

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

Source: 2011 Estimates - <http://www.cdc.gov/foodborneburden/>

Illnesses, Hospitalizations, Deaths

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

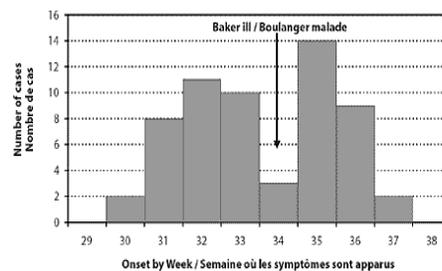
Illnesses		Hospitalizations		Deaths	
Microorganism	% (of Estimated Annual Total)	Microorganism	% (of Estimated Annual Total)	Microorganism	% (of Estimated Annual Total)
Norovirus	58	Salmonella, Nontyphoidal	35	Salmonella, Nontyphoidal	28
Salmonella, Nontyphoidal	11	Norovirus	26	Toxoplasma gondii	24
Clostridium perfringens	9	Campylobacter spp.	15	Listeria monocytogenes	19
Campylobacter spp.	9	Toxoplasma gondii	8	Norovirus	11
Staphylococcus aureus	3	E. coli (STEC) 0157	4	Campylobacter spp.	6
Subtotal	91		88		88

* For more information see <http://www.cdc.gov/foodborneburden/>

Example of Shifting Sources of Contamination

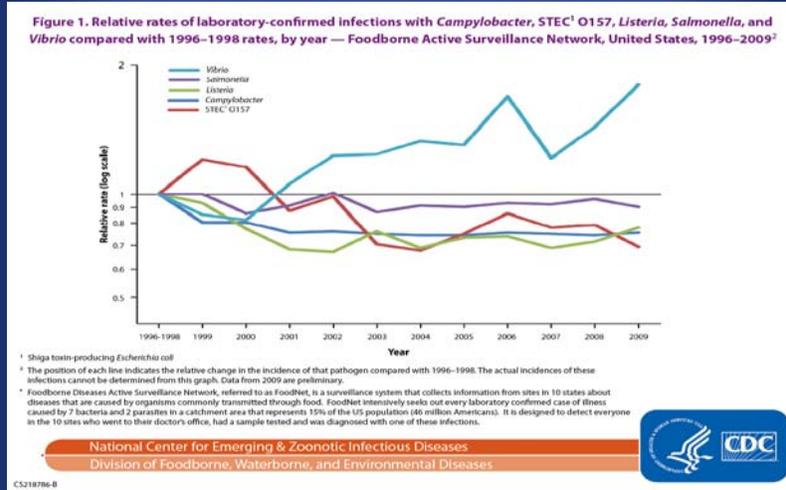
“ Salmonella Enteritidis Outbreak Linked to a Local Bakery, British Columbia, Canada, 2000”

Figure 2. Epidemic curve of S. Enteritidis cases by date of illness onset



Source: Public Health Agency of Canada – <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/05vol31/dr3107a-eng.php>

Trends in Foodborne Illness in the United States, 1996–2009



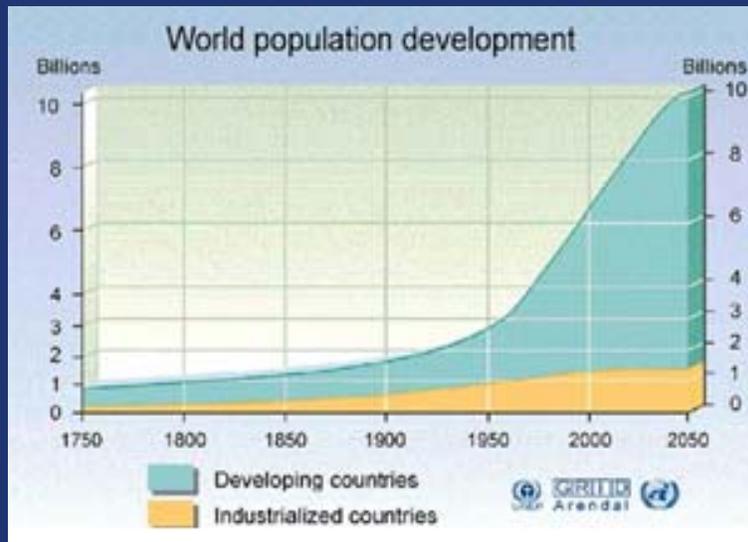
Source: <http://www.cdc.gov/foodborneburden/trends-in-foodborne-illness.html>

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”



