

Promoting Food Safety Through Collaboration

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Summary

1. Public health surveillance can find “a needle in a haystack”

- Invisible outbreaks are now visible
- ↑ Molecular microbiology
- ↑ Information technology



2. New challenges

- Not as easy to solve

3. Need new solutions and new collaborations

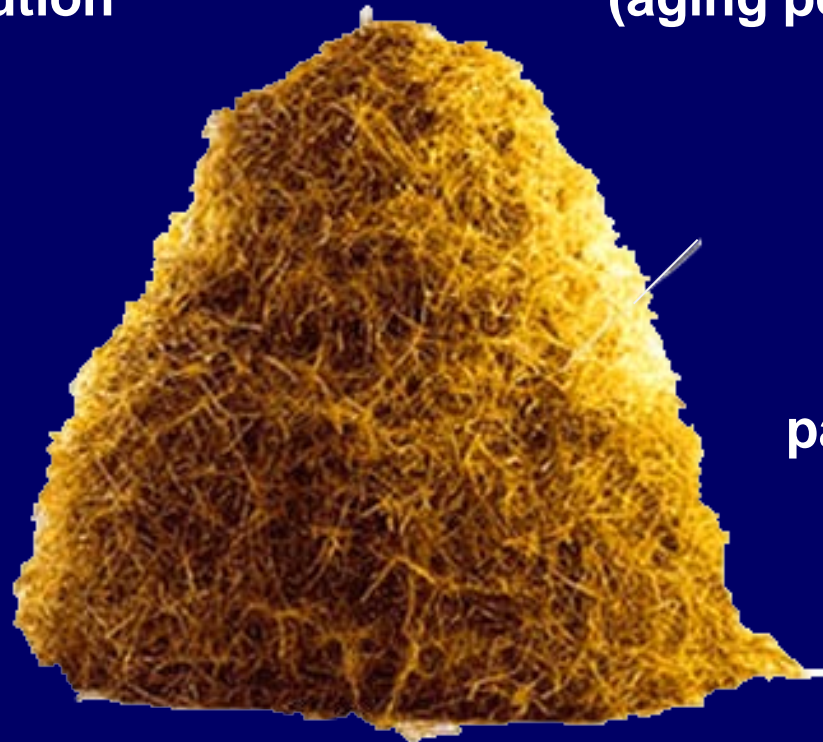
- Next generation of successes

Finding a Needle in a Haystack

Transportation
Revolution

Susceptible hosts
(aging population)

↑ Economies
of scale:
farm-to-table



Novel
pathogens

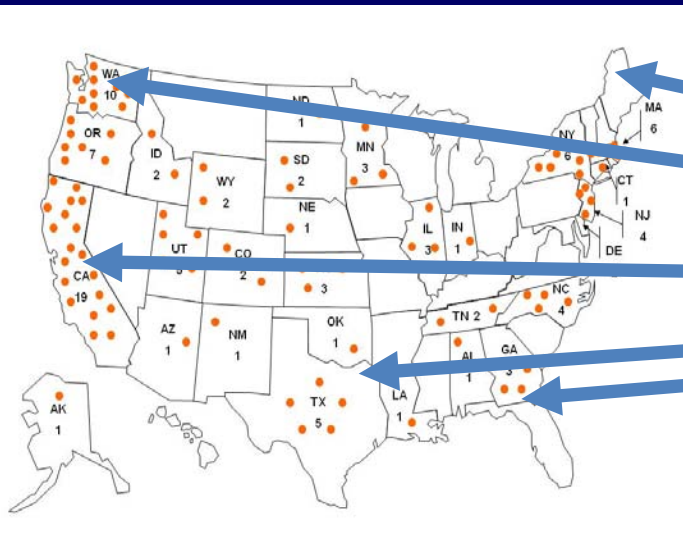
Consumer preference
(e.g., ↑ ready-to-eat foods)

**Cases infected with the outbreak strain of *Salmonella* Montevideo,
United States, by state,
as of November 30, 2009 (n=96)**

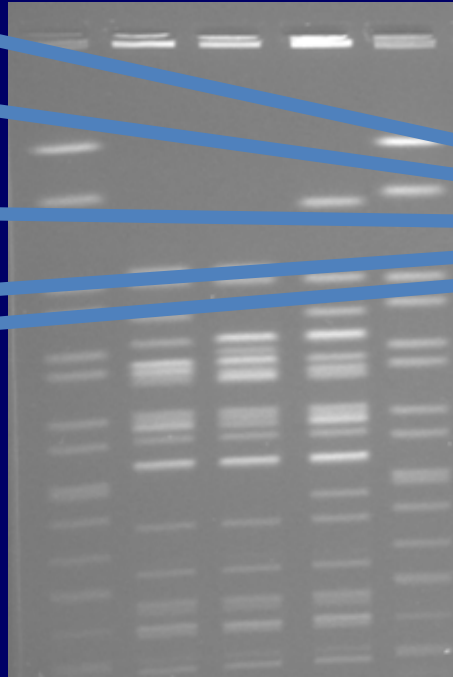


PulseNet laboratory network detects widespread clusters of infections

Public Health Labs in Each State



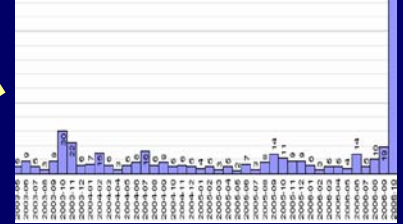
DNA "Fingerprint" patterns of Salmonella



