The Conference for Food Protection is a unique organization that meets every two years and brings together a wide range of local, state and federal regulatory officials, representatives from the food industry (foodservice, food store and vending), academia and consumer groups. Over the last four meetings, the organization has grown considerably in both visibility and prestige. To assure that the Conference will continue to support itself in the future, the Conference is offering sponsorships to defray the costs.

The 2008 Conference is expected to attract over 400 individuals representing the groups noted above. Show your support for the Conference by becoming a sponsor.

As a Sponsor you will receive:
- Prominent listing in the Program Book,
- Signs indicating your participation as a Sponsor,
- Ribbons for all your personnel attending the Conference, and
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Reduced Workshop cost @ $100 for complimentary registrants only.

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  - In addition to the 5 items listed above, your organization will receive: 3 Complimentary Registrations for the Conference Biennial Meeting 1 Page “Sponsored in part by” logo ad in the Program book

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  - In addition to the 5 items listed above, your organization will receive: 1 Complimentary Registration for the Conference Biennial Meeting 1 Quarter-Page “Sponsored in part by” logo ad in the Program book

- **BRONZE** for organizations investing $500
  - Your organization will receive the 5 items listed above.

Deadline for submitting your Sponsorship is January 25, 2008

If you have any questions about Sponsorships, please call Larry Eils at NAMA, 312-346-0370 ext. 224 or e-mail tech@vending.org for assistance.

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**WORKSHOP - APRIL 12, 2008**

“What is the Future of Global Fresh Produce Safety for Retail and Foodservice?”

**Morning Session:**

7:30 - 8:00 a.m. Registration
8:00 a.m. Welcome
Don Schaffner, Ph.D., Program Chair - Rutgers University

8:10 - 8:45 a.m. Produce Related Foodborne Infections: Review of Outbreak Surveillance
Art Liang, Ph.D. - US Centers for Disease Control and Prevention

8:45 - 9:20 a.m. FDA’s Perspective on Global Produce Safety
Nega Beru, Ph.D. - U.S. Food and Drug Administration

9:20 - 9:50 a.m. BREAK

9:50 - 10:25 a.m. State Perspective on Produce Safety
Marion Aller, Ph.D. - Florida Department of Agricultural and Consumer Services

10:25 - 11:00 a.m. Harmonizing Global Retail/Foodservice Produce Safety Standards
Ms. Cindy Jiang - McDonalds Corporation

11:00 - 11:40 a.m. ROUND TABLE DISCUSSION AND QUESTIONS

11:40 - 1:10 p.m. LUNCH (on your own)

**Afternoon Session:**

1:10 - 1:45 p.m. Role of Agricultural Producers and Processors in Assuring Fresh Produce Safety
Dave Gombas, Ph.D., - United Fresh Produce Association

1:45 - 2:20 p.m. Farm to Table, Fresh Produce Safety at Darden Restaurants
Mr. John Gurrisi - Darden Restaurants

2:20 - 2:55 p.m. Retail Procurement Standards in a Global Economy
Cory Hedman - Hannaford Bros. Company

2:55 - 3:15 p.m. ROUND TABLE DISCUSSION AND QUESTIONS

3:15 Meeting Adjourned

---

**SHOW YOUR SUPPORT FOR FOOD SAFETY**

Become a sponsor of the Conference for Food Protection 2008 Biennial Meeting

San Antonio, Texas • April 11 - 16, 2008

CEU Credit will be available
PRODUCE SAFETY
States’ Perspective
April 12, 2008

Marion Aller, DVM, DABT
Association of Food and Drug Officials (AFDO)
Association of Food and Drug Officials
AFDO

- Established in 1896

- Mission: to foster uniformity in the adoption of food safety laws, rules and regulations
What’s the situation?
What’s the situation?

- Increase in food borne illnesses associated with fresh produce
- Multiple commodities
- Multiple states – site differences
What’s the situation?

- Diversity in production practices
- Lack of existing regulatory oversight at farm & packing house
- Societal intolerance of adverse events
What’s the Solution?
What’s the Solution?

- FDA – listening sessions
- USDA – Request for Comments on Marketing Orders/Agreements - LGs
- CA – Marketing Agreement
- FL – State Regulation
- AFDO Model Code
Marketing Orders and Agreements

- Both: Tools to assist industry in setting standards (quality), provide research, develop marketing/promotional activities
- Both: Funded by assessments on handlers
- Both: Administered by industry nominated representatives
- Both: Initiated by producers
Marketing Orders and Agreements

- Both: Legal instruments – civil penalties
- Orders: Binding upon all handlers in geographic region
- Orders: Must be approved by growers
- Agreements: Bind only Voluntary signatories
CA Leafy Green Marketing Agreement (LGMA)

- CDFA Oversight – mandatory audits based on food safety practices

- Covered commodities: Fresh, Fresh Cut: Lettuce (many!), escarole, endive, spring mix, spinach, cabbage, kale, arugula, chard
LGMA COMPONENTS

www.caleafygreens.ca.gov

- PERSONAL HYGIENE
  - field and harvest
  - training
  - written SOPs
- FIELD EQUIPMENT
LGMA COMPONENTS

- ANIMAL EXCLUSION
  - Animals of Significant Risk
    - deer, pigs, cattle, sheep, goats
  - Periodic Monitoring
  - Harborage
LGMA COMPONENTS

- ENVIRONMENTAL ASSESSMENT:
  - Field of production
  - Adjacent Land Use
  - History of land use
  - Flooding
LGMA COMPONENTS

- WATER: Pre- Post- Harvest
  - document source/distribution system
  - specific testing requirements, frequency
  - preharvest / post harvest
  - varies by application method
  - record keeping
LGMA COMPONENTS

- SOIL AMENDMENTS
  - prohibits raw, uncomposted manure, biosolids
  - Use of certificates of treatment composition
  - procedures to prevent cross contamination
  - microbial testing
CA Leafy Green Marketing Agreement - Compliance

- 116 signatories – 99% by volume
- 368 Audits
- 42% operations cited
- 2 firms decertified, 1 declared ineligible
CA Leafy Green Marketing Agreement - Compliance

- 39 major deviations (corrective action required w/i 5 business days)
- Most of these record keeping
FLORIDA TOMATO RULE

- Requires Permit for Packing Houses
- Applies to all growers and packers
- Exempts small quantities
  - sold on premises
  - sold at farmers markets
  - provided to charities
FLORIDA TOMATO RULE

