Zoonotic Disease and Foodborne Illness

- Food continues to be an important route for transmission of disease between animals and humans.
- *Salmonella* Enteritidis: taking a closer look
- Multi-disciplinary collaboration – local, state/provincial, regional, national, international

Burden of Foodborne Illness: USA Estimates

- 48 million illnesses
- 128,000 hospitalizations
- 3,000 deaths

Illnesses, Hospitalizations, Deaths

Top Five Microorganisms Causing Domestically Acquired Foodborne Illness in the United States*

<table>
<thead>
<tr>
<th>Microorganism</th>
<th>Illnesses</th>
<th>Hospitalizations</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norovirus</td>
<td>58%</td>
<td>11%</td>
<td>28%</td>
</tr>
<tr>
<td>Salmonella, Nontyphoidal</td>
<td>35%</td>
<td>26%</td>
<td>11%</td>
</tr>
<tr>
<td>Clostridium perfringens</td>
<td>9%</td>
<td>8%</td>
<td>11%</td>
</tr>
<tr>
<td>Campylobacter spp.</td>
<td>9%</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>3%</td>
<td>4%</td>
<td>11%</td>
</tr>
<tr>
<td>Subtotal</td>
<td>91%</td>
<td>88%</td>
<td>88%</td>
</tr>
</tbody>
</table>

* For more information see [http://www.cdc.gov/foodborneburden/](http://www.cdc.gov/foodborneburden/)

Example of Shifting Sources of Contamination

“Salmonella Enteritidis Outbreak Linked to a Local Bakery, British Columbia, Canada, 2000”


The Perfect Microbial Storm

- An increasing human population
  - As the population expands it moves
  - Increased mixing of species
  - Microorganisms transferred to novel niches

- Globalization
  - Interconnecting cultures, industries, and organisms
  - International commerce has tripled in 20 years
  - A “Global Village”

Foods of Animal Origin

- Increased movement and density of people & animals
  - In 2000, emerging market economies accounted for 56% of the global middle class
  - By 2030, that figure is expected to reach 93%
  - China and India alone will account for 2/3 of this expansion

Source: Sustaining global surveillance and response to emerging zoonotic diseases, National Academies Press
"Livestock Revolution": 1983-2020
Meat Consumption

Microbial networks

Poultry population density  Human population density

Source: FAO, WHO, Rimsa, Mexico City April 2005
Salmonella Enteritidis Outbreak, 2010

Significant Public Health and Food Regulatory Response

Source:
http://www.cdc.gov/salmonella/enteritidis/index.html

http://www.cdc.gov/salmonella/enteritidis/se_timeline_092010.pdf
Food Safety:
Systematic Approach

Local Roles, Responsibilities & Resources

• Local roles responsibilities, and resources
  – Front line human disease surveillance and response
  – Retail / food service establishment regulation

• Defeating *Salmonella*: A 4-Point Plan: An example of consumer level approach to food safety
  – Get off to a CLEAN start!
  – CHILL your food and stop bacteria cold!
  – SEPARATE! Don’t cross-contaminate!
  – COOK safely!

State Food Regulatory Resources in the USA

• State agencies roles and responsibilities
  – Authorities vary significantly between states (example: adoption of FDA Model Food Code or food processing standards)
  – Direct regulation of non-food service segments of food supply
  – Conduct and coordinate food supply component of outbreak investigations

• Contact information
  – Directory of State and Local Officials (DSLO)-
    http://afdo.org/resources/dslo/search/bystate.cfm
  – Jurisdictional authorities – AFDO State Food Safety Resource Survey -
    http://afdo.org/resources/stateresourcesurvey.cfm#

Federal / National Roles and Responsibilities in the USA

• Federal regulatory jurisdictional authorities:
  – USDA FSIS – egg products, meat and poultry
  – FDA – 80 % of food supply including shell eggs

• Assess risks and develop science-based national standards
FDA Final Egg Safety Rule

• FDA web site has a wealth of information - see “Egg Safety Final Rule” page

• Comprehensive approach
  – Uninfected replacement birds
  – Biosecurity
  – Rodents, flies, and other pest control
  – Cleaning and disinfection
  – Refrigeration
  – Environmental sampling/testing
  – Egg sampling/testing
  – Required records

• Phased in requirements

Implementation of National Strategies

• Multi-disciplinary collaboration
  – requires active engagement at all levels
  – Government, industry, academia
  – Networking a key way to fill in gaps in jurisdictional authority and expertise

• Successful networking models
  – State level – example: FDA funded state Taskforces
    • Currently 28 state Taskforces (5 new states this year)
  – Regional level – example: GLBHI
Summary

• Food continues to be an important route of transmission of disease between animals and humans.
  – Population density
  – Globalization

• *Salmonella* Enteritidis
  – Comprehensive national strategy in US
  – Farm-to-fork approach

• Multi-disciplinary collaboration
  – Active engagement at all levels
  – Networking is key to fill in gaps in jurisdictional authority and expertise

Credits

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