PulseNet National Database (CDC)



National Cluster Detection (CDC)



Cluster Evaluation by CDC and States

All State labs and many big city labs participate in PulseNet, along with CDC, USDA and FDA

Boots on the Ground Response

- **Initial interviews (53 ill persons, 18 states)**
 - >300 food and animals exposures
 - No hypothesis identified
- **Gathering more details with open-ended interviews (16 ill persons, 8 states)**
 - Many ate Italian-style meats including salami
 - Many shopped at a national warehouse store chain
- **Honing in on focal groups**
 - South Carolina: group of ill hunters report consuming only homemade pork BBQ, milk, bread and alcohol in week before illnesses began
 - Arizona: wedding party catered with fruit, meat, and cheese trays

Identifying the source



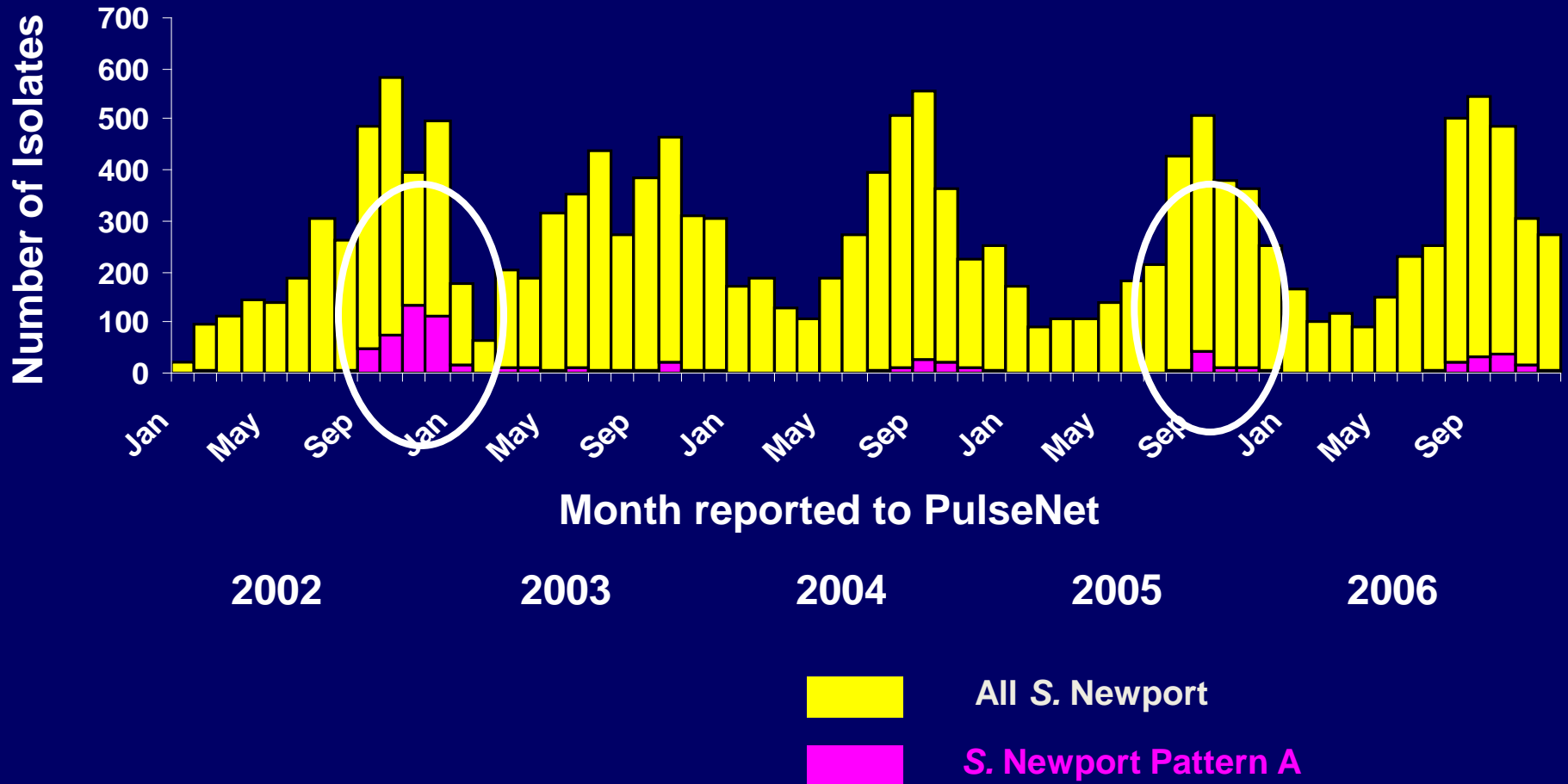
- **3 Breakthroughs**
 - Washington Department of Health collected shopper card data from ill persons who shopped at one warehouse store chain: 5 of 7 ill persons purchased Company A Italian-style deli meat variety packs in week before illness onset
 - CDC led multistate case-control study: found illness was significantly associated with eating salami
 - After multiple interviews, both hunters and wedding party remember purchasing Italian Style Meat tray
- **Trays and packs included salami rolled in pepper**
- **Outbreak strain of *Salmonella* found in 8 salami samples**
- **USDA/FSIS traceback: Produced in 3 Rhode Island facilities**



