

Food Safety Management: Present and Future

Michael Doyle



Food Safety Management: Present and Future

- Need for effective, internationally accepted food safety management systems
 - ▲ Increased reliance on food imports
 - Gaps in the food safety net
 - Examples of food safety management tools
 - Future solutions
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**Need for Effective,
Internationally Accepted Food
Safety Management Systems**

Increased reliance on imported food, especially from countries that do not have the same level of sanitary practices for producing and processing foods as most developed countries, can lead to major increases in food-associated illnesses

Trends in U.S. Food (exclude feed) Imports vs. Exports

- Dramatic increase in U.S. importation of food

	2001	2002	2003 (\$ million)	2004	2005
Import	34,115	35,826	40,888	47,234	51,892
Export	37,813	38,569	40,987	44,023	45,851

USDA, ERS (www.ers.usda.gov/publications/Agoutlook/AOTables/AOTables.htm)

United States Food Imports

- Approximately 15% of food consumed in USA in 2006 was imported
 - ▲ Food imports doubling ca. every 10 years
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Top Ten Agriculture (not only food) Export Countries to USA

Rank	Country	Values in million dollars		% Change from 2006 to 2007
		2002	2006	
1	Canada	10,350	13,432	13
2	Mexico	5,518	9,391	9.4
3	Italy	1,790	2,803	4.5
4	Australia	1,894	2,487	6.6
5	Ireland	286	2,354	- 8.8

USDA-Economic Research Service, FATUS Import Aggregation (www.fas.usda.gov/ustrdscripts/USReport.exe)

Top Ten Agriculture (not only food) Export Countries to USA

Rank 2006	Country	Values in million dollars		% Change from 2006 to 2007
		2002	2006	
6	China	1,002	2,265	33
7	Brazil	1,154	2,231	23
8	Netherlands	1,748	2,092	9.6
9	Indonesia	931	2,042	- 8.7
10	France	1,486	1,983	3.8
	TOTAL WORLD	41,909	65,326	9.8

USDA-Economic Research Service, FATUS Import Aggregation (www.fas.usda.gov/ustrdscripts/USReport.exe)

Examples of Trends of Import Share of U.S. Food Consumption for Specific Foods

Selected items	1980	1990	2000	2001
	(Percentage)			
Beef	8.7	9.7	11.0	11.6
Lamb	9.5	10.2	36.6	39.8
Fish and Shellfish (Fresh & Frozen)	56.8	65.8	81.7	83.3
Fruits (Fresh and Frozen)	5.8	15.6	22.3	23.1
Fruit Juices	11.6	48.7	31.9	31.5
Tree Nuts	25.6	35.7	39.3	48.9
Vegetables (Fresh & Frozen)	5.9	9.6	14.0	16.0

Andy Jerardo, USDA, ERS (www.crs.usda.gov) FAU79-01, July 2003

Gaps in Food Safety Net for Imported Foods

Microbiological Safety Issues Associated with Imported Foods

- Sanitation practices for food production and preparation are not universally equivalent throughout the world
 - Importing foods can move pathogens from areas where pathogen is indigenous to locations where it seldom or does not exist
 - ▲ Example, *Cyclospora* in raspberries from Guatemala to U.S. and Canada
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Pathogen Contamination of Produce

- Sources of pathogens:
 - ▲ Sewage/manure used as soil fertilizer or through environmental contamination
 - ▲ Irrigation water
 - ▲ Processing water
 - ▲ Poor personal hygiene of infected foodhandlers
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Examples of Food Safety Concerns Associated with Imported Produce

- Centuries old tradition of using human excreta on farmland is widespread in east Asia, especially in China and Vietnam
 - Irrigation water often contaminated with untreated human and animal fecal waste
 - ▲ Only 10% of human sewage from Mexico City is treated; rest goes untreated into rivers
 - Insanitary harvesting practices of importing countries
 - ▲ Mexican children infected with Norovirus or Hepatitis
A accompany parents in produce field during harvest
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Fecal Waste Used in Aquaculture Production

- Raw domestic sewage and/or livestock manure are frequently used in fish farming in many Asian countries
 - ▲ Estimates at least two-thirds of the world production of farmed fish is grown in ponds fertilized with animal manure or human sewage
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Chicken/Shrimp Farming in Thailand

- Chicken/shrimp farming is only means of income for many small stakeholders
 - ▲ Chicken coops (e.g., 20,000 birds/farm) sit in rows suspended over ponds that hold shrimp and fish
 - ◆ Livestock below feeds on waste from above

