Good Agricultural Practices
Farm to Table Food Safety for Colorado Producers

PART I
Food Safety Basics, Regulatory Landscape, 3rd Party Audits, and Worker Hygiene
Presenters & Agenda

• Speakers:

  Gretchen Wall
  Graduate Research Assistant
  Department of Food Science & Human Nutrition
  Colorado State University

  Martha Sullins
  Coordinator, County Information Service
  Department of Agricultural and Resource Economics
  Colorado State University

• Topics:
  o Foodborne Illness
  o Potential Sources of On-farm Contamination
  o Regulatory Landscape
  o Overview of 3rd Party Food Safety Audits
  o Hand Washing, Hygiene, and Health

Funded in part by the Colorado Department of Agriculture through the USDA’s Specialty Crop Block Grant Program
Food Safety Definitions

• **Food Safety** - the monitoring of food to ensure that it will not cause illness

• **Foodborne Illness (FBI)** - any illness resulting from the consumption of food

• **Food Defense** - protection from deliberate introduction of a dangerous substance

• **Pathogen** - disease causing microorganisms
Types of Contamination

• Biological
  o Microorganisms
    o bacteria, viruses, parasites
  o Natural Toxins
    o mushrooms, fish

• Chemical
  o Environmental Contaminants
    o mercury, pesticides

• Physical
  o Harmful Objects
    o glass, metal
Recent Outbreaks

2003: Green Onions
Hepatitis A

2004: Roma Tomatoes
Salmonella

2005: Frozen Raspberries
Norovirus

2006: Spinach
E. coli O157:H7

2007: Ground Beef
E. coli O157:H7

2008: Cantaloupe/Peppers
Salmonella

2009: Peanut Butter
Salmonella

2010: Eggs
Salmonella

2011: ?
## Foodborne Illness Statistics

<table>
<thead>
<tr>
<th>Organism</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Campylobacter</em> species</td>
<td>816</td>
<td>763</td>
<td>756</td>
</tr>
<tr>
<td><em>Salmonella</em> species</td>
<td>563</td>
<td>716</td>
<td>622</td>
</tr>
<tr>
<td><em>Giardia lamblia</em></td>
<td>580</td>
<td>562</td>
<td>500</td>
</tr>
<tr>
<td>Shiga-toxin <em>E. coli</em></td>
<td>165</td>
<td>212</td>
<td>168</td>
</tr>
<tr>
<td><em>Shigella</em> species</td>
<td>122</td>
<td>149</td>
<td>103</td>
</tr>
<tr>
<td><em>Cryptosporidium</em></td>
<td>216</td>
<td>113</td>
<td>138</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>27</td>
<td>38</td>
<td>53</td>
</tr>
<tr>
<td><em>Listeria monocytogenes</em></td>
<td>11</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td><em>Cyclospora</em></td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><em>Clostridium botulinum</em></td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The economic cost to society is high. U.S. estimates/year = $152 Billion
Average cost per illness = $1,850
Colorado estimate = $2,336,000,000

Alicia Cronquist, CO Dept of Health and Environment
Produce Characteristics

- Grows close to soil
- Open environment
- Large surface area
- High moisture content
- Generally favorable pH
- Often consumed raw
Potential Sources of Pathogen Contamination

Source: Beuchat, 1996
Good Agricultural Practices (GAPs)

- **GAPs (Good Agricultural Practices):** agricultural industry’s guide to minimize and prevent contamination of fresh fruits and vegetables on the farm.

- **GHPs (Good Handling Practices):** focuses on best practices for packing and storing facilities, cleaning and sanitation, and transportation.
Good Agricultural Practices (GAPs)

- Elements of GAPs
  - Worker Health & Hygiene
  - Irrigation Water
  - Manure
  - Sanitary Facilities
  - Field Sanitation
  - Packing Facility Sanitation
  - Transportation
  - Traceback

March 23
March 30
Pop Quiz!
Regulatory Landscape

2011 Food Safety Modernization Act (S.510)

- Passed January 5, 2011
- Changes to occur in the next 9 months - 3 years
- Some impacts clear, some yet to be defined
- Focus on prevention, not detection of issues
New Provisions

1) Recall food products with potentially severe health consequences

2) Adopt risk-based approaches to food safety

3) Inspect high risk food facilities

4) Gain access to records

5) Require foreign suppliers to comply with U.S. food safety standards

6) Require food companies to have written food safety plans (HACCP, GAPs, GMPs)

- Some exemptions exist for small scale producers and processors
What can farmers expect?