- Effective July, 2008
- Regulatory Inspections
FLORIDA TOMATO RULE
Best Practices Manual

- Environmental Assessment
  - History of use
  - Adjacent land use
  - Animal Exclusion

- Water
  - monitoring requirements
  - standards vary by application / use
FLORIDA TOMATO RULE
Best Practices Manual
Field

- Soil Amendments
  - Fertilizers
  - Compost
- Record Keeping
- Requires pathogen reduction step for Field Pack
FLORIDA TOMATO RULE
Best Practices Manual
Packing House

- HACCP Based SSOPs
- Water – Potable (micro) standard
  - Free chlorine
  - pH
  - Temperature (>10 deg incoming pulp temp)
  - contact time
FLORIDA TOMATO RULE
Best Practices Manual
Packing House

- Personal Hygiene
- Animal Exclusion
- Transportation
- Record Keeping
- Repackers – clean containers, maintain appropriate product identification
ENTER AFDO
BACKGROUND

- Approached by tomato industry during tomato safety forum November, 2006
- Industry concern: potential patchwork of state/local laws and regulations
AFDO BOARD CONSIDERATIONS

- General recognition that size/scope of FBIs associated with fresh produce are unacceptable
- Other commodities implicated in outbreaks
- Existing guidance dated
- No regulations at farm and packing houses
- Experience in developing Model Codes
WHY AFDO Model Code?

- Framework for national consistency
- Quicker than federal rule making
- More easily modified
- Open inclusive process
- As model code, provides mechanism for states/local authorities to address specific issues unique to that locale
APPROACH

- Begin where GAPS leave off
- Pull from Commodity Specific Guidance Documents - issues, metrics, responses
- Code: BROAD language
- Companion “Hazards Guide” – “how to comply” document
WHO is Participating?

- States: FL, VA, CA, OH, NC
- Federal: FDA, USDA
- Association of Fruit and Vegetable Inspection Standardization Agencies
- Industry: Western Growers Association, United Fresh Produce Association, Produce Marketers Association, GMA/FPA, National Restaurant Association, Florida Tomato Industry, Ag&Food Trans. Conf, of Am Trucking Assoc., various commodity associations
- Academia
- CSPI, Cons. Federation
THANK YOU

Dr. Marion Aller
FL Dept of Ag and Cons. Services
850-488-0295
allerm1@doacs.state.fl.us

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Association of Food and Drug Officials

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afdo@afdo.org
(717) 757-2888

2550 Kingston Road, York, PA 17402
FDA’s Perspective on Global Produce Safety

Conférence for Food Protection Workshop
April 12, 2008

Nega Beru, Ph.D.
Director, Office of Food Safety
Center for Food Safety and Applied Nutrition
Food and Drug Administration
Outline

- Historical perspective
- Produce Safety Action Plan
- Current activities related to produce safety
### Foodborne Outbreaks Related to Fresh Produce, 1973-1997: Trends in Burden

<table>
<thead>
<tr>
<th></th>
<th>1970’s</th>
<th>1990’s</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of outbreaks/ yr</strong></td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td><strong>Median cases/ outbreak</strong></td>
<td>21</td>
<td>43</td>
</tr>
<tr>
<td><strong>% of OB of known vehicle</strong></td>
<td>0.7%</td>
<td>6%</td>
</tr>
<tr>
<td><strong>% of OB associated cases</strong></td>
<td>0.6%</td>
<td>12%</td>
</tr>
</tbody>
</table>
Historical Perspective

- **1997** Multiple Federal agencies launch the National Food Safety Initiative (FSI)
- **1997** Several outbreaks associated with fresh and fresh-cut produce and sprouted seeds lead to the expansion of FSI to include the Produce and Imported Food Safety Initiative (PI FSI)
- **1998** FDA publishes “Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables” also known as Good Agricultural Practices (GAPs) and Good Manufacturing Practices (GMPs)
- **1999** FDA publishes guidance for the production of safe sprouts
Historical Perspective

- FDA GAPs/ GMPs cover water, manure and municipal biosolids, worker health and hygiene, sanitary facilities, field sanitation, packing facility sanitation, transportation and trace back.

- Implementation through education and outreach
  - Domestic: Cornell University’s National GAPs program
  - International: FDA/ Joint Institute for Food Safety and Nutrition
Outbreaks Continue

- Continue to have outbreaks associated with produce
  - Bacterial
  - Viral
  - Protozoan
- Largely associated with specific fruits and vegetables, often from specific regions or countries
- Outbreaks occur with both domestic and imported produce though agents and products may be different
Outbreak Reservoirs

Zoonotic
7  *E. coli* O157:H7
17  *Salmonella* sp.

Human
12  *Cyclospora*
3  Hepatitis A
2  *Shigella*

Source
17  Domestic
4  Foreign
6  Unknown
24  Total

17  Domestic
10  Foreign
6  Unknown
17  Total
Produce Safety Action Plan

- In January 2004, FDA initiated a review of its produce safety program

- Produce Safety from Production to Consumption: 2004 Action Plan to Minimize Foodborne Illness Associated with Fresh Produce Consumption

http://www.cfsan.fda.gov/~dms/prodpla2.html
How Does This Differ from Previous Initiatives and Efforts?

- Continues and builds upon existing efforts
- Addresses all principal points between farm and table where contamination could occur.
  - 1998 GAP/ GMP guidance focused on the farm and packing facility
The overarching goal of the action plan is to minimize foodborne illnesses associated with the consumption of fresh produce to the greatest extent possible.

