Jun2010.



Outline: Hindsight is 2020

- ❑ Making Strides Towards Better Surveillance and Investigation
- ❑ What Have We Learned?
- ❑ Challenges
- ❑ The Way Forward



Making Strides Towards Better Surveillance and Investigation: Since 1996...

- ❑ CDC Capacity ↑: FoodNet, HAV sentinel counties, National Outbreak Response System (NORS)
- ❑ State Epi Capacity ↑
- ❑ State Lab Capacity ↑: PulseNet, CalciNet, DPDx, *Salmonella* serotyping



Making Strides...

Example: PulseNet

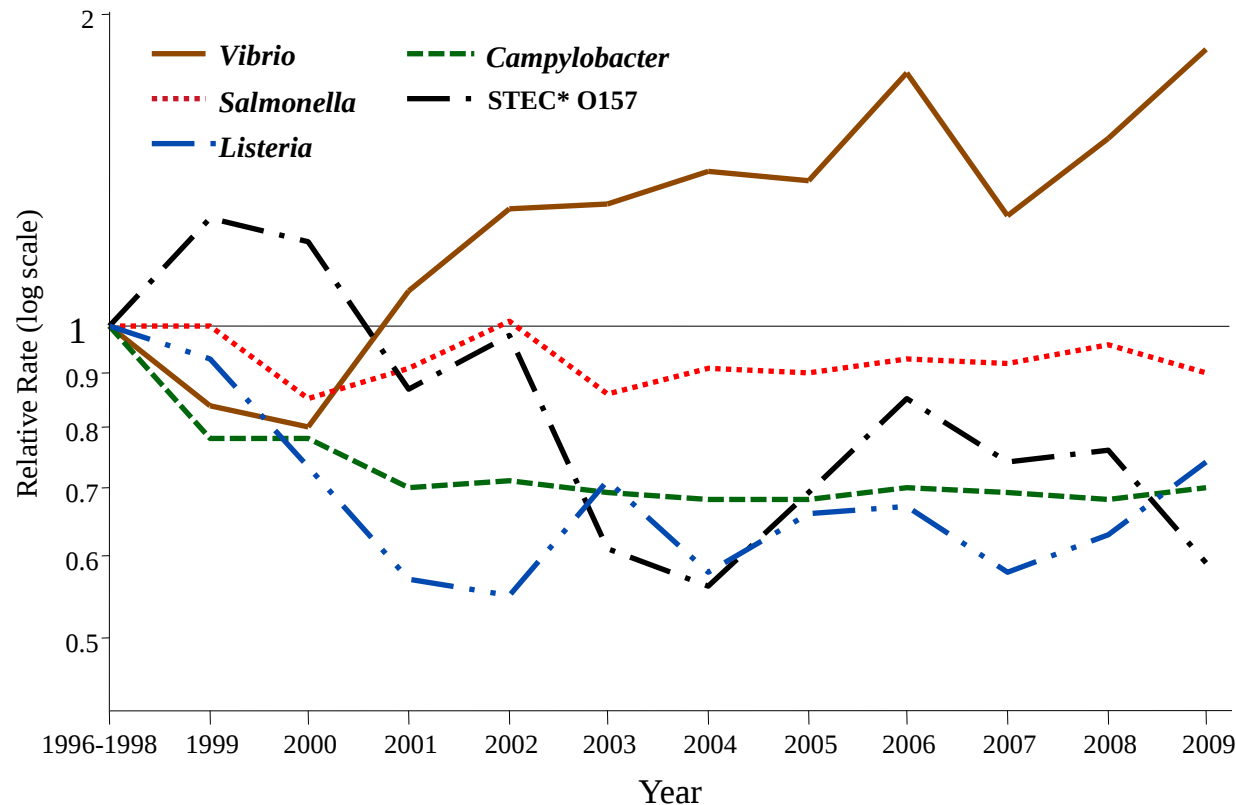
A routine part of surveillance for select pathogens

- ❑ 1996: Implemented in 1 state; 67% increase in number of detected *E. coli* O157 outbreaks
- ❑ 2001: Implemented in all states
- ❑ Cost-effective: Cost in 1 state covered by preventing 5 *E. coli* O157 infections
- ❑ 60,000 uploads per year
- ❑ Last year PulseNet identified:
 - 281 clusters at local/state level
 - 248 multi-state clusters



Trends in Foodborne Diseases, FoodNet, 1996-2009

FIGURE. Relative rates of laboratory-confirmed infections with *Campylobacter*, STEC* O157, *Listeria*, *Salmonella*, and *Vibrio* compared with 1996-1998 rates, by year – Foodborne Diseases Active Surveillance Network (FoodNet), United States, 1996-2009†



Since 1996-1998

Significant decrease

- *E. coli* O157* -41%
- *Campylobacter* -30%
- *Listeria* -36%
- *Salmonella* -10%

*Met Healthy People 2010 target for *E. coli* O157 (1.0 case/100,000 persons)

Since 2006

Limited progress

* Shiga toxin-producing *Escherichia coli*.

