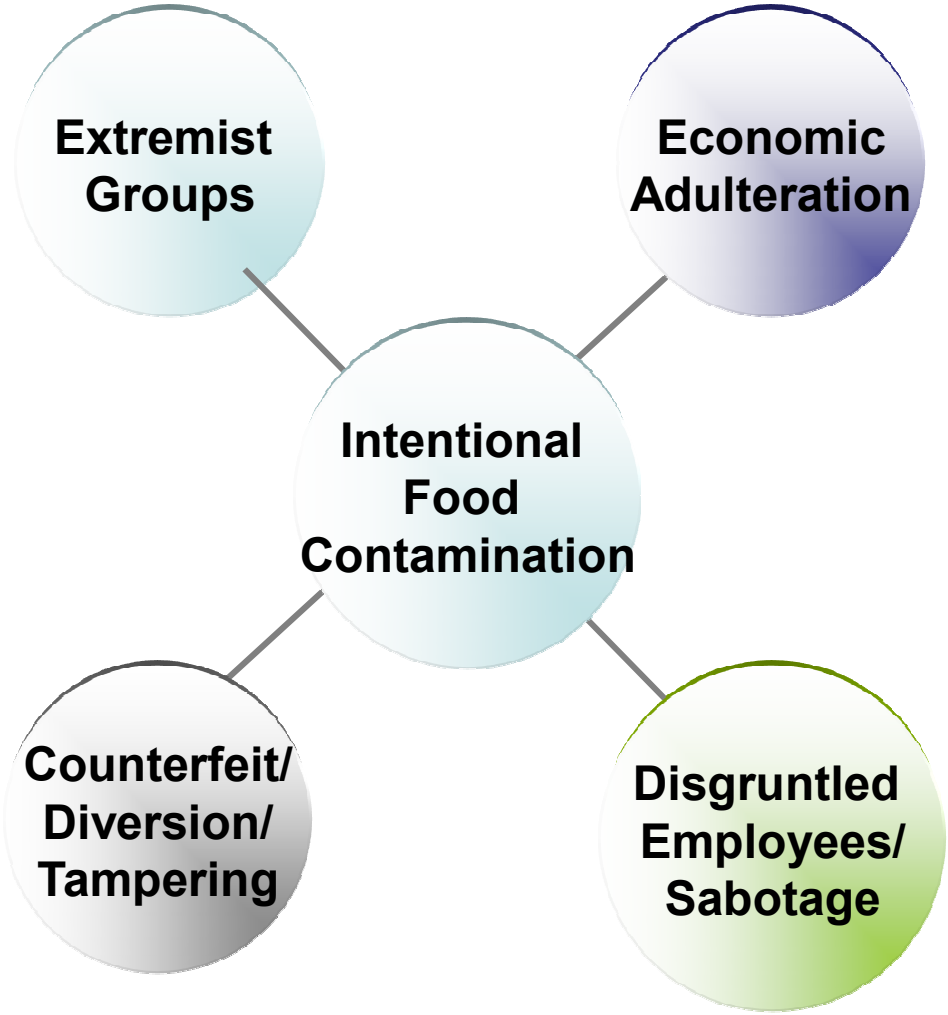
Food Defense: Background and Global Importance