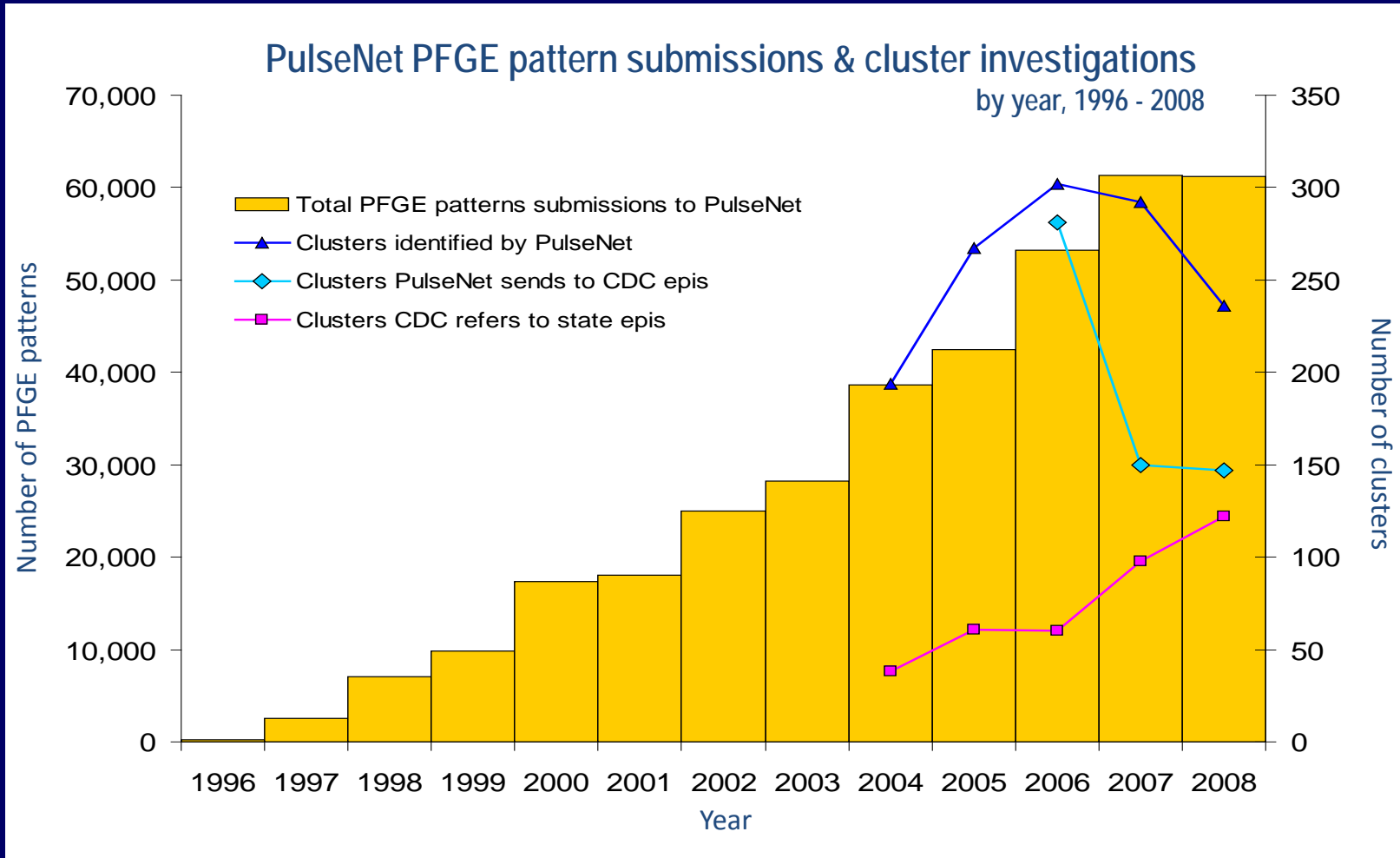
Jimmy Margulies; The Record

Resurfacing Needles...