† The position of each line indicates the relative change in the incidence of that pathogen compared with 1996-1998. The actual incidences of these infections cannot be determined from this graph. Data for 2009 are preliminary.



What Have We Learned?

- ❑ **Better surveillance and investigation can identify gaps in national food safety system**
- ❑ **Investigations can lead to**
 - Immediate control, halting an outbreak
 - Long-term prevention by changing the system
- ❑ **Synergy with regulatory agencies and other partners**
 - Depend on public health authorities for information to guide action
- ❑ **Local, state, and national events are interconnected**
 - An event in 1 location can have state and/or national implications
 - Local and state capacity is critical
 - Public health networks, like PulseNet, empower the whole system

What Have We Learned?

- ✓ **Better surveillance and investigation can identify more gaps**
- ✓ **Investigations can lead to**
 - Immediate control, halting an outbreak
 - Long-term prevention by changing the system
- **Local, state, and national events are interconnected**
 - An event in 1 location can have state and/or national implications
 - Local and state capacity is critical
 - Public health networks, like PulseNet, empower the whole system
- **Critical synergy with regulatory agencies and other partners**
 - Depend on public health authorities for information to guide action



Challenge: A Broad Range of Foods Can Be Contaminated

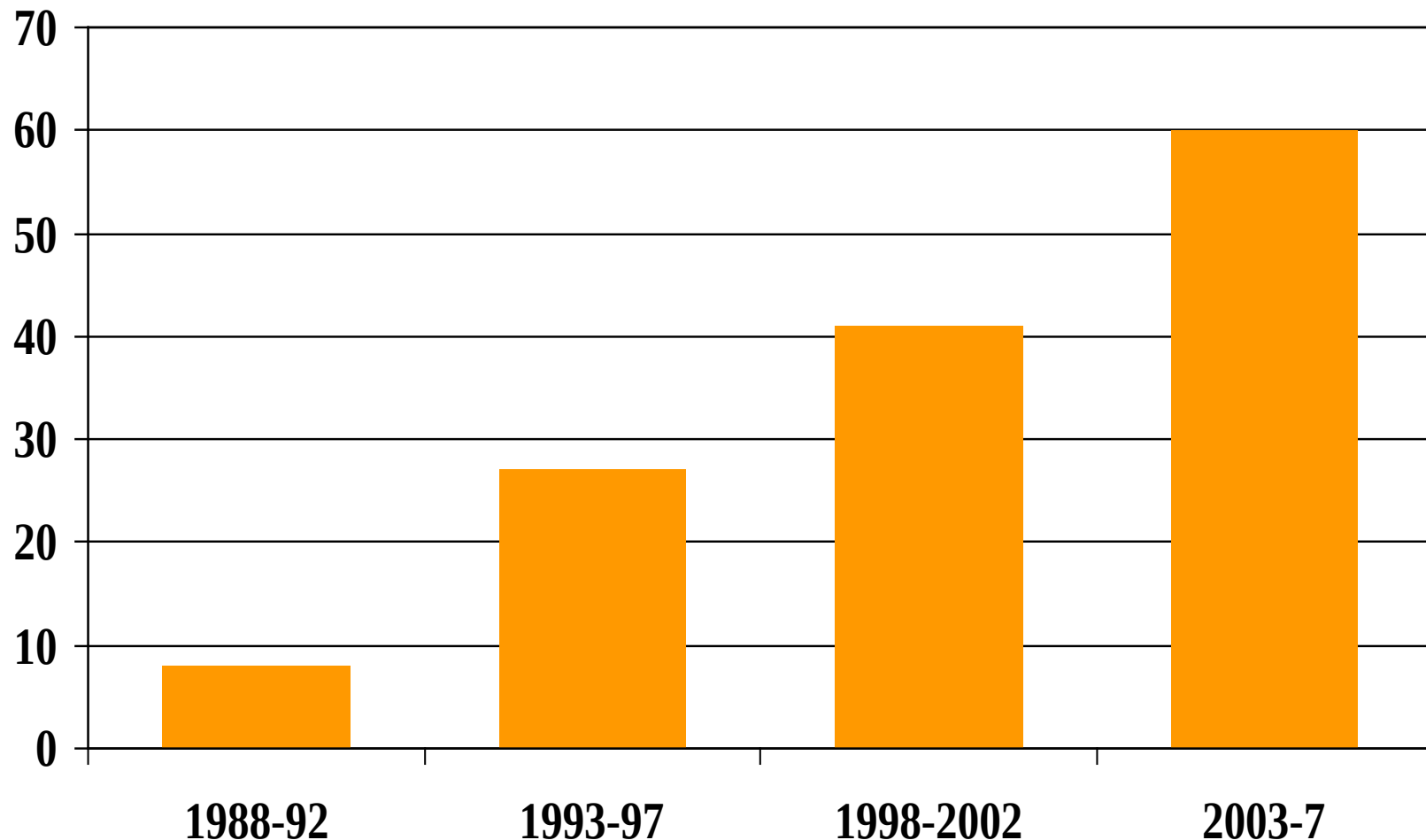
12 new food vehicles identified in multistate outbreaks since 2006