General Objectives

1. Prevent microbial contamination
2. Minimize public health impact when contamination occurs
3. Improve communication
4. Facilitate and support research relevant to fresh produce
Commodity Specific Guidance

- Melon Supply Chain – Nov. 7, 2005
  - [http://www.cfsan.fda.gov/~dms/melonsup.html](http://www.cfsan.fda.gov/~dms/melonsup.html)

- Lettuce and leafy greens – April 26, 2006
  - [http://www.cfsan.fda.gov/~dms/lettsup.html](http://www.cfsan.fda.gov/~dms/lettsup.html)

- Fresh Tomato supply chain – May 2006
  - [http://www.cfsan.fda.gov/~dms/tomatsup.html](http://www.cfsan.fda.gov/~dms/tomatsup.html)
Guide to Minimize Microbial Food Safety Hazards of Fresh-cut Fruits and Vegetables

(Final Guidance: Feb. 2007)

www.cfsan.fda.gov/guidance.htm
Fresh-cut Guide

- Recommends that processors employ HACCP principles
- Provides recommended practices in the following areas:
  - Personal health and hygiene, training, building & equipment, sanitation operations, production/processing controls/packaging, storage & transportation, recordkeeping, and recalls & tracebacks
Produce Safety Actions

- Consumer Education
  - Safe handling tips to help consumers protect themselves and their families from illness
    - Buying Tips
    - Storage Tips
    - Preparation Tips
    - Fresh Juice Safety
Other Efforts under Action Plan

- **Working Collaboratively with our stakeholders**
  - Lettuce safety conference, August 2006 and January 2007
  - Tomato safety conference, November 2006
  - Tomato research conference, February 2007
  - Conference on the role of testing in the safety of fresh produce, May 2007
  - Participated in leafy greens research meeting organized by UFPA, September 2007
Other Efforts under Action Plan

- Leafy Greens Safety Initiative in Central CA, August 2006, 2007
- Tomato Safety Initiative in the East Coast, started in June 2007
  - Geographically focused
  - Assess current industry approaches, actions, and adoption of guidance
  - Alert consumes early and respond rapidly in the event of an outbreak
  - Document observations that identify practices or environmental factors that potentially lead to produce contamination
  - Consider regulatory action as appropriate
Produce Safety at Retail & Foodservice

- Time/ Temperature Control For Safety
  - Tomatoes - Supplement to the 2005 Food Code
    - Retail PIM - Storage and Handling of Tomatoes
  - Leafy Greens - CFP Issue 2008-111-022
- Employee Health and Hygiene
  - Exclusions - Vomiting, diarrhea, jaundice
  - Hand Hygiene
- Chemical washes effective?
- Preventing cross contamination
- Encouraging GAPS via purchase specs
Enhancing Produce Safety Internationally

- **Codex Alimentarius**
  - Codex Committee on Food Hygiene (CCFH) recognized the need for international guidance for the safe production of fresh fruits and vegetables
  - Developed and adopted in 2003 “Code of Hygienic Practice for Fresh Fruits and Vegetables”
    - General guidance for the production, distribution and marketing of fresh fruits and vegetables
    - Annexes for sprouts and fresh-cut produce
Enhancing Produce Safety Internationally

- **Codex Alimentarius**
  - The United States Delegation submitted a request for new work to CCFH to develop several new annexes:
    - Leafy Greens (e.g., lettuce, spinach)
    - Tomatoes
    - Melons
    - Green Onions
    - Sprouts (update)
Enhancing Produce Safety Internationally

- **Codex Alimentarius**
  - CCFH asked FAO/WHO for a expert scientific consultation(s) for
    - Leafy green vegetables
    - Tomatoes
    - Melons
    - Green onions
    - Root crops
    - Berries
    - Root crops (carrots)
  - FDA helped to support the consultation
  - FAO/WHO expert panel in October 2007 - the safety of leafy greens and herbs is relevant worldwide and would justify attention by CCFH
  - The US has convened a group of experts to work on a leafy greens and herbs annex to the current code
Public Hearings on Produce Safety

- Held on March 20, 2007 in Oakland, CA and on April 13, 2007 in College Park, Maryland

- Purpose
  - Share information about recent outbreaks
  - Solicit information about current practices and risk factors for contamination of fresh produce
  - Possible measures by FDA to enhance the safety of fresh produce
Public Hearings on Produce Safety

- **Questions on five broad areas:**
  - Risk factors for each stage in the supply chain and each industry sector including testing
  - What should Federal actions be and where in the supply chain and what commodities should be the focus
  - Records for trace back
  - Written food safety plans, SSOPs and monitoring records
  - Monitoring and measuring adherence to GAPs/ GMPs or new recommendations

- **Comment period closed June, 2007**
Comment Breakdown

- Total of 48 comments
  - 24 Industry
  - 9 Government
  - 5 Universities
  - 5 Individual Consumers
  - 3 Consumer groups
  - 2 Environmental groups
Characteristics of a Produce Safety Regulatory Option Developed by FDA

- Consistent across the U.S.
- Based on sound science
- Overarching (all fresh produce)
- Accommodate specifics
  - commodity, region, operations, practices, size of establishment
Regulatory Options

- Guidance?
  - Update existing guidance
  - Develop additional guidance

- Regulation?

- Combination?
  - Broad scope regulation supplemented with guidance (commodity, region, practice-specific)

- Food Protection Plan legislative proposal to require preventive controls for high-risk foods
Questions?
Role Of Agricultural Producers And Processors In Assuring Fresh Produce Safety

David E. Gombas, Ph.D.
United Fresh Produce Association
April 12, 2008
Fresh and Fresh-cut Produce Safety

“Of 110 recent outbreaks, 35% were associated with fresh fruits and vegetables”
- CDC, August 2005

“Fresh produce is responsible for more illnesses, by far, than any other commodity we regulate”
- FDA, April 2006
## Produce Outbreaks 1996-2006 by Commodity

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Outbreaks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomatoes</td>
<td>12</td>
</tr>
<tr>
<td>Lettuce</td>
<td>14</td>
</tr>
<tr>
<td>Romaine lettuce</td>
<td>4</td>
</tr>
<tr>
<td>Mixed lettuce</td>
<td>1</td>
</tr>
<tr>
<td>Cabbage</td>
<td>1</td>
</tr>
<tr>
<td>Spinach</td>
<td>2</td>
</tr>
<tr>
<td>Cantaloupe</td>
<td>7</td>
</tr>
<tr>
<td>Melons</td>
<td>2</td>
</tr>
<tr>
<td>Honeydew melon</td>
<td>2</td>
</tr>
<tr>
<td>Squash</td>
<td>1</td>
</tr>
<tr>
<td>Green onions</td>
<td>3</td>
</tr>
<tr>
<td>Parsley</td>
<td>2</td>
</tr>
<tr>
<td>Basil</td>
<td>4</td>
</tr>
<tr>
<td>Basil or Mesclun</td>
<td>2</td>
</tr>
<tr>
<td>Green grapes</td>
<td>1</td>
</tr>
<tr>
<td>Mango</td>
<td>2</td>
</tr>
<tr>
<td>Raspberries/berries</td>
<td>6</td>
</tr>
<tr>
<td>Snow Peas</td>
<td>1</td>
</tr>
<tr>
<td>Unknown</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: FDA CFSAN
Fresh Produce is “Fresh”

