What Initiated the Need for a Food Safety Plan

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Disease Outbreaks Caused by Fresh Produce

- 1996-97 – 2,400 people sick from cyclospora in Guatemalan raspberries
- March 1997 – Michigan students and teachers contract hepatitis A from Mexican frozen strawberries
- 2000-02 – Four salmonella outbreaks from Mexican cantaloupe kill two people and hospitalize at least 18.
- October 2003 – Two die and 16 sick from E. coli-tainted fresh spinach in California
- November 2003 – Three die and at least 650 cases of hepatitis A from Mexican green onions
- May 2004 – 13 million pounds of raw almonds recalled after 8 cases of salmonella were reported
- June 2004 – 12 cases of salmonella in sprouts
- July 2004 – 429 cases of salmonella comes from tomatoes on deli sandwiches
- September 2005 – Dole Fresh Vegetables recalls bagged salads after two dozen people contracted E. coli
Produce in 2006

- Spinach  September
- Carrot juice  September
- Tomatoes  November
- Curly Spinach  December
- Taco Bell  December
- Taco John’s  December

183 people in 18 states confirmed ill with Salmonellosis traced to contaminated tomatoes

204 people ill with E. coli O157:H7, 3 deaths in 26 states

IN THE NEWS...

Spinach Pulls From Stores Across U.S.  
F.D.A. Warns of Outbreak And Not To Eat Bag Spinach  
Lettuce Suspected in Taco Bell E. coli  
Killer bacteria hunted in fields of California  
USA TODAY
FDA can shut down an entire industry

**Tomato/Jalapeno/Serrano Pepper Outbreak**

- FDA & CDC focused on clusters of illnesses
- Pointed to tomatoes as the food that caused 1442 people to become ill and 286 hospitalized with Salmonella Saintpaul
- Later investigation revealed that Serrano peppers from Mexico were the culprit

**1996 – 2006 Produce Outbreaks by Commodity**

- Tomato 12
- Lettuce 14
- Cantaloupe 7
- Romaine 4
- Basil 4
- Basil or Mesclun 2
- Mixed lettuce 1
- Cabbage 1
- Spinach* 2
- Parsley 2
- Raspberries 6
- Green onions 3
- Unknown 2
- Honeydew 2
- Mango 2
- Melons 2
- Almonds 2
- Green grapes 1
- Snow peas 1
- Squash 1
Foodborne outbreaks related to fresh produce, 1973-1997:

Pathogens identified in 103 (54%) of outbreaks

- **Bacterial** 62:
  - *Salmonella* 30
  - *E. coli O157* 13
  - Shigella 10
  - Campylobacter 4
  - Other 5

- **Viral** 21
  - Hepatitis A 12
  - Norovirus 9

- **Parasite** 16
  - Cyclospora 8
  - Other 8

- **Chemicals** 4

Pathogens with animal reservoir = 48 outbreaks
Pathogens with human reservoir = 34 outbreaks
Pathogens with uncertain reservoir = 21 outbreaks
Foodborne outbreaks reported to CDC 1998-2002*: Pathogens identified in 179 (72%) of 249 produce associated outbreaks

- **Bacterial:** 76
  - *Salmonella* 45
  - *E. coli O157* 14
  - *Shigella* 9
  - *Campylobacter* 4
  - *Other* 4

- **Viral:** 88
  - *Norovirus* 81
  - *Other* 7

- **Parasitic:** 6

- **Chemical:** 4

(*Preliminary information)

Produce Associated Outbreaks Affect Business

- Produce buyers & food retailers addressing the issue because of their customers
- Buyers are requiring third party inspections of farms that supply produce and certification of Good Agricultural Practices
- Growers implement GAPs to satisfy buyers & to maintain and increase their markets

Produce is Under the Microscope

- There continues to be concern expressed by elected officials
- There’s a new administration and a new Congress
- Fairly certain that there will be some food safety legislation in the next year
Current Problems With Harmful Microbes

- Some people are more vulnerable to foodborne illness:
  - Young children or elderly people.
  - Immuno-compromised individuals.
- New ways of transmitting organisms:
  - Widespread food distribution system.
  - New food formulations and handling practices.
  - Changes in food choices.
- New or evolving pathogens:
  - Example - *E. coli* 0157:H7.

Contamination With Microbial Pathogens: Where Can It Occur?

- In fields or orchards
- During harvesting and transport
- During processing or packing
- In distribution and marketing
- In restaurants and food service facilities
- In the home

FARM to FORK
Sources of Pathogens on Produce

- Contaminated irrigation water
- Handling by infected workers
- Fresh or uncomposted manure/fecal material
- Wild and domestic animals

Water Carries Pathogens

- *E. coli* 0157:H7 viewed primarily as a water-borne pathogen.
  - Many outbreaks associated with recreational water.
- *Salmonella, Giardia* and *Cyclospora* outbreaks on produce caused by contaminated water.
Clean water quality is most important when in direct contact with edible portion of crop close to or at harvest.

Know Water Source Quality

- Best source (lowest risk) is drinking water, such as municipal.
- Ground water is less likely to have microbial contaminants than surface water.
- Surface water quality and pathogen levels are affected by watershed activities and season.

Irrigation Water Microbial BMPs

- Drip Irrigation has lowest risk
- Overhead irrigation
  - Source determines risk
  - Apply to minimize leaf drying time
  - Longer periods between overhead irrigation and harvest lowers risk
Proper Facilities, Education, and Training, Training, Training

Farm Worker Hygiene

• Teach workers about food safety and their role in preventing microbial contamination of fruits and vegetables.

• Provide clean restrooms with soap, clean water, and single-use towels.

• Enforce proper use of facilities.

Remember: proper handwashing and appropriate field sanitation facilities reduce risk.
Manure = Fecal Matter = Microbes

• Human or animal: DO EVERYTHING you can to keep manure off produce.
• Preventing contamination is the goal.

- Manage compost piles to achieve high temperatures to kill potential pathogens.
- Know the source.
- Time application properly.

Preventing manure from contaminating produce is crucial for maintaining food safety.
Harvest Considerations

- Ideally pick dry fruit or vegetable.
- Leave fruit that has bird droppings on it.
- Clean and sanitize totes daily.
- Cool product quickly.
- Teach workers about proper handwashing.

Water Disinfection
Animal Displays or Petting Zoos

Guidelines for Animal Contact Areas

- Instruct the public to wash their hands BEFORE and AFTER petting or feeding the animals.
- Provide a Clean-Up Station at the beginning and end of the petting zoo area
- Post signs indicating the location of handwashing facilities
- Do not allow human food or drink in animal areas
- Ensure that no feed is fed to the animals unless you provide it.
Farmers Markets

- All food should be stored at least six inches off the floor or ground
- Keep produce shaded with a canopy, umbrella or constructed stand
- Use a spray bottle of potable water to keep produce moist and prove some evaporative cooling
- Display produce on clean ice
- Store extra produce in coolers and maintain temperatures at or below 45F.
- If possible have one individual handle the money to reduce the chance of cross contamination

PREVENTION is the Key to Reducing Microbial Contamination of Fruits and Vegetables