Foodborne Diseases

Classification of foodborne diseases

Estimated annual number of cases
- 76 million
- Hospitalizations due to FBD
  - 325,000 per year
- Deaths caused by FBD
  - 5,000 per year

CDC, 1999
Outbreaks of foodborne disease in North America

<table>
<thead>
<tr>
<th>Country</th>
<th>Period</th>
<th>Lapse (years)</th>
<th>No. outbreaks</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>1973-1987</td>
<td>15</td>
<td>7458</td>
</tr>
<tr>
<td>Canada</td>
<td>1975-1984</td>
<td>10</td>
<td>8672</td>
</tr>
<tr>
<td>Mexico</td>
<td>1980-1989</td>
<td>10</td>
<td>314</td>
</tr>
</tbody>
</table>

Foodborne disease outbreaks in the US 1993-1997

<table>
<thead>
<tr>
<th>Year</th>
<th>Outbreaks</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>489</td>
<td>17,477</td>
<td>9</td>
</tr>
<tr>
<td>1994</td>
<td>653</td>
<td>16,234</td>
<td>3</td>
</tr>
<tr>
<td>1995</td>
<td>628</td>
<td>17,800</td>
<td>11</td>
</tr>
<tr>
<td>1996</td>
<td>477</td>
<td>22,607</td>
<td>4</td>
</tr>
<tr>
<td>1997</td>
<td>504</td>
<td>11,940</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>2,751</td>
<td>86,058</td>
<td>29</td>
</tr>
</tbody>
</table>

CDC, 2000

Most frequent foods linked to foodborne disease outbreaks
USA, 1998-2002

% outbreaks with vehicle identified (4,047)

- Meat and Poultry: 17%
- Seafoods: 12%
- Fruits and Vegetables: 7%
- Dairy: 5%
- Egg: 4%
- Complex Vehicle: 2%
- Other: 52%

CDC, 2006
Most frequent pathogens causing outbreaks of foodborne disease in the US

Where do people get sick?

Factors favoring outbreaks of foodborne disease
Active surveillance of foodborne pathogens (FoodNet)

Estimated annual cost of foodborne disease in the United States

Cost of the *Salmonella* Saintpaul outbreak linked to peppers and tomatoes (?)
- Tomato sales down
  - 30 - 40% over last year
- Loss to Florida tomato farmers
  - 100 million
- Loss to packers, shippers, retail outlets
  - 200 million

USDA Economic Research Service, 2000
Economic impact of food safety incidents in internationally traded produce

Outbreaks of foodborne disease linked to cantaloupes in the US and Canada

<table>
<thead>
<tr>
<th>Year</th>
<th>Pathogen</th>
<th>No. cases</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>Salmonella ser. Chester</td>
<td>245</td>
<td>U.S.A. (Multistate)</td>
</tr>
<tr>
<td>1991</td>
<td>Salmonella ser. Poona</td>
<td>&gt;400</td>
<td>U.S.A. (Multistate)</td>
</tr>
<tr>
<td>1997</td>
<td>Salmonella ser. Saphra</td>
<td>24</td>
<td>California</td>
</tr>
<tr>
<td>1998</td>
<td>Salmonella ser. Oranienburg</td>
<td>22</td>
<td>Ontario, Canada</td>
</tr>
<tr>
<td>2000</td>
<td>Salmonella ser. Poona</td>
<td>43</td>
<td>U.S.A. and Canada</td>
</tr>
<tr>
<td>2001</td>
<td>Salmonella ser. Poona</td>
<td>51</td>
<td>U.S.A. and Canada</td>
</tr>
<tr>
<td>2002</td>
<td>Salmonella ser. Poona</td>
<td>43</td>
<td>U.S.A. (Multistate)</td>
</tr>
<tr>
<td>2008</td>
<td>Salmonella ser. Litchfield</td>
<td>51</td>
<td>U.S.A. and Canada</td>
</tr>
</tbody>
</table>

Mexican cantaloupes

- In 2003, Mexico did not receive the ≈170M expected from sales of previous years
- The 77,838.195 acre dedicated to growing melons in 2002 experienced a sudden significant decrease
- Currently only a few, certified growers are allowed to export cantaloupes to the US

SENASICA, 2004
Green onions

- 2003
- 555 ill with hepatitis A
- All ate at a specific restaurant in Monaca, Pennsylvania
- Outbreak traced back to green onions from 4 Mexican suppliers

Prices of green onions in November of 2003

- Other products also affected by bad publicity
  - Onions
  - Pearl onions
  - Other commodities from the same suppliers
    - Leeks
    - Broccoli
- Total loses associated with the outbreak estimated at $100 million

SENASICA, 2004
HACCP mandatory in the United States for production of:

- Meat and poultry products (Mega-reg)
  - Pathogen Reduction; Hazard Analysis and Critical Control Points (HACCP)
  - 9 CFR 304, 308, 310, 320, 327, 381, 416 and 417
- Seafood
  - Procedures for the Safe and Sanitary Processing and Importing of Fish and Fishery Products; Final Rule
  - 21 CFR Parts 123 and 1240
- Juices
  - Hazard Analysis and Critical Control Point (HACCP); Procedures for the Safe and Sanitary Processing and Importing of Juice
  - 21 CFR Parts 120 and 101