BBC News, January 27, 2004



Food Safety Issues with Imported Fishery/Seafood Products

- *Salmonella* is a common contaminant of fish and fishery products resulting in detention by FDA
 - ▲ In 2001, of 6,405 violations 28.6% were for adulteration by *Salmonella*
 - ◆ More than half of violations for *Salmonella* were for contaminated shrimp and prawns
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J. Allhouse et al., USDA, ERS, International Trade and Seafood Safety, AER-828, p. 109-124, Nov 2003

Leading Countries of FDA Food Import Refusals for August 2007

Country	Number of Refusals
China (Mainland)	187
India	173
Mexico	160
Canada	52
Pakistan	50

www.fda.gov/ora/oasis/8/ora_oasis_cntry_1st.html

Examples of FDA Food Import Refusals for *Salmonella* Contamination for August 2007

Country	Product
China	Shrimp Harvested in India then sent to China
China	Chives
China	Whole Black Peppercorns
China	Dog Chicken Strips
Egypt	Basil
Egypt	Fennel
India	Frozen Ginger
India	Frozen Fish Chunks in Tray
India	Black Pepper
India	Cumin

(Continued)

Examples of FDA Food Import Refusals for *Salmonella* Contamination for August 2007 (Continued)

Country	Product
Indonesia	Cinnamon
Indonesia	Frozen Grouper Fillets
Malaysia	Frozen Shrimp
Mexico	Dry Hard Cheese
Pakistan	Coriander Powder
Philippines	Frozen Octopus
Philippines	Dried Taro Leaves
Thailand	Shrimp & Prawns
Vietnam	Frozen Grouper
Vietnam	Ground Black Pepper

FDA Import Program (www.fda.gov/ora/import/ora_import_program.html)

USA Federal Inspection of Imported Foods

- In 1985, ca. 950,000 line items (food entries) under FDA jurisdiction were offered for import into U.S.
- In 1998, > 3 million
- In 2003, ca. 6 million
- In 2005, 8.7 million
- In 2006, > 9 million
- Projected 2007, ca. 11.7 million

Testimony to U.S. Senate Committee on Government Affairs, 1998

Testimony to U.S. Senate Committee on Agriculture, Nutrition and Forestry, 2005

Summary of Issues with Imported Foods Safety Net

- Food imports to the many countries, including the USA, are increasing at an unprecedented rate
 - Developing countries are major players in the food import market, and have or will likely become the predominant sources of the food supply of many countries worldwide
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Summary of Issues with Imported Foods Safety Net

- Food in many countries is not produced and prepared under acceptable sanitary practices or under conditions equivalent to U.S.-produced foods
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Examples of Food Safety Management Tools

- Risk Analysis
 - ▲ Exposure assessment models
 - ▲ Risk characterization (risk of illness per number of servings)
 - Good Agricultural Practices (GAPs)
 - Current Good Manufacturing Practices (cGMPs)
 - Good Hygienic Practices (GHPs)
 - Sanitation Standard Operating Procedures (SSOPs)
 - Hazard Analysis Critical Control Points (HACCP)
 - Appropriate Level of Protection (ALOP), Food Safety Objectives (FSOs), Performance Objectives (POs)
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Definitions of Some Food Safety Management Tools

- ALOP – Acceptable Level of Protection
 - ▲ Example, the number of illnesses per 100,000 population caused by a hazard/food combination
 - ◆ Hypothetical example, no more than 1 case of listeriosis per 100,000 population from eating seafood salad
 - FSO – Microbiological Food Safety Objective
 - ▲ Maximum frequency or concentration of a microbial hazard in a food considered tolerable for consumer protection
 - ◆ Example, the level of *Listeria monocytogenes* in RTE foods must not exceed 100 CFU/g at time of consumption
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Definitions of Some Food Safety Management Tools

- PO – Performance Objectives
 - ▲ Control parameters at a step or combination of steps that contribute to ensuring safety of a food
 - ◆ Example, kill 5D of E. coli O157 in ground beef by heating at 160°F (71.7°C)
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Example of Microbiological Food Safety Management System

Epidemiologic data indicate public health concern



Risk evaluation (expert panel or QRA)
(Determine ALOP)



Establish Food Safety Objective



Establish Performance Objectives
(Process/product requirements)



Implement control measures
(SSOPs, cGMPs, HACCP)



Establish monitoring/verification procedures
(Microbial, chemical/physical, sensory tests)