- Includes over 300 separate commodities, each with its own hazards, controls and risk profile
- In almost all cases, food safety relies on prevention of contamination, the weakest form of hazard control
  - Inhibiting pathogen growth is not sufficient
  - No practical “kill” step currently available
Green Leafy Salads

5,000,000 bags / day

> 1.8 billion / yr

Contamination must be controlled
to better than 1 / billion / yr
Food Safety Programs for Fresh Produce

FDA Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables (GAPs, 1998)

- Generic to all fresh produce
- Focused on most likely sources of pathogen contamination: workers, water, wildlife and manure
- Dozens of GAP-based training materials, programs and audits developed and implemented
- Still the primary guidance document for most fruits and vegetables
Food Safety Programs for Fresh Produce

- “Things to consider” when developing, assessing adequacy of individual farm, facility food safety programs
- Builds on ’98 GAPs, but extends to entire supply chain
Key Production Considerations

- Water and Irrigation Methods
- Soil amendments – animal manure
- Equipment Cleaning/Segregation
- Production Locations
  - Climate and Environment – rain, windborne contamination risks
  - Animal/Urban Encroachment – monitoring and minimizing animal activity in fields
Key Harvest Considerations

- Machine Harvest – food contact surfaces
- Hand Harvest – soil contact, hygienic practices
- Water used during harvest – drinking water quality
- Transportation vehicles – clean and sanitary
- Water/ice, equipment, containers used during product cooling
Key Processing Considerations

- Wash water – **not** a “kill” step
  - Disinfectant levels, monitoring
  - Avoid overloading system with soil, organic debris, product

- Labeling – Ready to wash vs. ready to eat

- Finished Product Packaging – final protection against subsequent contamination
Guidance for Industry

Guide to Minimize Microbial Food Safety Hazards of Fresh-cut Fruits and Vegetables

Guidance
Contains Nonbinding Recommendations

Additional copies are available from:
Office of Food Safety
Division of Plant and Dairy Food Safety (HFS-317)
5100 Paint Branch Parkway
College Park, MD 20740
(Tel) 301-436-1700
http://www.cfsan.fda.gov/guidance.html

U.S. Department of Health and Human Services
Food and Drug Administration
Center for Food Safety and Applied Nutrition
February 2008
There is no evidence that GAPs, Commodity Specific Guidelines, and other best practices, properly applied, are not sufficient to assure fresh produce food safety.
Total Cases = 192*

as of 1300 EDT, 5 October 2006

*Total does not include one confirmed case in Ontario, Canada.

*as of October 3, 2006, 1:00pm EDT

All data are preliminary
So what went wrong?

- Many speculations
  - Flooding?
  - Contaminated manure, root uptake?
  - Contaminated aquifer, wells?
Outbreak Speculations

“The tainted spinach was eventually traced by state and federal investigators to a 50-acre San Benito County field where it had been contaminated by a combination of cow and wild boar feces, a boar carcass found near the field and stream water containing the E. coli bacteria.”

2 more *E. coli* O157:H7 outbreaks linked to leafy greens in 2006

- Taco Bell, Taco John (foodservice)
- Both outbreaks linked to iceberg lettuce
Taco Bell *E. coli* O157:H7 Outbreak

- Occurred Nov-Dec 2006 in 4 East Coast States
- 71 illnesses (53 hospitalized, 8 HUS, no deaths)
- "Based on a number of factors, iceberg lettuce is considered overall to be the single most likely source of the outbreak…"
  - Shredded cheese, ground beef also implicated
  - Green onion falsely implicated

- Field investigation report released Nov ’07
  - No findings
Taco John *E. coli* O157:H7 Outbreak

- Occurred Nov-Dec 2006 in 2 Midwest States
- 81 illnesses (26 hospitalized, 2 HUS, no deaths)

- Field investigation report released Feb ‘08
  - Outbreak strain found at two dairies adjacent to a supplier’s lettuce field
  - Field’s irrigation system shared cross-connection with manure waste system at one dairy
Pipe from irrigation well
Fresh water reservoir supply gate
Gate valve in pipe between tail water pond and pump sump
Pipe connecting irrigation system of dairy 1 & 2
Supply pipe to fields located on south east side of Wildwood
Gate valve to allow gravity drain from Field 213 at dairy 1 to the lift pump sump

PIPE MANIFOLD
FDA News

FOR IMMEDIATE RELEASE
P06-181
November 3, 2006

FDA Notifies Consumers that Tomatoes in Restaurants Linked to Salmonella Typhimurium Outbreak
Current Information Suggests Outbreak is Not Ongoing

The U.S. Food and Drug Administration (FDA) today announced the results of an investigation by state and Centers for Disease Control and Prevention (CDC) investigators, which found consuming tomatoes in restaurants as the cause of illnesses in the Salmonella Typhimurium outbreak. To date, 21 states have reported 183 cases of illnesses to the CDC.

Salmonella can cause serious and sometimes fatal infections in young children, frail or elderly people, and others with weakened immune systems. Healthy persons often experience fever, diarrhea (which may be bloody), nausea, vomiting, and abdominal pain. In rare circumstances, infection can result in the organism getting into the bloodstream and producing more severe illnesses.

Based on information currently available from the CDC, the investigation shows a peak in cases of illness in late September. This suggests that the outbreak is not ongoing. The agency believes that the tomatoes that caused the illnesses have at this point been consumed, destroyed or thrown out because they are perishable. Therefore, FDA does not believe a consumer warning about tomatoes on store shelves is warranted at this time.

FDA has initiated a traceback of these tomatoes and continues its close collaboration with the CDC and state and local authorities to identify the source of contamination on tomatoes in this outbreak. In particular, FDA is working closely with the states of Minnesota, Massachusetts, and Connecticut, since groups of illnesses were specifically reported in these states.
Where Do We Go From Here?