- ☐ Bagged spinach
- ☐ Carrot juice
- ☐ Peanut butter
- ☐ Broccoli powder on a snack food
- ☐ Dog food
- ☐ Pot pies
- ☐ Canned chili sauce
- ☐ Hot peppers
- ☐ White Pepper
- ☐ Raw cookie dough
- ☐ Puffed breakfast cereal
- ☐ Cracked red and black pepper on salami



Challenge: Multi-state Outbreaks are Being Detected More Frequently

Multi-state foodborne outbreaks 1988-2007



Source: Preliminary 2009 NORS



Challenge: Cost of Outbreaks

- ❑ **Aug-Sept. 2006—*E. coli* O157:H7 in bagged spinach**
 - 199 ill in 26 states
 - Three deaths
 - \$200 million in damages
- ❑ **Feb. 2007—*Salmonella* in Peter Pan peanut butter**
 - 425 ill in 25 states,
 - \$50-60 million in recall costs
- ❑ **Summer 2008—*Salmonella* Saintpaul in imported jalapeño and serrano peppers (and initially tomatoes)**
 - 1,442 ill in 43 states
 - 286 hospitalizations
 - Two possibly-associated deaths
 - Florida tomato producers lost ~\$100 million

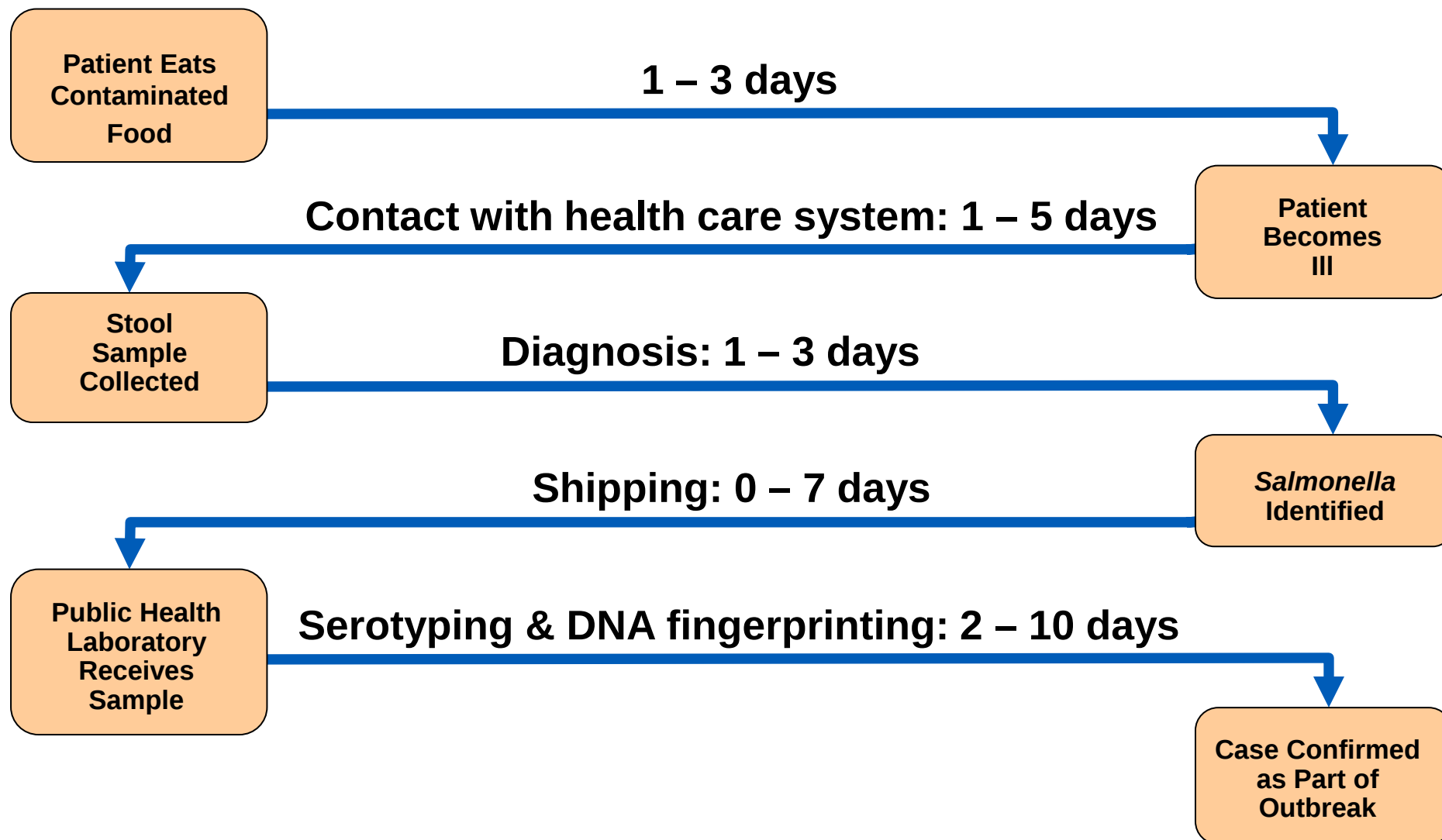
The Way Forward: Strategies for Improving Prevention

- ☐ Improve public health surveillance for foodborne infections
- ☐ Improve foodborne outbreak investigation and coordination
- ☐ Translate lessons learned to drive policy and inform regulatory and industry changes



The Surveillance Process

Reporting Cases Takes Time



Improving Surveillance for Foodborne Infections: The Challenge

□ Routine surveillance is incomplete, slow, and variable

➤ Molecular subtyping