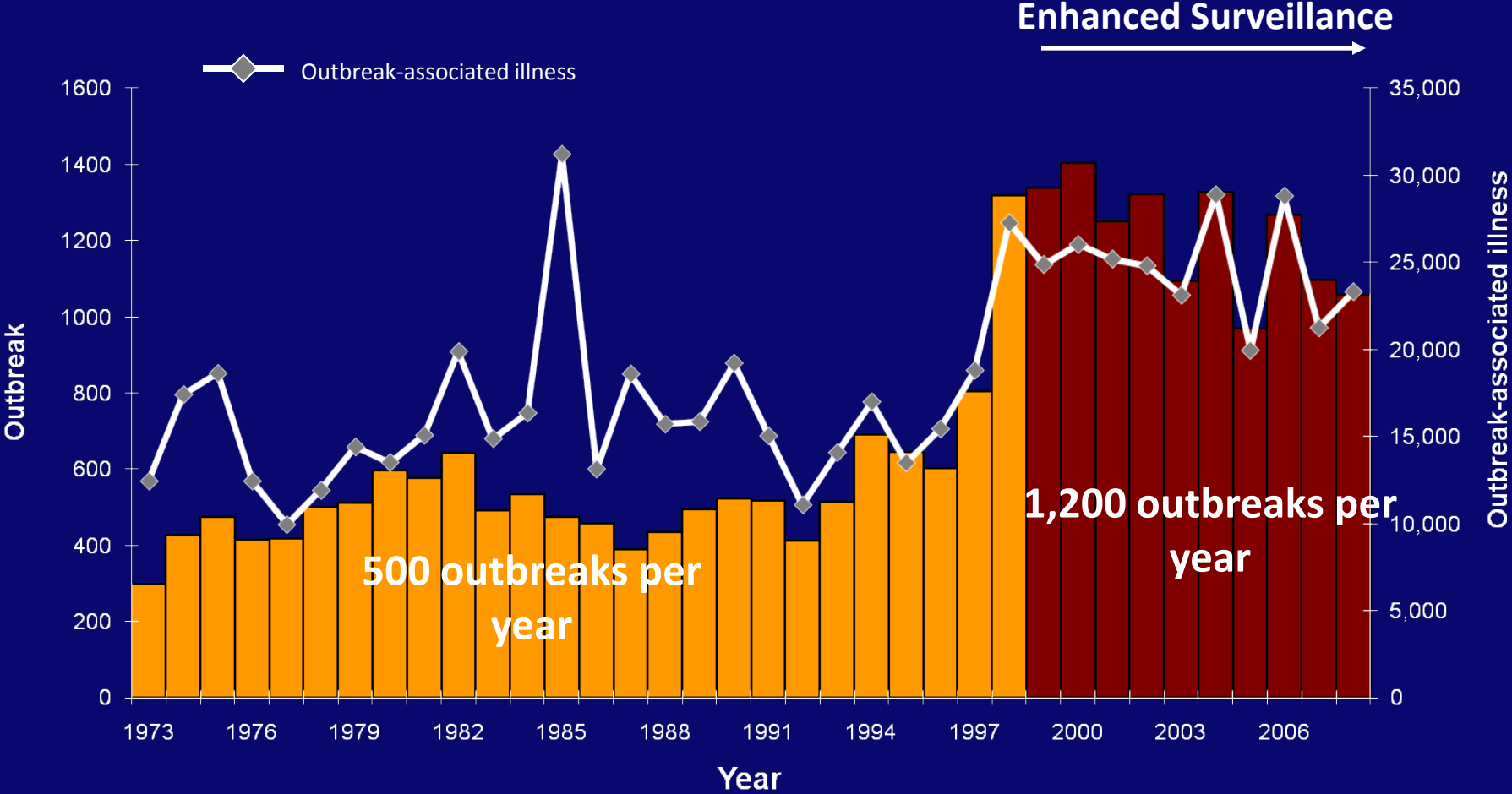
Isolates of *Salmonella* Newport Reported to PulseNet , 2002-2006



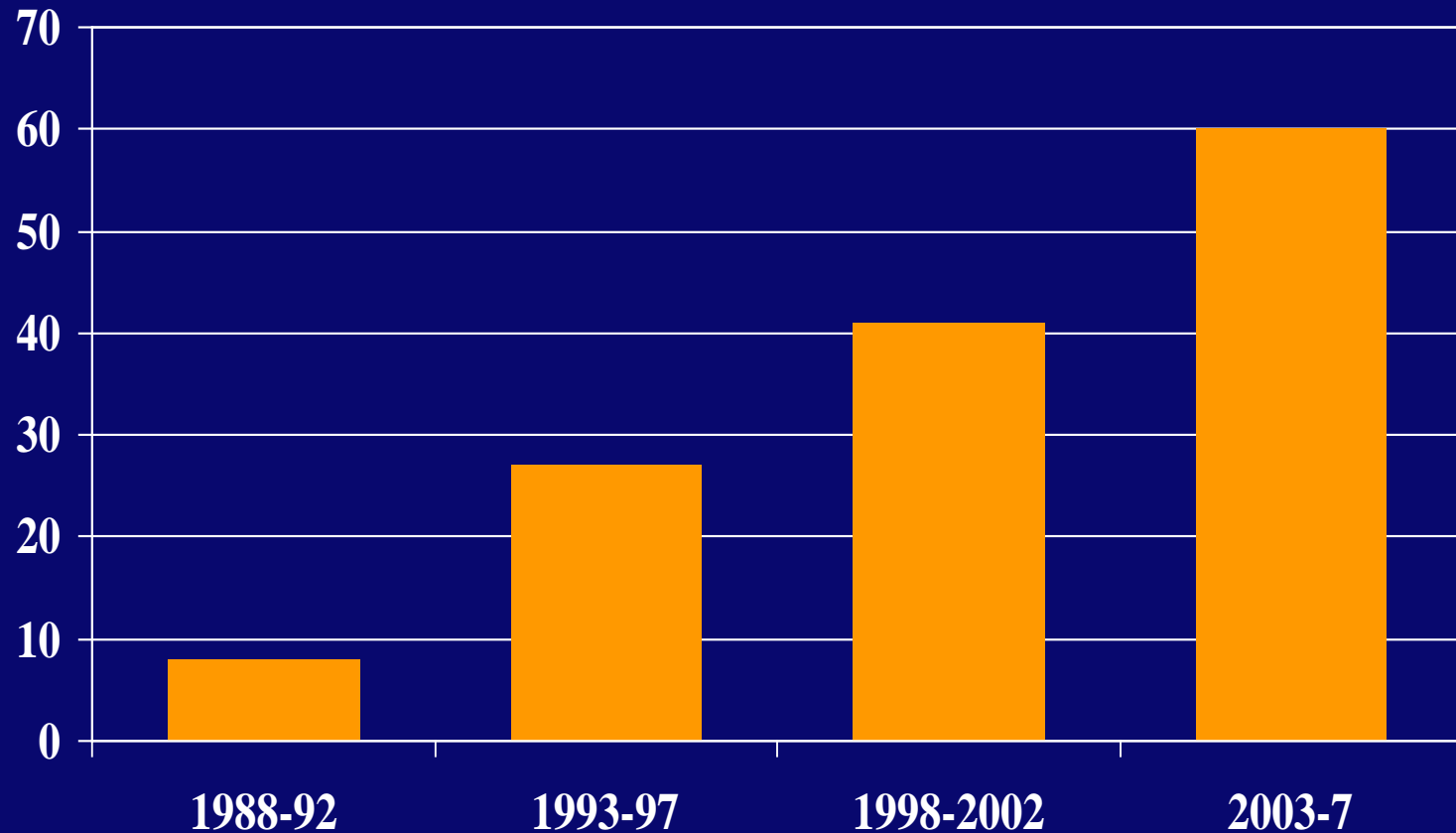
Challenge: More Potential Outbreaks Than We Can Investigate