- Best Practices
- Compliance
- Research
CA Leafy Greens Best Practices

- Builds on existing Commodity Specific Guidelines: irrigation water, compost, worker hygiene, domestic and wild animal activity
- Includes “metrics” to better communicate how many, how often, how far
- Science-based when possible
  - When science is lacking, specific criteria based on expert opinion, consensus
Irrigation Water

- Test Organism: generic *E. coli*
- Sampling Procedure: 100 mL collected at POU
- Sampling Frequency: Not less than 18 hr apart, not more than monthly
- Test Method: FDA or other accredited for quantitative monitoring of *E. coli* in water
- Acceptance criteria:
  - \( \leq 126 \) MPN rolling geometric mean, \( n=5 \) AND
  - \( \leq 235^* \) MPN on any single sample

*\( \leq 576 \) MPN for drip or furrow
Several diverse, independent buyer (retail, foodservice) initiatives intended to define safe practice specifications for the fresh produce industry

- Irrigation water standards
- Use of soil amendments
- Distances from domestic animals
- Corrections for incursions by wild animals
- Worker hygienic practices
- Microbiological testing
Compliance - Before

- Voluntary compliance with GAPs, guidelines, customer standards
- Verified with self-inspections, customer inspections, 3rd party audits
- Inconsistent programs, standards, performance
- These haven’t gone away
Compliance - Now

- California Leafy Green Handler Marketing Agreement now in effect:
  [www.caleafygreens.ca.gov](http://www.caleafygreens.ca.gov)
  - Voluntary participation, but then mandatory
  - Requires “handlers” to purchase only from leafy greens growers who comply with Leafy Greens Best Practices
  - Grower audits performed by USDA AMS, CDFA
  - >90% of all California leafy greens now included

- AZ implementing similar program. FL developing
Compliance – Now

Tomatoes

- California Tomato Farmers cooperative
  - Voluntary participation, but then mandatory
  - Requires tomato grower members to comply with tomato best practices
  - Audits performed by USDA Shipping Point Inspection personnel

- Florida legislative approach
  - Empowers FL Dept of Ag to inspect growers
  - Similar, but different, audit criteria
Produce Safety Standards

- Must be consistent for an individual produce commodity wherever sourced, domestic or imported
- Must be mandatory, with sufficient federal oversight, in order to be most credible to consumers
- Must be risk-based and commodity-specific, based on the best science and flexible to adapt as science evolves – one size does not fit all
Research

1. A “kill step” in the supply chain
2. Better methods to prevent, detect and correct contamination in the supply chain
3. Science to support quantified acceptance criteria, for example:
   • How far is far enough from a dairy operation? 20 ft? 200 ft? 1 mile? Uphill/downhill? Wind?
   • How long to wait after potential contamination of a field? 6 weeks? 3 months? 1 year?
Summary

- Fresh produce food safety is based primarily on prevention of contamination
- Food safety best practices have become stronger and stricter, despite lack of investigative findings
- Federal, mandatory standards required to restore consumer confidence
- Standards must be based on science, and flexible to adapt while science “catches up”
Role Of Agricultural Producers And Processors In Assuring Fresh Produce Safety

Questions?
Darden Restaurants
Fresh Produce Safety Program

John Gurrisi, REHS
Darden Restaurants Inc.
Director of Total Quality – Fresh Produce

Conference for Food Protection
San Antonio, Texas
April 12, 2008
Overview

• Source
  – Ranches/Fields
  – Harvesting/Packing
  – Cooling, Storage and Distribution
  – Processing Plants

• Distribution to Restaurants

• Restaurant Handling
Fresh Produce Sourcing

Most critical prevention step starts at the source

• The essence of Darden’s program is VISIBILITY AND TRACEABILITY
  – Feet and eyes on the ground
  – Nourish and Delight Brand™

• Focus will be on:
  – PEOPLE
  – ANIMALS
  – WATER
  – STRONG SUPPLIER RELATIONSHIPS
Fields and Ranches

- Darden supplier approval process
- Ensure all approved growers develop & implement GAP’s
- Foreign fields must pass Darden audits
- 3rd party audit required
- Supplier internal auditing required
- Traceability to field and lot
Employee Hygiene and Workforce Standards

• Exclude ill employees from handling produce or food contact equipment
• Correct usage of toilets & hand washing facilities
• Hand washing standards & practices
• Eating, smoking, clothing, jewelry standards and practices
Field Sanitation & Facilities

- Portable toilets with hand washing – readily available, supplied and maintained
- Toilets monitored and documented for cleanliness and supplies
- No human waste in the field
- Field crops free of equipment oils and fluids
- No excessive weed growth
- Trash and debris removal
Animal Control

• Barriers in place and designed to the targeted species
• Look for evidence of animals in the fields – tracks and feces
Agricultural Water

• Source protected from animals & people
• Microbiological testing routinely conducted according to risk
  – Target is <2.2 MPN Generic E-coli
• Water treatment as needed to maintain quality
Pre-Harvest Product Testing

- Test high risk products such as leafy greens, green onions, tomatoes, herbs, berries and melons
- Test for E. Coli O157:H7, Salmonella
- Confirmed positives = Do Not Harvest
- Pesticide Testing
Harvest Crews

- Darden harvest crew audits
- GHP’s (Good Harvesting Practices)
- Third party audits
- Internal audits
- Crews properly attired
- Exclude ill employees
Social Responsibility

• Complies with labor laws for the country
  – No underage children
  – Proper documentation

• Day care facilities & schools as applicable

• Health care facilities as applicable

• Housing as applicable
Consultorio Médico.

Trabajo Social.
Harvest Equipment

- Machinery clean & in good condition (peeling paint, frayed belts, deterioration)
- No leaking fluids
- Hand tools clean and sanitized
- Sanitizer levels checked & documented
- Product wash water monitored to verify sanitizer concentrations
Packing Sheds

- Darden packing shed approval process
- Ensure all approved packing sheds develop & implement GMP’s
- Must pass Darden audits
- 3rd party audit required
- Supplier internal auditing required
- Key elements include: traceability, personal hygiene, water chemistry, equipment, pests, storage & trucking
Fresh Cut Produce Processors

- Darden fresh produce processor approval
- Ensure GMP's, HACCP, SOP's, SSOP's
- Must pass Darden audits
- 3rd party audit required
- Processor internal auditing required
- Traceability & recall programs tested
- Environmental Testing
- Trucking and distribution
Fresh Produce Distributors

- Darden distributor approval process
- Ensure all approved distributors develop & implement GMP’s
- Must pass Darden audits
- 3rd party audit required
- Distributor internal auditing required
- Traceability & recall systems tested
- Trucking – Temperature & cleanliness
Produce Practices In Restaurants

• Managers Must:
  – Provide training and accountability
  – Check for approved sources
  – Check for quality
  – Check for proper storage (dry, refrigerated)
  – Check for proper handling
    • Sanitized sinks (dedicated sink ideal)
    • Established washing & preparing procedures
    • No bare hand contact
Continuous Improvement

• All segments of the produce industry working collaboratively together
• Strong supplier relationships
• Standards must be continually reviewed and improved upon – Raising the bar
• Industry needs more research
  – Water quality
  – Product testing
It’s 9:00 am, do you know where your produce is coming from?