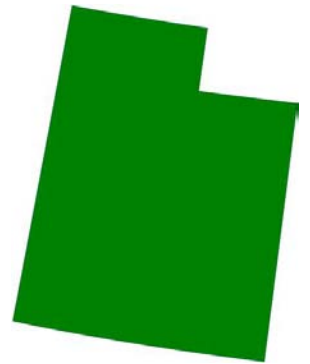
- Only 63% of states require referral of *Salmonella* isolates to the public health laboratory
- 77% of those referred are subtyped in PulseNet
- 18 days from onset of illness to posting to PulseNet

➤ Case interview

- 63% routinely interviewed with a standard state questionnaire
- Of those, 42% collect a comprehensive food history (content varies by state)
- 14 days after onset of illness until first interview

Improving Public Health Surveillance for Foodborne Infections: Short-Term

- ❑ **Create network for methods assessment (OutbreakNet Sentinel Sites)**
 - 3 pilot sites in 2009, (UT, WI, NYC)
 - Assessing case interview methods
- ❑ **Strengthen and build on successful model of PulseNet**
 - Subtype more pathogens in public health laboratories
- ❑ **Share lessons learned at annual meetings**
- ❑ **Provide laboratory, epidemiology, and environmental health training**
- ❑ **Build global capacity with WHO**



NYC



Improving Public Health Surveillance for Foodborne Infections: Longer-Term

❑ **Expand OutbreakNet Sentinel Sites**

- Refine faster standardized approaches to surveillance
- Assess faster laboratory processes to speed up subtyping
- Measure costs and impact

❑ **Implement best practices and methods in many states and large local health departments**

- Example: telediagnosis for parasitic infections can reduce time from 48 hours to 30 minutes and costs by 80%