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



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

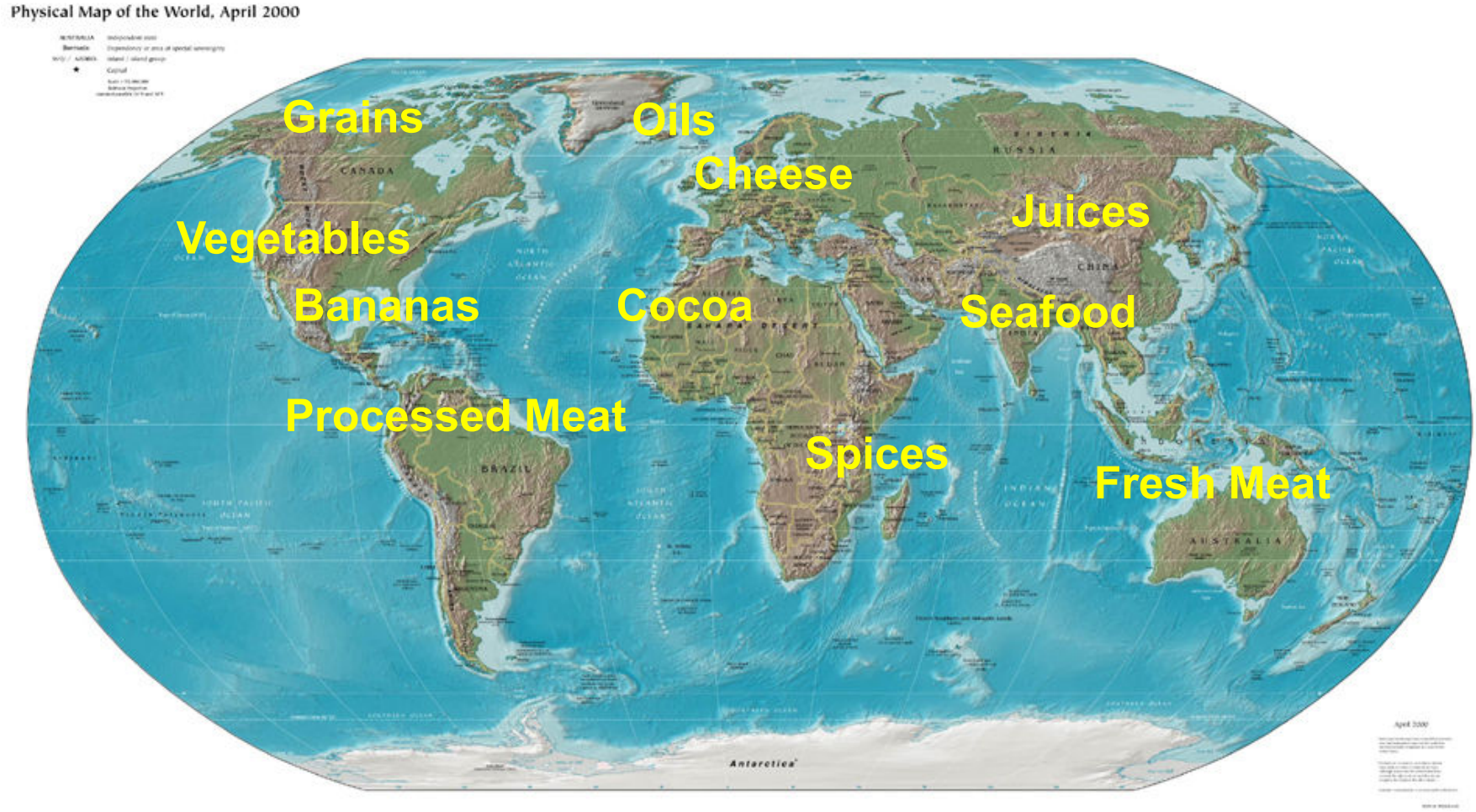
Intentional:

- Biological
- Chemical
- Radiological
- Physical

These are partial lists – more info at:

http://emergency.cdc.gov/bioterrorism/

Globalization of the Food Supply



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**


LETTUCE
Canada, Chile, Dominican Republic, Mexico, Peru, USA
CROUTONS
Argentina, Australia, Brazil, Canada, China, France, India, Mexico, Netherlands, Poland, Russia, Switzerland, Uruguay, USA, Vietnam
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, food animals, and the environments in which they are produced.
CUCUMBERS
Canada, Honduras, India, Mexico, Spain, USA
TOMATOES
Canada, Dominican Republic, Holland, Israel, Italy, Mexico, USA
FETA CHEESE
Canada, Denmark, Egypt, Germany, Greece, Israel, Italy, Turkey, UK, USA
ONIONS
Canada, China, Germany, India, USA
VINAIGRETTE
Argentina, Brazil, Canada, Chile, China, France, Germany, Greece, India, Indonesia, Italy, Mexico, Morocco, Peru, Portugal, Spain, Thailand, Tunisia, Turkey, USA, Vietnam
OLIVES
Greece, Israel, Mexico, Spain, USA
SPROUTS
Argentina, Australia, Bangladesh, Canada, China, Egypt, France, India, Morocco, Nepal, Pakistan, South Africa, Spain, Turkey, USA
MANDARIN ORANGES
Israel, Mexico, Morocco, South Africa, Spain
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
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www.iom.edu

Past Events - Intentional

2010

US uncovers plot to poison hotels and restaurants at multiple locations

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

2007

People's Daily 2003

61 Students felled by rat poison in central China

BBC NEWS 2003

Italy on alert for water poisoner

JOURNAL OF FORENSIC SCIENCES 2010

Arsenic Poisoning Caused by Intentional Contamination of Coffee at a Church Gathering

AUSTRALIAN 2006

350 Iraqi Policeman Suffer Food Poisoning

THE INDEPENDENT 2002

'Al-Qa'ida' attempt to poison Rome's water supply foiled

Associated Press 2003

Grocery store worker accused of poisoning beef

Telegraph.co.uk 2003

Milk alert as poison terrorist strikes

- **Unintentional Incident**

vs.