✓ FDA to develop minimum safe production and harvest standards to prevent food safety hazards

Possible exemptions

o Low-risk fruits and vegetables

o Farms that:
  ✓ Direct market more than 50% of products to qualified end users
  ✓ Have gross sales of all food and food products of less than $500,000
  ✓ Sell to consumers, stores, or restaurants that are in-state or within 275 miles of where the products were harvested or processed
  ✓ Disclose to consumers the name and address of the farm from which the food originated
What can food facilities expect?

- A variance process will give some businesses and states extra time to comply

  • **Definition does not change**
    → Any business that packs or holds food that is not grown, raised or consumed on that farm, or it manufactures or processes food that is not consumed on that farm [except for exempted farms, and farmers markets, roadside stands and CSAs]
    → Possible exemptions for facilities that make animal food and those that store raw ag commodities (but not fruits and vegetables)

  • **Requirements**
    ✓ Develop HACCP plan and written preventive controls plan to include sanitation, allergen controls, verification of suppliers, follow Good Manufacturing Practices
    ✓ Keep records of all of these plans
Tips to Remember

✔ State, local and county government food safety laws must still be followed for producing, harvesting, holding, transporting, and selling fresh fruits and vegetables

✔ Food buyers may still mandate food safety or certification programs:
  • Farm to School programs may be GAP audited
  • Retailers and institutional food service buyers may still require food safety programs

Resources:
Check FDA for updates
http://www.fda.gov/Food/FoodSafety/FSMA/default.htm
Types of Audits

First Party: a self audit conducted by the firm
Ex. Cornell GAPs Self Audit

Second Party: an audit performed by the buyer
Ex. Grocery chain specifications

Third Party: an audit performed by a party separate from the producer or buyer
Ex. USDA GAPs, Primus Labs, Davis Fresh, etc.
The Not-So-Scary Truth

90% of audit requirements are already being done on the farm, they just need to be documented!
The Basics: On Farm Food Safety Audit 101

- Audit is performed only by request of auditee
- Valid for 1 year
  (contingent upon passing unannounced audits)
- Prior to start, applicant must sign an “Agreement to Participate” document
- Program is designed for continual & consistent use
  - Unannounced visits will confirm consistent use

- Unannounced visits (usually <3/year) may consist of:
  - Brief visit with contact person
  - Walk through of farm/packing operation
  - Review of any changes to food safety plan (ie. New employee training, change to standard operating procedures (SOPs))
Audit Scopes & Communication

*Key is communication between buyer and seller to understand what is expected

✓ Audit Scopes

- Part 1*: Farm Review
  *All audits must begin with and pass this portion
- Part 2: Field Harvest and Field Packing Activities
- Part 3: House Packing Facility
- Part 4: Storage and Transportation
- Part 5: Vacant
- Part 6: Wholesale Distribution/Terminal Warehouse
- Part 7: Preventative Food Defense Procedures
Good Agricultural Practices (GAPs)

- Elements of GAPs
  - Worker Health & Hygiene
  - Irrigation Water
  - Manure
  - Sanitary Facilities
  - Field Sanitation
  - Packing Facility Sanitation
  - Transportation
  - Traceback

Source: Beuchat, 1996

March 23
March 30
Worker Hygiene and Training

• Pathogen transfer can occur from agricultural worker to food via several routes
Worker Hygiene and Training

Preventative Measures

1. Educate employees
   • Training Programs
   • Documentation

2. Provide appropriate facilities
   • Hand washing
   • Toilet Facilities

3. Reinforce good hygiene practices
   • Set a good personal example
   • Monitor use

4. Maintain and service facilities

5. Reassign sick employees

Photo credits: Cornell GAPs Food Safety Begins on the Farm Grower’s Guide
Hand Washing

