Food Defense: Background and Global Importance
Protecting the Food Supply

- **Food Safety** – the efforts to prevent accidental (unintentional) contamination of food products

- **Food Defense** – the efforts to prevent intentional contamination of food products (*Human intervention as the source of contamination*)

- **Food Security** – when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life (WHO, 1996)
The Spectrum of Intentional Food Contamination

- Extremist Groups
- Economic Adulteration
- Counterfeit/Diversion/Tampering
- Disgruntled Employees/Sabotage
Why Are We Concerned?

• Intentional contamination does happen
• Intelligence indicates that it is a known means to cause widespread health and economic harm
• “How to” info is widely available
• Food supply is
  – soft target — difficult to protect
  – global — we’re in this together
Why the Food Supply?

Intentional contamination has the potential to cause:

- significant public health consequences
- widespread public fear
- devastating economic impacts
- loss of public confidence in the safety of food and effectiveness of government
- disruption of trade
- possibly even increased food insecurity
Farm-to-Table Chain

- Contamination could occur at any point:
  - crops, livestock, processing, distribution, storage, retail, and transportation
- An act at any point could harm significant numbers of people and have major economic impact
Examples of Potential Contaminants

Unintentional:
- Biological
- Chemical
- Physical

Intentional:
- Biological
- Chemical
- Radiological
- Physical

These are partial lists – more info at:

http://emergency.cdc.gov/bioterrorism/
Globalization of the Food Supply

Physical Map of the World, April 2000

Grains

Vegetables

Bananas

Processed Meat

Cheese

Cocoa

Seafood

Spices

Fresh Meat

Oils

Juices

Bananas

Cocoa

Seafood

Fresh Meat
Globalization of the Food Supply

• In U.S. food imports growing rapidly
  – Now 15-20% of food consumed
  – Imported seafood: ~75-80%
  – Fresh fruit: ~50%
  – Vegetables: ~20$

• Agricultural exports: ~$100 billion
• Agricultural imports: ~$80 billion

• An incident may not only impact your company--Can impact the whole industry and the national economy
The Well-Traveled Salad. Do You Know Where Your Food Has Been?

As consumers, many of us fail to recognize that even our domestic and local food supplies are part of a global network. The daily activity of consuming food directly links our health as humans to the health of crops and produce, foods, animals, and the environments in which they are produced.

A “One Health” approach to food safety—bringing together expertise and resources from the clinical, veterinary, wildlife health, and ecology communities—has the potential to reveal the sources, pathways, and factors driving the outbreaks of foodborne illness and possibly prevent them from occurring in the first place.

NOTE: Countries are listed in alphabetical order and not by volume of export.
Past Events - Intentional

2010
US uncovers plot to poison hotels and restaurants at multiple locations

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2003
61 Students felled by rat poison in central China

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2007
Beijing - The food poisoning of 203 hospital patients in northeast China was an intentional act, police said...

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2003
JOURNAL OF FORENSIC SCIENCES
Arsenic Poisoning Caused by Intentional Contamination of Coffee at a Church Gathering

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2006
350 Iraqi Policeman Suffer Food Poisoning

2006
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2002
'The Independent'
'Al-Qa'ida' attempt to poison Rome's water supply foiled

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2003
Associated Press
Grocery store worker accused of poisoning beef

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2003
'Telegraph.co.uk'
Milk alert as poison terrorist strikes

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Unintentional Incident vs. Intentional Incident
Unintentional Incident

- September 1994 – an estimated 224,000 ill
  - Ice cream contaminated with *Salmonella* Enteritidis
- Ice cream was produced in a single facility
- Most likely cause
  - Post processing contamination during transportation
  - Pasteurized ice cream mix was transported in a truck that had previously carried raw liquid eggs
Intentional Incident

• 1984 – Oregon cult members added *Salmonella* bacteria to restaurant salad bars

• Intent:
  – affect outcome of a local election

• Result:
  – 751 illnesses reported
  – 45 individuals required hospitalization
  – No fatalities
Threat as a Weapon

• Even the threat of tampering can pose serious problems for public health and the international economy

• Example – 1989 threat of cyanide in Chilean grapes imported into the U.S.
  – incident cost Chile $300 million in lost revenue
Public Health Impact

• Significant public health consequences related to intentional contamination, especially if a smart insider

• Modeling studies have estimated ~4,000-600,000 potential deaths and illnesses

• Depending on type of food, agent & point of contamination--public health consequences can change significantly
Economically Motivated Adulteration

Fraudulent, intentional substitution or addition of a substance in a product for the purpose of increasing the apparent value of the product or reducing the cost of its production, i.e., for economic gain
What is EMA?

Forms of Economic Adulteration

“Concealment”
salmonella peanut contamination concealed

“Unapproved Enhancements”
melamine added to milk to enhance the protein value

“Mislabeling”
sunflower oil sold as olive oil

“Counterfeiting”
misbranded toothpaste

“Dilution”
watered down milk

“Substitution”
honey with beet sugar

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The Economics of EMA

• EMA costs global food and consumer products industry $10 to $15 billion/year

• One incident can cost 2 – 15% of yearly revenues which translates to:
  – $10 billion company = $400 million loss
  – $500 million company = $60 million loss
Cyber Security Concerns

• Some food companies rely on computer systems to control food manufacturing processes
• Given the heightened focus on cyber security, all sectors should be adequately prepared
• Cyber security company, Symantec, estimates that over 80% of small businesses do not have a formal cyber security plan
• A typical cyber attack on small business can cost ~ $200,000—which could put company out of business

(Symantec)
Cyber Security Concerns

- Password-protect access to facility’s computer systems
- Install firewalls on computer network and use up-to-date computer virus protection/detection system
- Training for personnel with access to critical cyber assets on recognizing & reporting indicators of insider threat
- Limit physical access to computer systems to authorized personnel
- Have policy/procedures for handling of insider threat incident
Special Considerations

• Type of agent might differ from an unintentional contamination incident
• Scale of incident might be greater
• Crime Scene: coordination with local and federal law enforcement
• Elevated public concern and media interest
• Need to confirm facility is free of residual contaminant before resuming food production
• EMA and cyber security new areas to address
Comprehensive Food Defense Strategy

• Directed by laws and directives:
  – Provide outreach and training
  – Conduct vulnerability assessments
  – Develop mitigation strategies
  – Conduct surveillance
  – Conduct research
  – Manage food defense emergencies
  – Risk communications
Coordination Essential

- Industry
- Food regulatory agencies
- Intelligence agencies
- Law enforcement
- State Department
- Foreign partners
- Public health agencies
- Academia
The Challenge

- Gaps in food defense capacity in many parts of the world
- Contamination of the food supply would not only have serious consequences for a targeted country, but would likely also impact other countries
Benefits of Implementing Food Defense

- Helps protect your business and economy
- Further protects public health
- Supports safety and quality efforts
- May expose process/business inefficiencies
- May reduce theft
- Reduces risk and impact of an event
- Competitive advantage!
Summary

- There are a broad spectrum of non-traditional threats to the food supply.
- It is possible to cause significant public health and economic impact from intentional contamination.
- We must focus farm-to-fork.
- Important to develop a comprehensive strategy.
- Collaboration of all stakeholders is essential.
- *Food supply is global*—we must work together to reduce/minimize risk and impact of an incident of intentional contamination.

*Food and Drug Administration*

*U.S. Food and Drug Administration*  
*Protecting and Promoting Public Health*  

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*www.fda.gov*
Questions?

For additional information on food defense:

FDA
http://www.fda.gov/fooddefense

USDA/FSIS
http://www.fsis.usda.gov