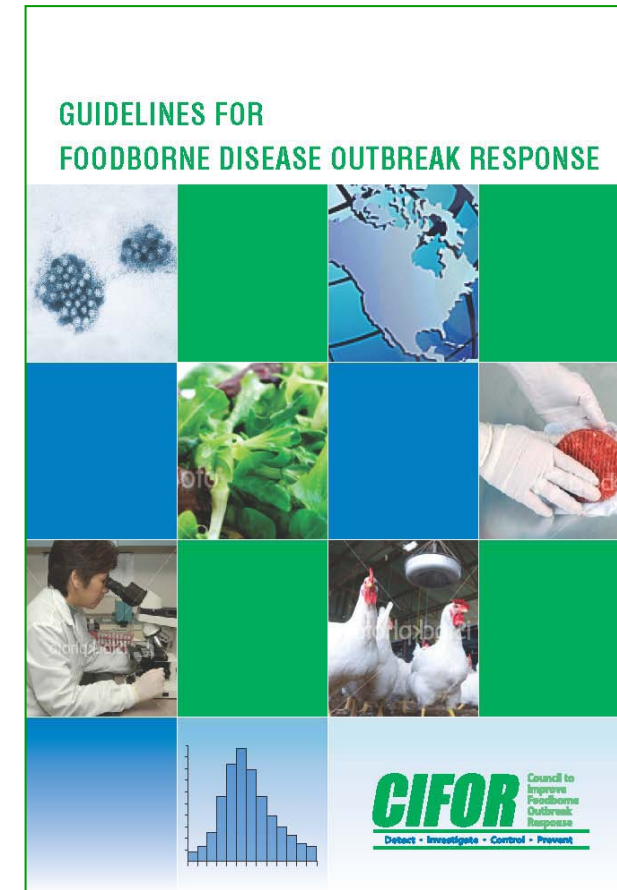
❑ **Combine information from monitoring food and animals**

❑ **Make surveillance more global**



Improving Foodborne Outbreak Investigation and Coordination: Short -Term

- ❑ **Implement 2009 Guidelines by CIFOR**
- ❑ **Improve methods and build capacity**
(a multiagency group)
- ❑ **OutbreakNet Sentinel Sites can evaluate methods to:**
 - Conduct rapid and coordinated investigations
 - Optimize laboratory processes
 - Integrate environmental health
 - Refine templates for communication
- ❑ **Engage regulatory partners early in investigations**



Improving Foodborne Outbreak Investigation and Coordination: Longer-Term

- ❑ **Ensure improved methods are used more widely**
- ❑ **Document effectiveness in:**
 - Reducing time to subtype pathogens and interview ill persons in detail
 - Increasing proportion of outbreaks with defined etiology and specific food source
 - Identifying new food vehicles or intervention points on which prevention can be focused
- ❑ **Collaborate with other countries**

Translating Lessons Learned to Drive Policy and Inform Regulatory and Industry Changes

□ Improve the knowledge base for

- Burden of illness (including chronic sequelae)
- Trends (including population subgroups)
- Attribution of illness to particular foods, reservoirs, and venues

□ Enhance the dialogue with partners

- Online surveillance data and searchable databases
- After outbreaks: Joint assessment of procedures, findings, and implications
- Focus research on new issues identified

