Outbreak Alert!

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CSPI and IACFO

• The Center for Science in the Public Interest is a bi-national NGO representing consumers in both the US and Canada

• Safe Food International partners with consumer organizations in other regions of the world on food safety issues

• The International Association of Consumer Organizations provides representation in Codex for consumer organizations on five continents
Estimating Food Borne Disease: The Starting Point

- The CDC estimates that foodborne diseases affect 76 million Americans annually.
- An estimated 5,000 Americans die from foodborne diseases and another 325,000 people are hospitalized each year.
- The worst cases of foodborne illness occur in the most vulnerable: the old, the young, and those with weakened immune systems.
Foodborne Disease Surveillance & Investigation in the U.S.

- **FoodNet** – active surveillance
- **PulseNet** – laboratory network that performs microbial sub-typing
- **Outbreak Alert!** – food attribution
Foodborne Diseases Active Surveillance Network (FoodNet)

- Active, laboratory-based surveillance within 10 well-defined surveillance areas around the United States
- Monitor trends in foodborne diseases
- Conduct case-control studies
FoodNet (cont.)

FoodNet Pathogens
- Campylobacter
- Cyclospora
- Cryptosporidium
- *Escherichia coli* O157:H7
- *Listeria monocytogenes*
- Salmonella
- Shigella
- Vibrio
- *Yersinia enterocolitica*

- Approximately 17,000 laboratory-diagnosed cases, each year
- Data collected includes patient demographics, co-morbidities, hospital stay details, and laboratory results
Figure 2. 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, United States, 1996–2007†.

* 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 can differ.

Source: Centers for Disease Control and Prevention (CDC)
PulseNet USA

- National database of pulsed-field gel electrophoresis (PFGE) patterns
- Enables outbreak cases and concurrent sporadic cases to be distinguished
- Does not include routine PFGE patterns from food and animal sources
What is PFGE?

- DNA “fingerprinting”

- A method used to differentiate specific strains of bacteria using DNA migration by size in an agarose gel stimulated by an electrical current

- More sensitive and discriminating than conventional gel electrophoresis because the electrical field used to stimulate DNA migration is pulsed (constantly changing) rather than uniform
PulseNet USA (cont.)

PulseNet Pathogens
Campylobacter jejuni
Cyclospora
Cryptosporidium
Escherichia coli O157:H7
Listeria monocytogenes
Salmonella
Shigella
Vibrio
Yersinia enterocolitica

- The PulseNet database includes tens of thousands of PFGE patterns
- Labs at the national, state, and local levels have access to the database
History of Outbreak Alert!

- CSPI started collecting data on food borne illness (FBI) outbreaks in 1997 and organizing it by regulatory agency (USDA and FDA).

- The data was not readily available from CDC; however, with our continued requests, CDC started posting a yearly line listing on the internet.

- In 1999, we published the first line listing of FBI outbreaks organized by food category and by regulatory agency.
Outbreak Alert!

Food Categories
- Beef
- Beverages
- Breads & Bakery
- Dairy
- Eggs & Egg Dishes
- Game
- Luncheon/Other Meats
- Multi-Ingredient Foods
- Multiple Foods
- Pork
- Poultry
- Produce
- Seafood

- Outbreaks are grouped by food vehicle, and placed in one of 13 food categories
- It is a unique database of outbreaks linked to specific foods, as well as specific pathogens
- A project managed and maintained by a private, non-profit, consumer advocacy group
Unique Data

- CSPI database contains over 5400 outbreaks, with both known food source and etiology, which occurred in the U.S. between 1990-2005

- Outbreak data was compiled from several different sources including the CDC, state and local health departments, and scientific journals
Outbreak Alert!

Source: Outbreak Alert! Center for Science in the Public Interest, 2006
Number of Outbreaks By Food, 1990-2005

Source: Outbreak Alert! Center for Science in the Public Interest, 2006
Outbreak Trends of Major Food Categories

Note: In 1998, CDC began enhanced surveillance efforts to increase FBI reporting.
Database Applications

- Outbreak data with food attribution is critical to conduct a food/hazard assessment for HACCP

- Assesses food types most often linked to foodborne illness outbreaks by location

- Assesses pathogens causing outbreaks by location and food type
Outbreaks by Vehicle, 1990-2005

Source: Outbreak Alert! Center for Science in the Public Interest, 2006
Locations of Foodborne Illness Outbreaks

Outbreak Location 1990-2005

- Private Home: 22%
- Restaurant/Food Est.: 42%
- Multiple/Unknown: 8%
- Other: 7%
- Workplace: 5%
- Religious/Social Club: 4%
- Schools: 4%
- Catered Event: 4%
- Camping/Picnic/Farms: 4%

Source: Outbreak Alert! Center for Science in the Public Interest, 2006
Etiology of FDA Regulated Foods – Produce and Seafood Outbreaks

Pathogens in Produce Outbreaks 1990-2005

- Norovirus: 33%
- Campylobacter: 2%
- Salmonella: 23%
- Staphylococcus: 1%
- Clostridium: 5%
- Shigella: 8%
- Bacillus: 1%
- Other: 5%
- Hepatitis: 5%
- E. coli: 6%
- Toxins: 2%

Pathogens in Seafood Outbreaks 1990-2005

- Scombrotoxin: 36%
- Ciguatoxin: 22%
- Vibrio: 9%
- Other Bacteria: 16%
- Norovirus: 9%
- Other: 5%
- Toxins: 6%
- Salmonella: 23%
- Shigella: 8%
- E. coli: 6%
- Campylobacter: 2%
- Hepatitis: 5%

Source: Outbreak Alert! Center for Science in the Public Interest, 2006
Etiology of USDA Regulated Foods – Beef and Poultry

Pathogens in Beef 1990-2005
- Bacillus 26%
- Clostridium 40%
- Staphylococcus 4%
- Other 3%
- E. coli 26%
- Campylobacter 2%
- Norovirus 5%

Pathogens in Poultry 1990-2005
- Salmonella 40%
- Shigella 2%
- Bacillus 5%
- Clostridium 28%
- Staphylococcus 8%
- Other 6%
- E. coli 1%
- Norovirus 9%

Source: Outbreak Alert! Center for Science in the Public Interest, 2006
FDA vs. USDA – Foodborne Illness Outbreaks

Source: Outbreak Alert! Center for Science in the Public Interest, 2006
Limitations of CSPI’s database

- Represents a small percentage of actual foodborne illnesses.
- Represents less than half of reported foodborne outbreaks, others include unknown food or pathogen.
- Sporadic cases of foodborne illnesses are omitted, e.g. *Campylobacter* and *V. vulnificus* are underreported in the data.
Outbreaks With Unknown Food or Etiology Are the MAJORITY of Reported Outbreaks

Source: The Center for Science in the Public Interest and CDC
Available Online

http://www.cspinet.org/foodsafety
Exciting News from Safe Food International:

SFI is launching a website containing the news contained in SFI’s Regional Updates! Please Visit:

http://regionalnews.safefoodinternational.org/

This website includes the following topics from each region:
– Food/Waterborne Illness Outbreaks
– Food Safety Studies
– Food Safety Policy Issues
– Animal/Plant Health Issues
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