Thank You!
Global Food Safety Initiative

Cory Hedman, MPH
Director, Food Safety & Quality Assurance
Hannaford Supermarkets

GFSI Board of Directors
What is CIES – The Food Business Forum?

Knowledge, Networking and Orchestrating Common Industry Positions on strategic non-competitive issues

- 200 retailer companies
- 200 manufacturer companies
- 150 countries

- International
- Neutral
- Permanent Dialogue
  - Through leadership
  - Global network
Global Food Safety Initiative

- GFSI launched at the CIES Annual Congress in 2000, following a directive from the food business CEO’s
- Food Safety was and still is “top of mind” with consumers
- Consumer trust needs to be strengthened and maintained, while making the supply chain safer
- Managed by CIES – The Food Business Forum
## CIES - CEO “TOP OF MIND”

<table>
<thead>
<tr>
<th></th>
<th>Ranking 2008</th>
<th>Ranking 2007</th>
<th>Ranking 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate Responsibility</td>
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<td>Food Safety</td>
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<td>8</td>
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<td>Consumer Health and Nutrition</td>
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<td>3</td>
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<tr>
<td>Economy and Consumer Demand</td>
<td>4</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Retailer Supplier Relations</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
GFSI Mission and Objectives

“Continuous improvement in food safety management systems to ensure confidence in the delivery of safe food to consumers”

- **Convergence** between food safety standards through maintaining a benchmarking process for food safety management systems

- **Improve cost efficiency** throughout the food supply chain through the common acceptance of GFSI recognized standards around the world

- Provide a unique international stakeholder platform for networking, knowledge exchange and sharing of best food safety practices and information
GFSI Foundation Board of Directors

Members of the GFSI Foundation Board of Directors

- Roland Vaxelaire, Carrefour, France (Chairman of the GFSI Board)
- Kevin Chen, China Resources Vanguard, P.R. China
- Yves Rey, Danone, France
- Cory Hedman, Hannaford, USA
- Bryan Farnsworth, Hormel Foods Corp., USA
- Cindy Jiang, McDonalds, USA
- Hans-Jürgen Matem, Metro, Germany
- Johann Züblin, Migros, Switzerland
- Hugo Bymes, Royal Ahold, The Netherlands
- Terry Babbs, Tesco, UK
- J P Suarez, Wal-Mart, USA

Providing strategic direction and supervision of GFSI and governance to the GFSI Technical Committee
GFSI Technical Committee

- An international, multi-stakeholder group
- Comprised of over 50 food safety experts
- Open to key experts by invitation
- Works on common-interest projects to ensure continuous improvement in food safety
Technical Committee Priorities

- Technical Committee
  - Accreditation/Auditor Competence
  - Protocol for Small Suppliers
  - Auditing in Emerging Markets
  - Bioterrorism/Food Defense
GFSI Stakeholders

- Wider group of food business stakeholders
- Annual meeting
- Opportunity to influence GFSI strategy
- Share knowledge and best practices with other food safety experts in keeping with the GFSI mission
2007 GFSI Priorities

- Communication and awareness around the world
- Common acceptance by retailers
- Auditor competence
- Bridge gaps with ISO 22000
- Support other associations/lobbying organizations
GFSI More Representative World-wide

- **New Board Members**
  - Kevin Chen, China Resources Vanguard
  - Hugo Byrnes, Royal Ahold
  - Cindy Jiang, McDonalds

- **Increasing the reach and inclusion of all influential stakeholders in food safety with food service**
  - Strategic Alliance with National Restaurant Association, USA
  - Strategic alliance with CCFA Food Safety Program and JCA
    - China and Japan GFSI Meetings
      (April 22nd and 24th 2008)
Convergence = Confidence

- Benchmarking work on four key food safety standards (BRC, IFS, Dutch HACCP and SQF) reached a point of convergence
- All standards were completely aligned with the GFSI Guidance Document Version 4 requirements
- Increased confidence in the standards, with comparable audit results
What does this mean?

“Once certified, accepted everywhere”
GFSI Breakthrough 2007

The following companies have come to a common acceptance of GFSI benchmarked standards
Certificates Issued Globally

Over 30,000 certificates issued against GFSI recognized standards in 2007

50% increase compared to 2006
Continuous Improvement

- Revision of the Guidance Document Version 4
  - Version 5 issued September 2007, Part 3 on Auditor Competence completely revised by the Technical Committee to reflect multi-stakeholder requirements
  - Available at www.ciesnet.com

- Benchmarking to existing and new versions of standards against GFSI Guidance Document Version 5
  - All standards retain their alignment with GFSI Guidance Document Version 5
Auditor Competence

- Engagement with the International Accreditation Forum and European Accreditation and their members to solicit acknowledgement and worldwide implementation of GFSI requirements
  - To ensure a consistent and optimal approach by accreditation bodies in their surveillance of certification bodies to satisfy the needs of all end users of accreditation

- Creation of a GFSI Accreditation Task Force with involvement of all GFSI recognized standards

- To build a common foundation and harmonize accreditation requirements, ensuring greater consistency in auditor competency across GFSI recognized standards

- GFSI/EA Agreement of Cooperation
GFSI Adding Value …

- Less duplication
- Driving continuous improvement in the content of the standards
- Healthy competition between existing schemes, driving continuous improvement in the delivery of the standards
- More cost efficiency in the supply chain
- Comparable audit approach and results
- Confidence in sourcing and thus, safer food for the consumer
Challenges for 2008!