Foodborne Disease Outbreaks Reported per Year, 1973–2008



Multi-state Foodborne Outbreaks, 1988-2007



Preliminary data, 2009

Source: CDC foodborne outbreak reporting system

Challenge: New Food Vehicles

- **12 new food vehicles since 2006:**
 - Bagged spinach *E. coli* O157
 - Carrot juice Botulism
 - Peanut butter/peanut paste *Salmonella*
 - Broccoli powder on a snack food *Salmonella*
 - Dog food *Salmonella*
 - Turkey pot pies *Salmonella*
 - Canned chili sauce Botulism
 - Hot peppers *Salmonella*
 - White pepper *Salmonella*
 - Raw cookie dough *E. coli* O157
 - Puffed breakfast cereal *Salmonella*
 - Cracked red and black pepper on salami *Salmonella*

A Multinational Loaf

Amy Schoenfeld: New York Times, June 15, 2007

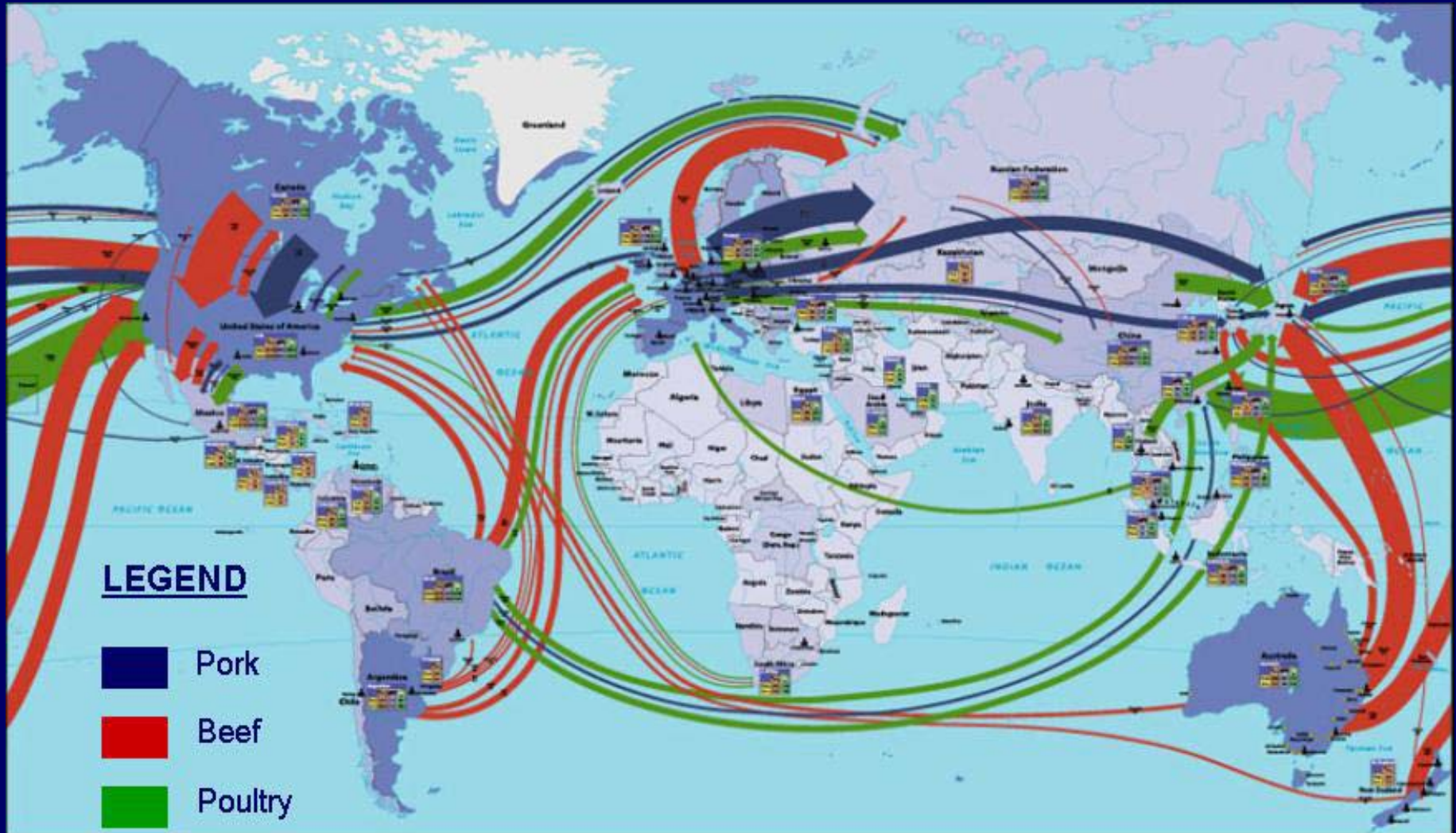


- **Wheat gluten** – France, Poland, Russia, Netherlands, Australia
- **Honey** – China, Vietnam, Brazil, Uruguay, India, Canada, Mexico, Argentina
- **Calcium proprionate** – Netherlands
- **Guar gum** – India
- **Flour enrichments** – China
- **Beta-carotene** – Switzerland
- **Vitamin D3** – China



A 21st Global Economy

Global Meat Trade



Source: Center for Global Food Issues

Some Large U.S. Food Recalls

Year	Pathogen	Food	Amount recalled
2010	<i>Salmonella</i> Montevideo	Ready-to-eat Italian Sausage Products	>1,263,754 lbs
2009	<i>E. coli</i> O157:H7	Non-intact steak and ground beef outbreaks	1,115,049 lbs
2009	<i>E. coli</i> O157:H7	Cookie dough	300,000 cases of product
2009	<i>S. Typhimurium</i>	Peanut butter/peanut products	>3000 types of products
2008	<i>E. coli</i> O157:H7	Ground beef	5,300,000 lbs
2007	<i>E. coli</i> O157:H7	Frozen pizza	5,000,000 pizzas
2007	<i>E. coli</i> O157:H7	Ground beef (3 outbreaks)	35,400,000 lbs
2006	<i>Salmonella</i> Tennessee	Peanut butter	326,000,000 lbs
2004	<i>Salmonella</i> Enteritidis	Raw almonds	13,000,000 lbs
2003	<i>E. coli</i> O157:H7	Blade Tenderized Frozen Steak	750,000 lbs
2002	<i>Listeria monocytogenes</i>	Ready-to-eat poultry products	27,400,000 lbs
2002	<i>E. coli</i> O157:H7	Ground beef	18,600,000 lbs
2000	<i>Listeria monocytogenes</i>	Ready-to-eat poultry products	16,900,000 lbs
2000	<i>E. coli</i> O157:H7	Ground beef	1,100,000 lbs
1998	<i>Listeria monocytogenes</i>	Hot dogs, deli meats	35,000,000 lbs
1998	<i>Salmonella</i> Agona	Toasted oats cereal	3,000,000 lbs
1997	<i>E. coli</i> O157:H7	Frozen ground beef	25,000,000 lbs

