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What Initiated the Need for a Food Safety Plan

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GAP Food Safety Training (Massachusetts)
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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

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- 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

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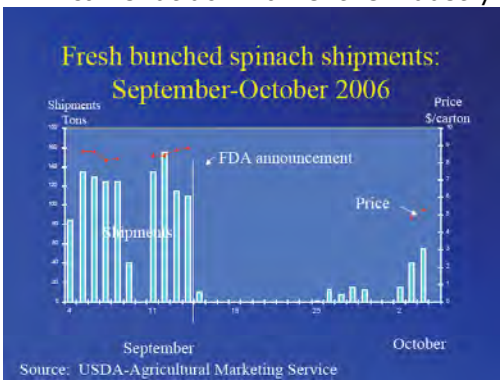
Produce in 2006

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

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**



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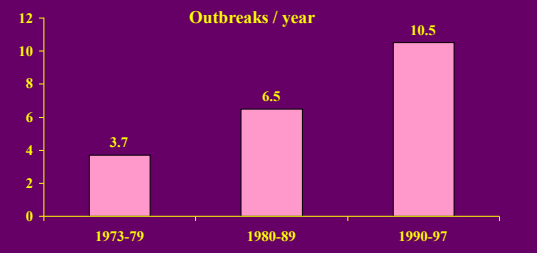
1996 – 2006 Produce Outbreaks by Commodity

- Tomato 12
- Lettuce 14
- Cantaloupe 7
- Romaine 4
- Basil 4
- Basil or Mesclun2
- 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

Number of Produce Associated Outbreaks by Decade, 1973-1997



1998-2006 Produce Outbreaks

- 5 commodity groups make up >75 percent of produce related outbreaks

Commodity	% produce outbreaks
Lettuce/leafy greens	30%
Tomatoes	17%
Cantaloupe	13%
Herbs (Basil, parsley)	11%
Green onions	5%
Total % of 5 top commodities	76%

US Food and Drug Administration, 2007

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

Pool, 2008

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.

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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

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Sources of Pathogens on Produce

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

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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.**

Water Management

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.**

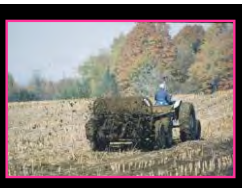
Remember: proper handwashing and appropriate field sanitation facilities reduce risk.

Manure = Fecal Matter = Microbes

- **Human or animal: DO EVERYTHING you can to keep manure off produce.**
- **<u>Preventing contamination</u> is the goal.**

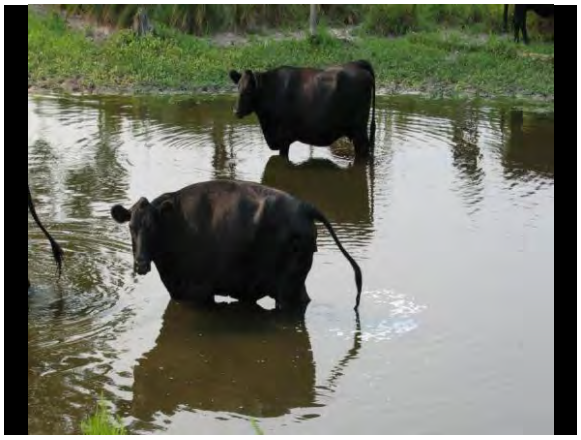
Manure

- **Manage compost piles to achieve high temperatures to kill potential pathogens.**



- **Time application properly.**

- **Know the source.**



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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.**

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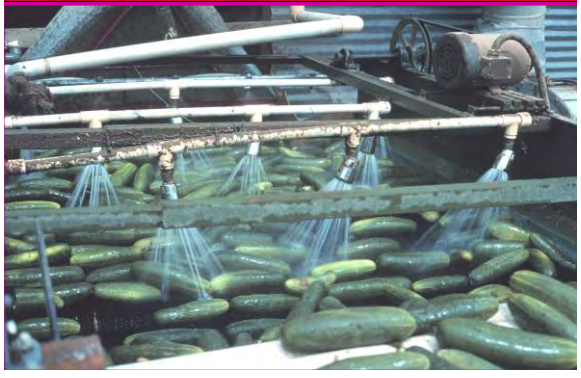
Water Disinfection



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Animal Displays or Petting Zoos

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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


GAPs
Good Agricultural Practices Program
Visit us at www.gaps.cornell.edu
Food Safety Begins on the Farm: A Grower's Guide
Food Safety Begins on the Farm: A Grower Self Assessment of Food Safety Risks
Food Safety Begins on the Farm
Fruits, Vegetables, and Food Safety:
Health and Hygiene on the Farm
Field Hygiene Poster Series


Good Hygiene Protects Everyone
Did you know? In the Field there is a need for hygiene too!
Did you know? Your kitchen could be a source of illness!
Fun Fruit & Very Vegetable Tour Coloring Book
Reduce Microbial Risks with Good Agricultural Practices
Refrigerator Magnets


Food Safety Begins on the Farm