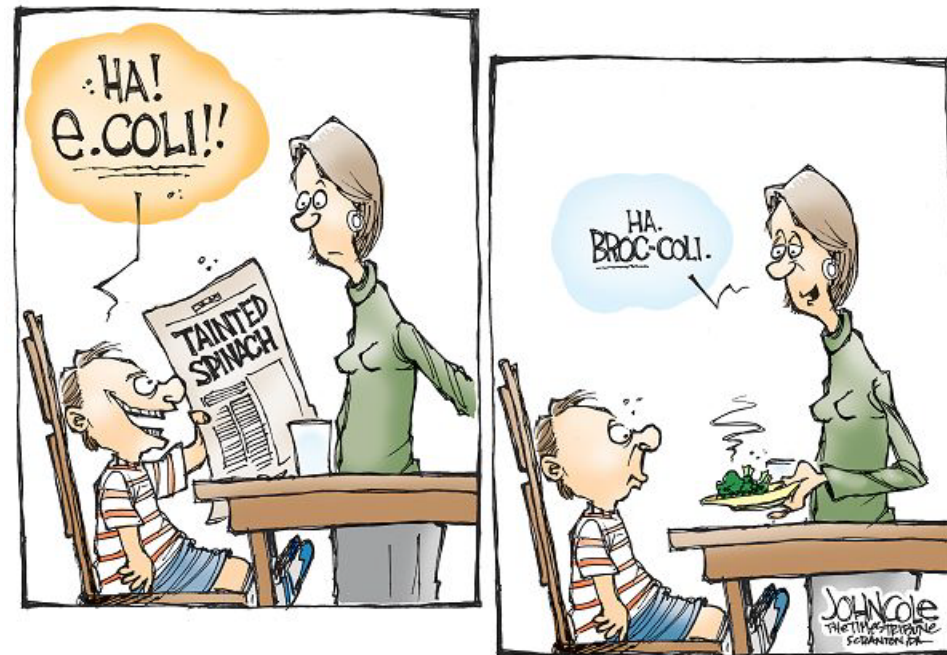


Foodborne Disease Prevention: Closing Thoughts

❑ Further reductions are possible

- Stronger public health infrastructure
- Improved federal partnership
- Industry collaboration

❑ Anticipate the unexpected

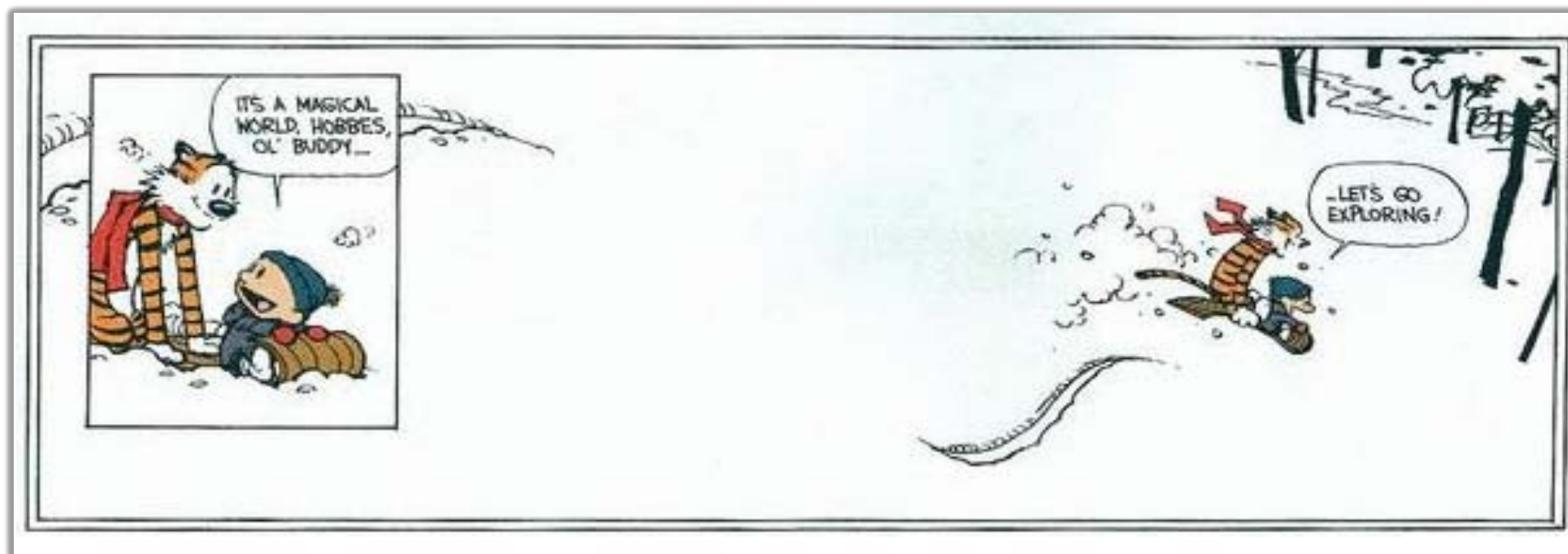


Acknowledgements

- ☐ Art Liang
- ☐ Rob Tauxe
- ☐ Peter Gerner-Smidt
- ☐ Chris Braden
- ☐ Don Sharp
- ☐ Jeff Jones
- ☐ Patricia Griffin
- ☐ Chris Prue
- ☐ Aron Hall
- ☐ Jan Vinje
- ☐ Scott Holmberg
- ☐ Brynn Berger
- ☐ Hannah Ross-Suits



Thank You!



RADM Ali S. Khan

ask0@cdc.gov 404.639.7377

<http://blogs.cdc.gov/publichealthmatters/>

The views and conclusions of this report are those of the authors and do not necessarily represent the views of the CDC.