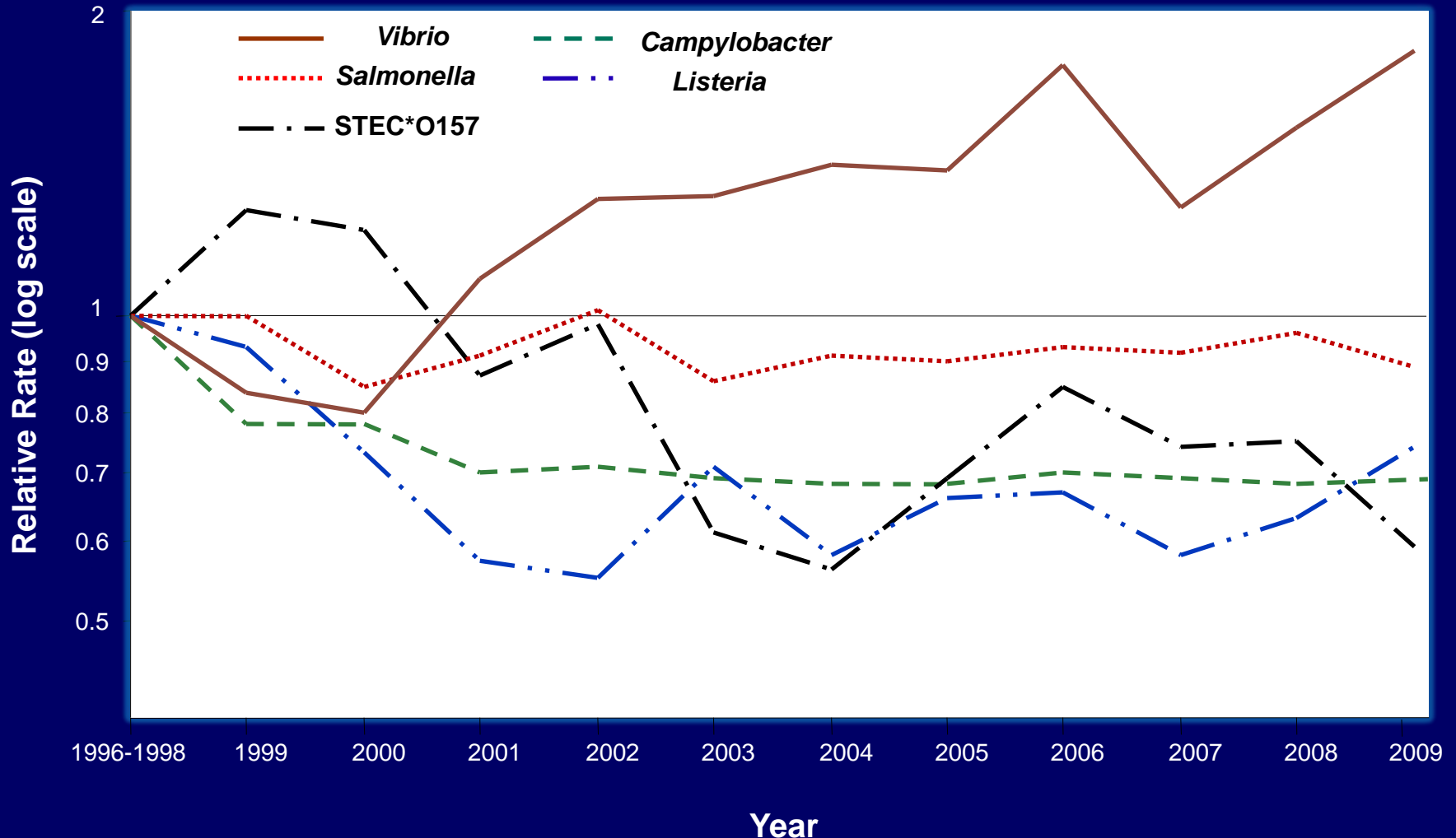


Walt Handelsman: Newsday

CDC Foodborne Disease Surveillance & Outbreak Systems, 1996-2008

- **National Molecular Subtyping Network for Foodborne Disease Surveillance (PulseNet USA)**
- **Electronic Foodborne Outbreak Reporting System (eFORS)**
- **Foodborne Diseases Active Surveillance Network (FoodNet)**