David Chico, VMD, MPH, DACVPM
Director Emergency Programs
NYS DAM DAI



Source: Image from SustainableScale.org

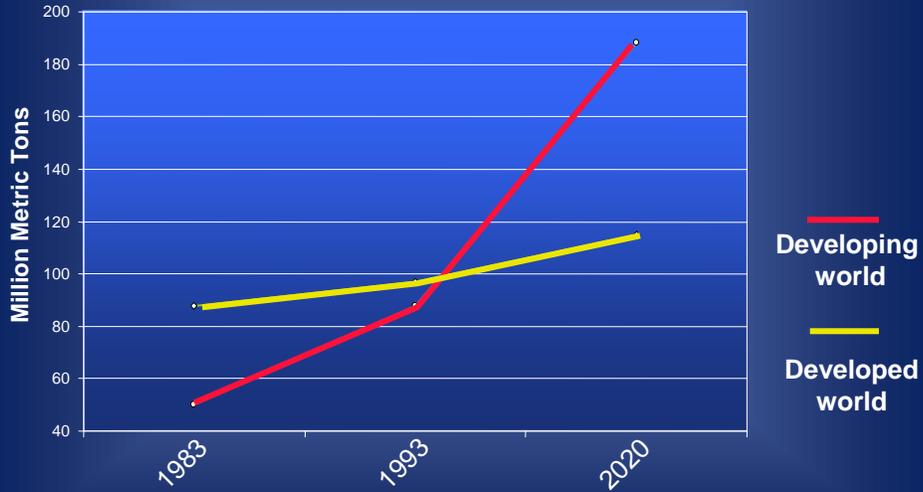
Foods of Animal Origin

- 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

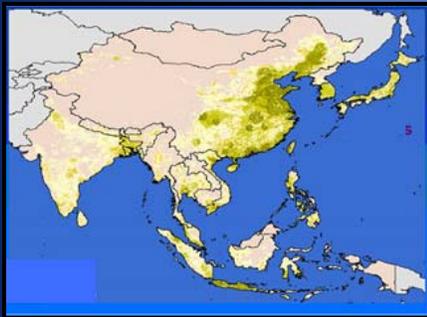
"Livestock Revolution": 1983-2020 Meat Consumption



David Chico, VMD, MPH, DACVPM
Director Emergency Programs
NYS DAM DAI

Microbial networks

Poultry population density



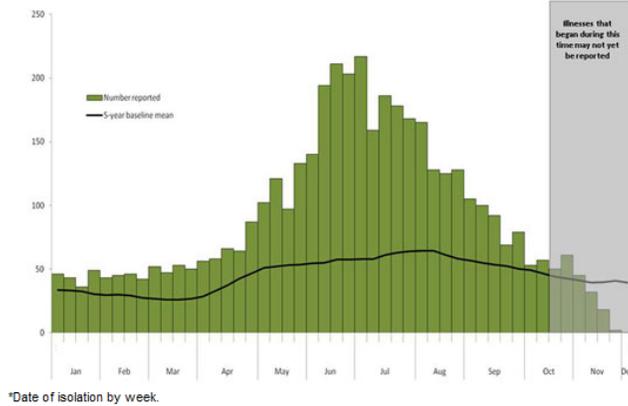
Human population density



Source: FAO, WHO, Rimsa, Mexico City April 2005

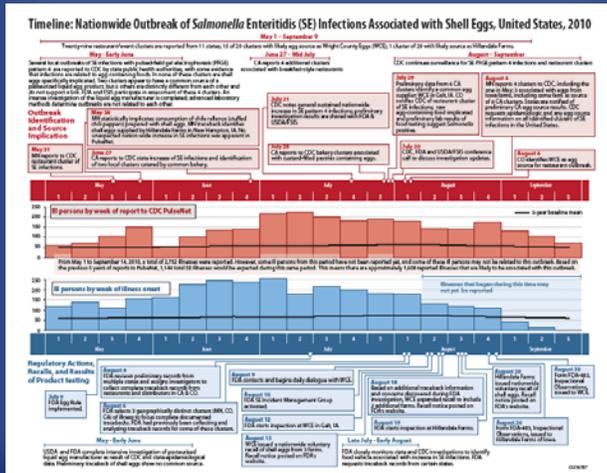
Salmonella Enteritidis Outbreak, 2010

Number of *Salmonella* Enteritidis cases matching PFGE pattern JEGX01.0004 reported to PulseNet, United States, 2010



<http://www.cdc.gov/salmonella/enteritidis/index.html>

Significant Public Health and Food Regulatory Response



Source: 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!

Source: Canadian Food Inspection Agency, "Salmonella Food Safety Facts Preventing foodborne illness" - <http://www.inspection.gc.ca/english/fssa/concen/cause/salmonellae.shtml>

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

- Dr. David Chico, New York State Department of Agriculture and Markets
- Katie Arends, Michigan Department of Community Health
- Dr. Kevin Walker, Michigan State University
- Louise Sharpe, Canadian Food Inspection Agency
- Connie Kiefuik, USDA Food Safety Inspection Service
- Dr. Dwayne Jarman FDA Detroit District Office
- Dr. Dan Harpster USDA Animal Plant Health Inspection Service (APHIS)