- Build on the foundation of common acceptance by 8 retailers by all stakeholders
- Continue to communicate and build awareness of GFSI
- Auditor Competence and Training
- Auditing in Emerging Markets and protocols for small suppliers
- Food Defense & Bio-terrorism
- Work on greater consistency of food safety requirements in vertical supply chains
- Safer sourcing in the supply chain (i.e. ingredients)
Thank you........
Harmonization on Global Produce Safety Standards

Cindy Jiang
Director
Worldwide Food Safety, Quality, and Nutrition
McDonald’s Corporation

2008 Conference for Food Protection
McDonald’s World

- In **118** countries
- Over **31,000** restaurants
- Serving > **52 million** customers everyday
Outline

• Industry effort on food safety audit harmonization
  ▪ Current state of audits and audit standards
  ▪ Our customer expectations
  ▪ Journey to harmonization

• Harmonization on produce food safety standards
  ▪ Current guidelines and standards
  ▪ Call for collaboration

• Summary
## Audits & Audit Standards

<table>
<thead>
<tr>
<th>Audits:</th>
<th>Audit standards</th>
</tr>
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<tbody>
<tr>
<td>- Sanitation audit</td>
<td>- ISO 9001</td>
</tr>
<tr>
<td>- GMP audit</td>
<td>- ISO 22000</td>
</tr>
<tr>
<td>- Food Safety audit</td>
<td>- BRC Global Standard: Food</td>
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<tr>
<td>- Quality system audit</td>
<td>- IFS / HDE</td>
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<tr>
<td>- HACCP audit</td>
<td>- GMA-SAFE</td>
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<td>- Food defense audit</td>
<td>- SQF 1000/2000</td>
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<td>- ......</td>
<td>- AIB Bakers Quality Seal</td>
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<td></td>
<td>- Silliker’s GMP/Food Safety Audit System</td>
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<td></td>
<td>- NSF-Cook &amp; Thurber Food Safety, Quality and Security Expectations and Criteria for Food Processing Facilities</td>
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<td>- ......</td>
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</table>
Current Audits & Standards

Food Safety Audits

A confusing array of redundant audits

Customer

Audit Company a

Audit Company b

Audit Company c

Audit Company d

Audit Company e

Std A cert
Std B cert
Std C cert
Std D cert
Std E cert
Std F cert
Std G cert
Std H cert
Harmonization on Audit Standard?

**AUDIT STANDARDS**

- AIB
- BRC
- FPA – SAFE
- IFS
- ISO 22000
- NSF – Cook & Thurber
- Silliker
- SQF

Food Safety (Codex as baseline + other)

Regulatory Compliance

Quality Management

ISO 9001

(>90% contents are the same)
Our Customer Expects...

Safe and High Quality Food
McDonald’s SQMS Document
Table of Contents

1. Scope
2. Quality management system
3. Management responsibility
4. Crisis management
5. Quality product realization
6. Verification and continuous improvement
7. Glossary
The Supply Chain

Food Manufacturer

McDonald's

McDonald's

Fruits
Journey to Harmonization

Apr. 2007

Global Audit Harmonization Initiative:

Vision:
- Protect consumers and brands by establishing a common framework of Food Safety, Regulatory Compliance, and Quality Management Systems across the global food supply chain.
- Create a globally accepted audit framework to ensure safe food efficiently delivered to consumers.

Co-Lead: McDonald’s, Cargill, Coca Cola, and Kraft

GAHI Effort:
- Food Service
- Retailer
- Food Manufacturer
- Associations
- Auditing firms
Journey to Harmonization

GAHI Effort:
• Food Service
• Retailer
• Food Manufacturer
• Associations
• Auditing firms

Collaboration:
• GAHI
• GFSI
• NRA

Apr. 2007
Nov. 2007
Global Food Safety Initiative (GFSI)

- Established in 2000 within CIES
- CIES: The Food Business Forum

www.ciesnet.com
GFSI Mission

“Continuous improvement in food safety management systems to ensure confidence in the delivery of safe food to consumers”
GFSI Objectives

- **Convergence** between food safety standards through maintaining a **benchmarking** process for food safety management schemes.

- **Improve cost efficiency** throughout the food supply chain through the **common acceptance of GFSI recognised standards** by retailers around the world.

- Provide a unique international stakeholder platform for **networking, knowledge exchange and sharing of best food safety practice and information**.
GFSI Guidance Document

• **Key elements:**
  - Food Safety Management System
  - Good Practices & HACCP Requirements
  - Requirements for the delivery of food safety management systems

• **Provides:**
  - guidance on how to seek alignment for existing standard owners.
  - a framework for benchmarking.
  - guidance on the operation of certification processes.

• **It is NOT a new standard !**
The GFSI Road to Harmonization

Goal

Safe Food
Cost Effectiveness

Manufacturers / Retailers

Guidance Document

IFS

BRC

SQF

Dutch HACCP

“Once certified, accepted everywhere”
GFSI Announcement

The following companies have now come to a common acceptance of GFSI benchmarked standards

- Ahold
- METRO Group
- Wal-Mart
- Migros
- Groupe Carrefour
- TESCO
- Delhaize Group

Group Strength, Local Expertise
Journey to Harmonization

GAHI Effort:
- Food Service
- Retailer
- Food Manufacturer
- Associations
- Auditing firms

Collaboration:
- GAHI
- GFSI
- NRA

Further Collaboration:
- NRA
- GFSI
Further Collaboration

March 6, 2008

GFSI

GFSI/NRA USA office

FMI
Audit Firms
GMA
AMI
Other associations in the US
Government
Consumer Groups
Future Audit

Audit Content

Common Framework + Customer Specifications

Customer 1
Customer 2
Customer 3
Customer 4
Customer 5

One of the GFSI Bench-marked Stds.

Customer Specifications

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</tbody>
</table>
Customer Needs
Produce Safety Standards

**Global GAP** (Harmonizes and establishes standards for GAP around the globe.)

**SQF 1000 System:**
Growing and Production of Fresh Produce: Leafy Greens

**U.S. FDA Guide** to Minimize Microbial Food Safety Hazards of Fresh-Cut Fruits and Vegetables

**LGMA** (mandatory government audit program that certifies the member companies)

**Canadian Horticultural Council:** On-Farm Food Safety Producer, Storage Intermediary and Packer Manuals

**FSLC** (On-Farm Produce Standards & Produce Processor Standards)
The Content of Safety Standards

Growing & Harvesting Operations | Transportation | Processor | Distribution

Based on Science and be Practical
The Power of Collaboration

April 2008

Global GAP

UFPA
PMA
WGA

FMI
NRA
FSLC
Audit Firms
Other associations in North America
Government
Consumer Groups

Think about our customer!
Global GAP

• A single integrated standard with modular application for different product groups:
  ▪ Crops Base
    • Fruit & Vegetables
    • Flowers & Ornamentals
    • Combinable Crops
    • Green Coffee
    • Tea
    • Cotton
  ▪ Livestock Base
  ▪ Aquaculture Base
Summary

• We have the same customer to serve.
• It is time to reduce the redundant food safety audits, we need to focus on improvement.
• Let’s collaborate on food safety common framework/standards for produce.
Thank You!
Conference for Food Protection - 2008 Biennial Meeting,
April 12, 2008 – San Antonio, TX
“What is the Future of Global Fresh Produce Safety for Retail & Foodservice?”