- **EHS-Net: Environmental Health Specialists Network**
- **OutbreakNet & Sentinel Sites**
- **Council to Improve Foodborne Outbreak Response (CIFOR)**

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†



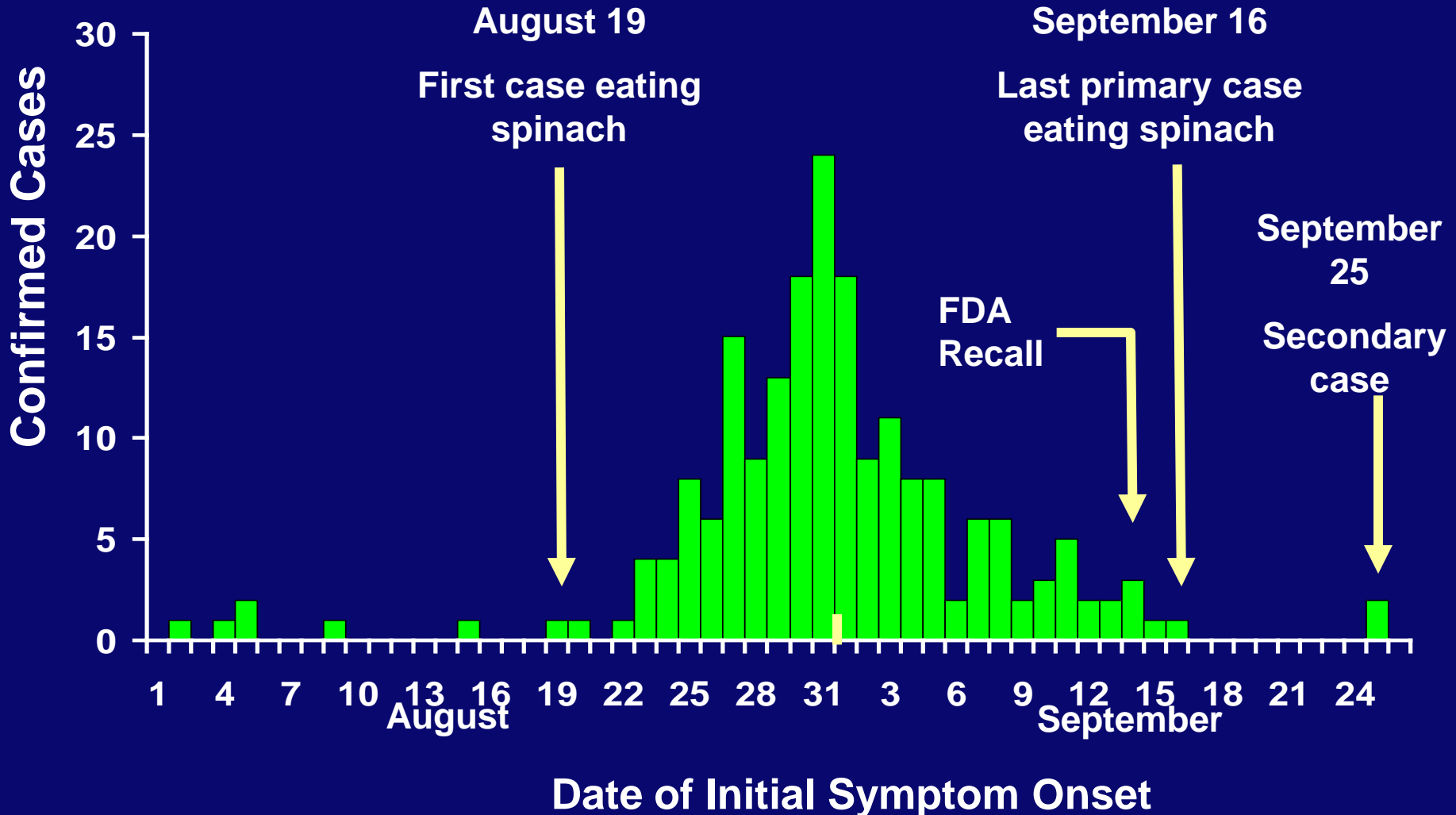
* Shiga toxin-producing *Escherichia coli*.