Weaknesses in Food Safety Management Tools

- Effective food attribution, risk assessment, and risk prioritization processes
 - Effective interventions/CCPs, especially for foods consumed raw or uncooked such as fresh fruits and vegetables
 - Effective sampling protocols and testing procedures
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Future Solutions

Proposed Future Solutions

U.S. Food and Drug Administration Food Protection Plan and U.S. Department of Health and Human Services Action Plan for Import Safety

FDA Food Protection Plan

- Three elements of protection:
 1. Prevent Foodborne Contamination
 2. Intervene at Critical Points in the Food Supply Chain
 3. Respond Rapidly to Minimize Harm

November 2007

FDA Food Protection Plan – Prevent Foodborne Contamination

- **Promote increased corporate responsibility to prevent foodborne illnesses**
 - Identify food vulnerabilities and assess risks
 - Expand the understanding and use of effective mitigation measures
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FDA Food Protection Plan – Intervene at Critical Points in the Food Supply Chain

- Apply inspections and sampling based on risk
 - Enhance risk-based surveillance
 - Improve the detection of food system “signals” that indicate contamination
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FDA Food Protection Plan – Respond Rapidly to Minimize Harm

- Improve immediate response
 - Improve risk communications to the public, industry and other stakeholders
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FDA Food Protection Plan – Examples of “Action Plans”

- “FDA will seek partnerships with industry to enhance consumer confidence.”
 - ▲ Develop food protection plans that address safety and defense vulnerabilities
 - ▲ Implement prevention steps
 - ▲ Develop contingency plans to improve response to a foodborne illness outbreak
 - “FDA will work with industry, consumer and federal, state, local and international partners to help model and promote preventative controls based on best industry practices.”
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FDA Food Protection Plan – Examples of “Action Plans”

- “FDA plans to acquire additional data to develop a better understanding of foreign country practices for food and feed.”
 - ▲ Share U.S. food safety and defense best practices with foreign governments and provide technical assistance
 - ▲ FDA will analyze food import trend data and integrate it into a risk-based approach for inspection
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FDA Food Protection Plan – Examples of “Action Plans”

- “Establish a risk-based process to continuously evaluate which FDA-regulated products cause the greatest burden of foodborne disease.”
 - ▲ Focus on products that have the potential to pose the greatest risk to human and animal health
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Action Plan for Import Food Safety (The roadmap includes 50 action steps)

- Sample Action Plans:
 - ▲ Develop Good Importer Practices with food exporting countries
 - ◆ Raise level of hygienic practices for food production and processing in different countries
 - ▲ Establish third-party certification programs
 - ▲ Establish field presence at key foreign ports
 - ▲ Enhance field laboratory capacity
 - ▲ Develop foreign governments data exchange program for foreign inspection results and adverse event reports
 - ▲ Develop best practices for track-and trace technologies

Proposed Future Solutions

USA food industry food protection plan for food imports

USA Food Industry (Grocery Manufacturers Association) Proposed Approach to Food Safety Management for Food Imports

- Mandatory foreign supplier quality assurance program
 - ▲ All importers must establish supplier programs to insure imported foods meet FDA safety requirements
 - ▲ Food companies will use FDA guidance to adopt foreign supplier food safety programs
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USA Food Industry (Grocery Manufacturers Association) Proposed Approach to Food Safety Management for Food Imports

- Voluntary qualified importer food safety program
 - ▲ Prioritize imports to target FDA inspections and resources
 - ▲ Permit importers who meet high safety standards and share additional testing data to be eligible for expedited entry
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USA Food Industry (Grocery Manufacturers Association) Proposed Approach to Food Safety Management for Food Imports

- Capacity building at foreign locations
 - ▲ Expand capacity of foreign governments to prevent and detect threats to food safety
 - ▲ Expand FDA training programs
 - ▲ Expand FDA access to foreign facilities and data
 - ▲ Expand efforts to harmonize food safety standards globally
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USA Food Industry (Grocery Manufacturers Association) Proposed Approach to Food Safety Management for Food Imports

- Capacity building at USA borders
 - ▲ Expand FDA resources (personnel, laboratory capacity, scientific expertise)
 - ▲ Increase and target inspections
 - ▲ Improve FDA's analytical testing and use of information technology
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Conclusions

- Global changes in food importation necessitates effective, internationally accepted food safety management systems
 - Currently have major holes internationally in the food safety net
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Conclusions

- Many food safety management tools are available, but many more effective management tools are still needed
 - Pressing need to address weaknesses in food safety management tool box
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