Produce-related Foodborne Infections:
Review of Outbreak Surveillance

Arthur P. Liang, M.D., M.P.H.
National Center for Zoonotic Vector-borne & Enteric Diseases
Centers for Disease Control & Prevention, Atlanta, GA
Since 1973, CDC collects reports of outbreaks investigated

- Data collected: # of cases, implicated food, etiology
- Definition of an outbreak:
  - 2 or more cases of a similar illness resulting from the ingestion of a common food
Most outbreaks investigated by local & state health depts

- In 2006, 1247 outbreaks reported
- CDC, ~90 foodborne outbreaks or clusters
- CDC, 15 Epi-Aids
- Reporting is voluntary & variable
States that will participate in CaliciNet in 2008

CaliciNet members 2008 (n = 22)
Background: Foodborne outbreak surveillance system

Foodborne-disease outbreaks reported to CDC, 1990 - 2004

Enhanced surveillance

1 By states to the Foodborne Disease Outbreak Surveillance System
Foodborne outbreaks related to fresh produce, 1973-1997*

Fresh produce defined as:

uncooked produce items, or “salad” without eggs, cheeses, seafood or meat

Fresh produce-related outbreaks 1973-1997

1973-1997
- 190 outbreaks
- 16,058 illnesses
- 598 hospitalizations
- 8 deaths

- 3.2 % of all outbreaks of determined source
- 6.2 % of those outbreak-associated cases

Average # of produce-associated outbreaks by decade, USA, 1973-97*

* Preliminary data
Agents identified
Produce-related outbreaks, 1973-1997

- Salmonella: 30
- E coli O157: 13
- Shigella: 10
- Campy: 4
- Other Bacteria: 6
- HAV: 12
- Norovirus: 8
- Cyclospora: 8
- Chemical: 4
- Other: 8

N = 103 (54%) of 190 outbreaks
Foods implicated
Produce-related outbreaks, 1973-1997
n = 85 outbreaks

- Lettuce, 25
- Melon, 13
- Sprouts, 11
- Apple/OJ, 11
- Berry, 9
- Tomato, 3
- Green Onion, 3
- Carrot, 2
- Other, 8

Generic or multiple: 105
One specific vehicle: 85
### Trends: Fresh produce-related outbreaks 1973-1997*

<table>
<thead>
<tr>
<th></th>
<th>1970’s</th>
<th>1990’s</th>
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</thead>
<tbody>
<tr>
<td># of outbreaks / yr</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>% of outbreaks of known vehicle</td>
<td>0.7%</td>
<td>6%</td>
</tr>
<tr>
<td>Average # of cases per outbreak</td>
<td>21</td>
<td>43</td>
</tr>
<tr>
<td>% of outbreak associated cases</td>
<td>0.6%</td>
<td>12%</td>
</tr>
</tbody>
</table>
Foodborne outbreaks related to produce, reported to CDC, 1998-2004*

• Produce defined as:

Food items that are classified as either fruit or vegetables

*eFORS, preliminary analysis & subject to change
Produce-related outbreaks reported to CDC, 1998-2004*

1998-2004
- 384 outbreaks (28 multistate outbreaks)
- 15,856 Illnesses
- 716 Hospitalizations
- 15 Deaths

• 7% of all outbreaks of determined source
• 14% of those outbreak-associated cases

*EFORS, preliminary analysis & subject to change
Agents identified
Produce-related outbreaks, 1998-2004*

N = 190 (49%) of 384 outbreaks

* eFORS, preliminary analysis & subject to change
Foods implicated
Produce-related outbreaks, 1998-2004*

n = 384 outbreaks

- Lettuce, 29
- Melon, 11
- Sprouts, 20
- Juice, 8
- Berry, 7
- Tomato, 11
- Green Onion, 4
- Other, 78

Generic or mixed: 216
One specific vehicle: 168
“Fresh” or “Fresh-cut” produce defined as:

fresh fruit & vegetables in an unpeeled, natural form, raw products & minimally processed that are reasonably likely to be consumed without cooking...

Does not include produce . . . where the point of contamination is the retail food setting.

Reported outbreaks linked to produce, 1996-2006

Reported outbreaks linked to produce by pathogen or other Agent type, 1996-2006

- Bacteria: 78
- Parasitic: 16
- Chemical/toxin: 1
- Viral: 3
Agents identified
Produce-related outbreaks, 1996-2006

- E coli O157H7, 24
- E coli O157NM, 4
- Shigella, 2
- HAV, 3
- Cyclospora, 16
- Salmonella, 48
- Chemical, 1

FDA Analysis, n = 98 outbreaks
Foods implicated
Produce-related outbreaks, 1996-2006

- Leafy greens, 24
- Sprouts, 27
- Tomato, 12
- Berry, 6
- Green Onion, 3
- Herbs, 6
- Melon, 11
- Other, 7
- Undetermined, 2

n = 98 outbreaks
Foods implicated
Fresh-cut Produce outbreaks, 1996-2006

Leafy greens, 11
Tomato, 5
Melon, 2

n = 98 outbreaks
# Reported outbreaks linked to produce by origin, 1996-2006

<table>
<thead>
<tr>
<th>ORIGIN of PRODUCE</th>
<th># of OUTBREAKS (% of TOTAL OUTBREAKS)</th>
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</thead>
<tbody>
<tr>
<td>Imported</td>
<td>28 (28.5%)</td>
</tr>
<tr>
<td>Domestic</td>
<td>32 (32.7%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>38 (38.8%)</td>
</tr>
<tr>
<td>Total</td>
<td>98 (100%)</td>
</tr>
</tbody>
</table>
Summary

- Produce-related outbreaks increased from 1970’s thru 1990’s
- Increase in outbreaks and size of outbreaks
- 21st Century problem has not gone away
- “Needle in a haystack.”
Thank-You

Disclaimer: The findings & conclusions in this presentation are those of the author & do not necessarily represent the views of the Centers for Disease Control & Prevention