- **Intentional Incident**

Unintentional Incident

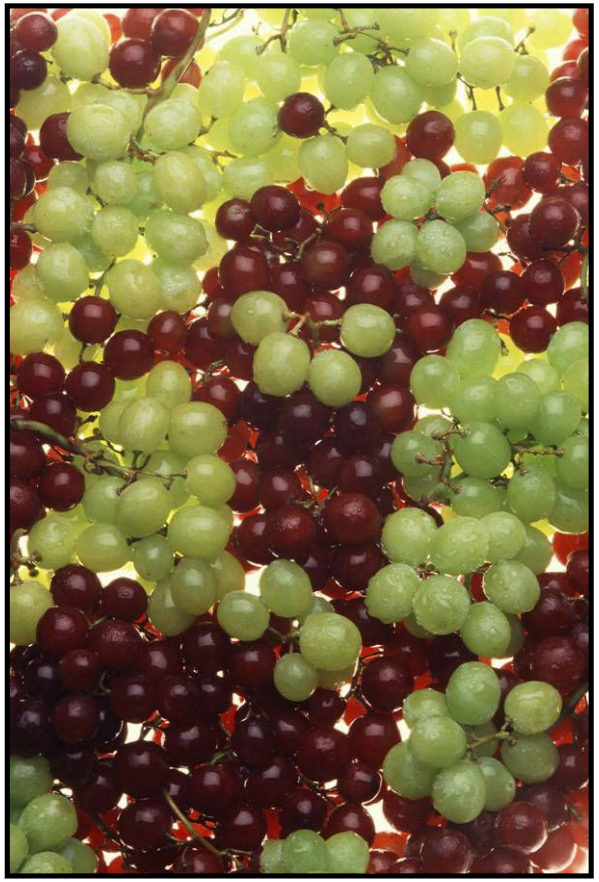
- September 1994 – an estimated **224,000** ill
  - Ice cream contaminated with *Salmonella* Enteritidis
- Ice cream was produced in a single facility
- Most likely cause
  - Post processing contamination during transportation
  - Pasteurized ice cream mix was transported in a truck that had previously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



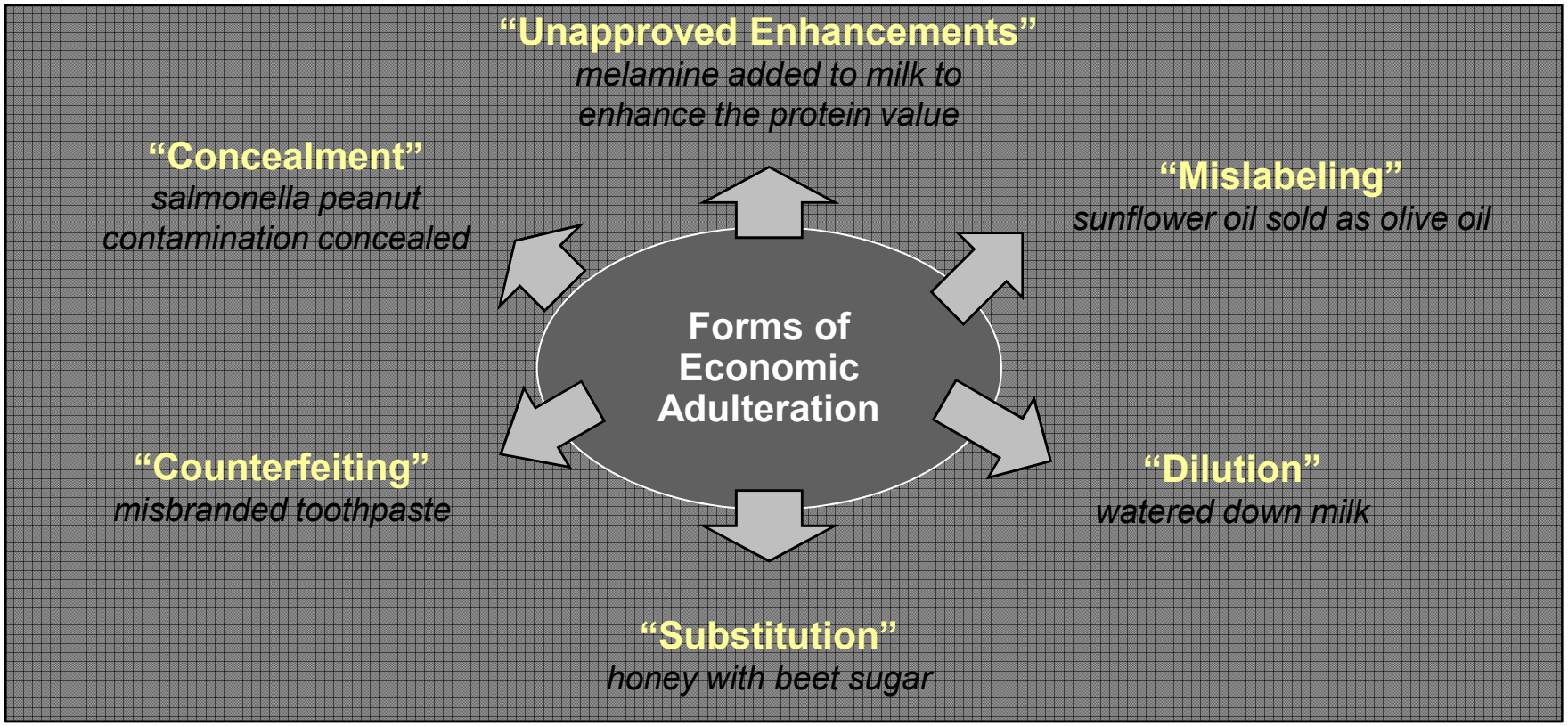
Public Health Impact

- 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?



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

Questions?

For additional information on food defense:

FDA

http://www.fda.gov/fooddefense

USDA/FSIS

http://www.fsis.usda.gov