- Use soap and warm water.
- Rub hands together to make a lather.
- Vigorous friction on areas of lathered hands and arms for at least 20 seconds.
- Use a scrub brush to clean under and around finger nails.
- Rinse well under warm water.
- Dry hands with a paper towel or hot air dryer.
### Documentation: Training

<table>
<thead>
<tr>
<th>Training: Human Health &amp; Hygiene</th>
<th>Documented Compliance (Yes/No)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>All employees receive basic instruction in food safety.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supervisors are trained to be familiar with the typical signs and symptoms of infectious illnesses.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All employees receive training in good personal hygiene (including bathing, hand washing, teeth brushing, wound care, etc.).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The importance of good hygiene, and regular and thorough hand washing are stressed on a consistent basis.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GAPs & Impact of 2003 Hepatitis A Outbreak

Table 2—Impact of food safety outbreak on Mexican growers, by GAP status

<table>
<thead>
<tr>
<th>GAP status</th>
<th>Volume of green onion sales</th>
<th>Demand for other products</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAPs</td>
<td>Fairly constant</td>
<td>No impact</td>
</tr>
<tr>
<td>Partial GAPs</td>
<td>Down a bit</td>
<td>Some impact</td>
</tr>
<tr>
<td>No GAPs</td>
<td>Down by 50 percent</td>
<td>Down by about 30 percent</td>
</tr>
<tr>
<td>No GAPs and named by FDA</td>
<td>No sales and most fields plowed</td>
<td>Shippers stopped selling all or almost</td>
</tr>
<tr>
<td></td>
<td>under</td>
<td>all products from these growers</td>
</tr>
</tbody>
</table>

Summary

- Contamination of fresh fruits and vegetables may occur via many routes on the farm, however water, manure, and handling by employees are a significant risk factor.

- GAPs are currently NOT mandatory, but may be in the future- so plan ahead!

- Participating in 3rd Party Audits for food safety can help you develop and implement your food safety plan.

- Training, documenting, and verifying that employees are following good hygiene practices can reduce the risk for a foodborne outbreak originating on the farm.
Resources

USDA Audit Check List
http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5050869

USDA Audit Score Sheet
http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5050871

National Good Agricultural Practices Network for Education and Training, Cornell University
http://www.gaps.cornell.edu/

Good Agricultural Practices: A Self-Audit for Growers and Handlers, UC Davis

Good Agricultural Practices, Joint Institute for Food Safety and Applied Nutrition:
http://www.jifsan.umd.edu/training/gaps.php
Acknowledgements

• Department of Food Science and Human Nutrition
  - Dr. Marisa Bunning, Food Safety Extension Specialist & Asst. Professor
  - Dr. Patricia Kendall, Extension Specialist and Professor
  - Mary Schroeder, Research Associate
  - Jessica Hedden, Ryan Friedman, Andrew Kester, Graduate students

• Department of Agricultural and Resource Economics
  - Martha Sullins, Coordinator, County Information Service

• College of Agricultural Sciences
  - Dr. Dennis Lamm, Extension Specialist and Professor

• Colorado Department of Agriculture
  - Tracy Vanderpool, Fruit & Vegetable Section Chief

• Colorado State Extension
  - Adrian Card, Boulder Extension Agent
  - Ruth Willson, Extension Technology
Contacts

• Marisa Bunning, Ph.D.
  Assistant Professor and Extension Specialist, Food Safety
  970-491-7180
  mbunning@cahs.colostate.edu

• Martha Sullins
  CSU Extension Coordinator, County Information Service
  970-491-5706
  sullins@ext.colostate.edu

• Tracy Vanderpool
  Fruit and Vegetable Section Chief, CO Dept. of Ag
  719-852-4749
  Tracy.Vanderpool@ag.state.co.us

• Gretchen Wall
  Graduate Research Assistant
  Gretchen.Wall@colostate.edu