† 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.

Challenge: Timeliness

e.g. leafy greens

Number of Cases by Date of Illness Onset, US, Aug–Sept 2006



Focus on Prevention

- 1) Understand the burden, trends, and attribution of foodborne infections to food commodities**
- 2) Understand the ecologies and reservoirs of these pathogens**
- 3) Develop better tools for diagnosis, confirmation, and subtyping foodborne pathogens**
- 4) Discover previously unidentified foodborne pathogens**
- 5) Develop and assess strategies to streamline outbreak detection and investigation**
- 6) Improve control and prevention strategies**
- 7) Improve outbreak coordination and communication**

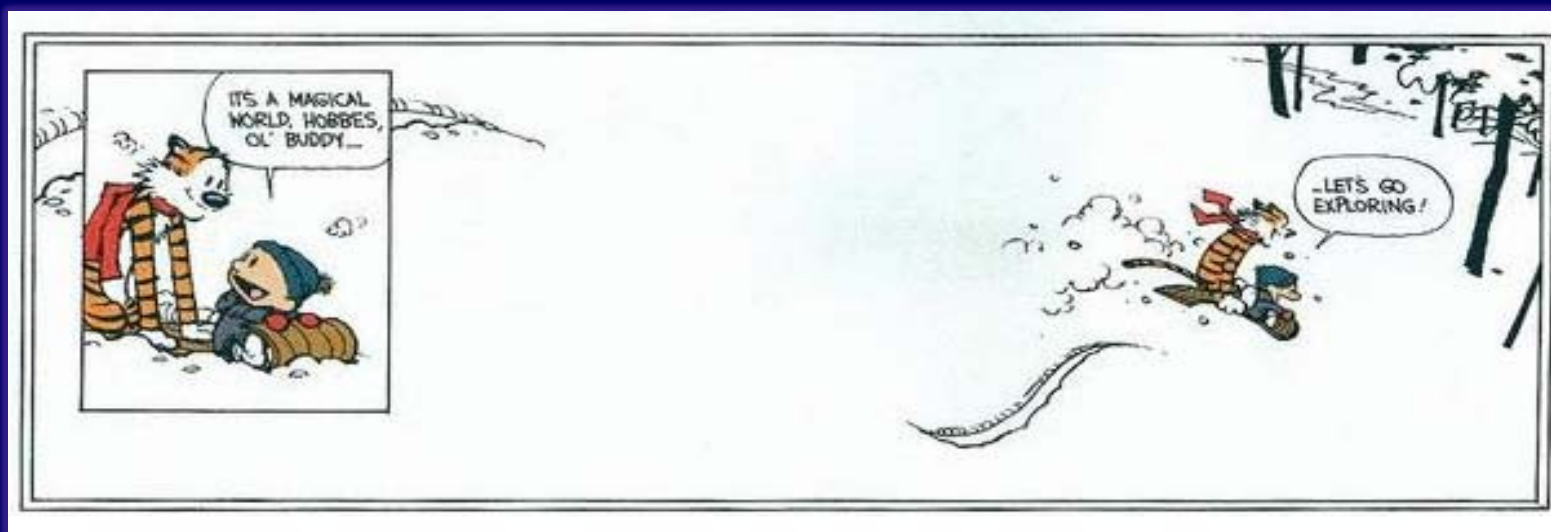
Need for Coordination and Consistency

- **States & Local Health Departments**
 - **50 States**
 - **Foodborne Diseases = Department of Health**
 - **Food Protection = Department of Health or Department of Agriculture**
 - **~3000 City & County governments**
 - **Eroding infrastructure**
 - **Centralized, Autonomous, Mixed governance**
 - **Foodborne disease reporting & outbreak investigation start here**
- **Federal Entities**
 - **CDC, FDA, USDA, FSIS, and others**

How can we work together?

- **Outbreak investigations should be done by multidisciplinary & multiagency teams**
- **Understanding by all of the iterative nature of outbreak investigations; no two are exactly alike**
- **Balancing competing priorities: supporting epi investigation; removing food from commerce; environmental investigation of root causes**
- **Decision-making about actions/needs should be discussed & consensus sought**
- **Building trust & collaboration among agencies & disciplines is essential for protecting public health**

Thank You!



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

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