GAPS OF WRATH

GOOD AGRICULTURAL PRACTICES
for vineyards and wineries
The Pledge of Allegiance

I pledge allegiance to the flag of the United States of America and to the republic for which it stands, one nation under God, indivisible, with liberty and justice for all.
GMP = Manufacturing Practices
SOP = Operating Procedures
HACCP = Hazard Analysis
GAP = Good Ag. Practices

FOOD SAFETY PLAN
FSMA

Assess
Evaluate
Manage

Risk Management

Measure

[Image of jack-o'-lanterns and cartoon character]
Engineering Flowchart

DOES IT MOVE?

No

No

No Problem

WD-40

Yes

Should it?

Yes

No Problem

Yes

Should it?

No
FSMA Science-based Standards

- Agricultural water
- Farm worker hygiene
- Manure and other additions to the soil
- Animals in growing areas, and
- Equipment, tools and buildings
- Sprouts
Modified Requirements

- Foods subject to low-acid canned food regulations (microbiological hazards only)
- Foods subject to HACCP (seafood and juice)
- Dietary supplements
- Alcoholic beverages
Trace one Forward and Back

GROWER name and address on all packages or placard on bulk displays
Good Agricultural Practices

Hazard Analysis Critical Control Point

Risk Analysis
Good Agricultural Practices

An Overview for GRAPE PRODUCER
Good Agricultural Practices (GAPs)

A “PREVENTION” FOCUSED FOOD SAFETY MANAGEMENT PROGRAM

The goal is to reduce microbial risks in fresh or minimally processed fruits and vegetables—making produce safer.
Why are Foodborne Illnesses Increasing?

- Complexities of the Food System
- Aging of the Population
- Chronic Illnesses / Compromised Immunity
- Changing Microorganisms:
  * More Virulent Strains
  * Adapting to Stresses
Fruit and Vegetable Bacterial Outbreaks: 1988 - 1998

Source: CDC Foodborne outbreak surveillance system
US Produce Outbreaks: 1990 - 1998

- Salad Bar: 35.4%
- Fruit: 20.8%
- Lettuce: 16.7%
- Sprouts: 9.4%
- Unknown/Other: 7.3%
- Cabbage: 5.2%
- Carrots: 3.1%
- Tomatoes: 2.1%

Source: CDC Foodborne outbreak surveillance system
Fruit and Vegetable Outbreaks by Origin of Produce: 1990 - 1998

Source: CDC Foodborne outbreak surveillance system
Why Should We Care?

Every year foodborne illnesses result in an estimated:

• 76 million cases of foodborne illness.
• 325,000 people hospitalized for foodborne illness.
• 5,200 needless deaths each year.
• Economic losses between 10-83 billion dollars.
Produce Associated Outbreaks Affect Business

• Strawberry industry lost an estimated $50 million in 1996 after mistakenly being indicated as the source of pathogens in an outbreak.

• Odwalla shareholder value dropped approximately 41% ($12.4 million) in six months after outbreak.

• Melons

• Peppers/tomatoes

• Peanuts
• In the right environment, bacteria replicate ~ every 20 minutes.

• An head of lettuce has 1 bacteria on it.

• How long will it take to multiply to 100 cells?

  140 minutes / 2 hrs & 20 min

The Infective Dose of *E.coli* O157: H7 could be as few as 10 cells.
“I can always wash the produce before I eat it or sell it”

• Preliminary studies in strawberries and apples indicate that once the fruit is contaminated, the pathogens are difficult to remove.

• Prevent contamination.

• Control multiplication.
PREVENTION is the Key to Reducing Microbial Contamination of Fresh Fruits and Vegetables
What Can We Do To Minimize the Risks?

Focus on risk reduction, not risk elimination.

“Current technologies cannot eliminate all potential food safety hazards associated with fresh produce that will be eaten raw.”
What are my chances of causing a foodborne illness outbreak?

• The chances are low, but the consequences are dire.....to both people and your business.

• It is possible to have been in business for 20 years and have never had a problem, but that does not insure no problems in the future.

• Everyone’s commitment is important.
Vulnerability of Produce Industry

- Low levels of sporadic contamination
- Low levels of infectious dose
- Severity of disease
  - Hemolytic Uremic Syndrome (HUS)
  - Life threatening
- Survival/growth under acidic conditions especially *E. coli* O157:H7
Good Agricultural Practices to Reduce Risks of Microbial Contamination
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
Evaluate the Whole Operation

Pre-plant, Production, Harvest & Post-Harvest

- Irrigation and Wash Water Sources
- Manure Source, Use, and Handling
- Employee Training and Hygiene
- Farm and Equipment Sanitation
ORAL FECAL ROUTE

Animals ➔ Feces ➔ Insects ➔ soil ➔ water ➔ Produce ➔ meat, milk, eggs ➔ Humans

(modified from Beuchat, 1996)
Reduce Plant Diseases

• Many bacteria behave the same in the environment.
  ▪ *E. coli / Salmonella* vs. Bacterial Leaf Spot / decay

• Many BMPs that decrease plant pathogens also decrease human pathogens.
Reduce Post Harvest Loss

• Post-harvest management practices that reduce loss to spoilage or shrinkage will reduce risks.

• These include sorting, quick cooling, chlorinated wash water, and good refrigerated storage and shipping.
Review Field Management Practices

- Manure
- Water quality
- Worker & field sanitation
- Post harvest handling
- Transportation
Manure = Fecal Matter = Microbes

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

• Manage compost piles to achieve high temperatures to kill potential pathogens.

• Time application properly.

• Know the source.
Exclude Animals

• Keep wildlife out of production areas as much as possible.

• Manage rodents and birds in packing houses and storage areas.

• No dogs or other pets in the fields***.
Bird control methods

**Bird netting** is the most effective at eliminating bird damage and is the most expensive and involved of the bird control measures.

- Net whole or part of vineyard.
- Net the most exposed parts of the block or where the most bird pressure is - like the outside rows, near tree row or power lines.
- Netting every ten rows in higher density plantings has proven to provide enough discouragement for birds.

**Visual Devices.** Balloons, scarecrows, hawk-kites, reflective tape and other visual devices have a limited effect on bird control. These devices work best in conjunction with another bird control measure like netting, **propane air cannons, or other noise devices**.
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

- Know the source of the water and intended use.
- Evaluate the irrigation method.
- Test water quarterly for fecal coliforms and keep records of all water test results.
- Be active in local watershed groups.
Spray Water Quality

• Use potable water for pesticide sprays.

• When potable water is not available, test water quality and keep records.

• Low water volumes reduce risk.
Wash Water Quality

- Use potable water for all produce washing, cooling, dipping, icing, and processing.

- Avoid water temperatures in dump tanks that are more than 10°F cooler than produce.
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.
FARM WORKERS ARE FOOD HANDLERS !!!
Promote Cleanliness at U Pick

• Invite customers to wash their hands prior to entering the fields.
• Provide clean and convenient restrooms for customer use.
• Supply soap, clean water, and single-use towels for hand washing.
Proper Handwashing

- Reduces infection 35 to 50%
- Reduces GI-illness up to 80%
Farm Worker Hygiene

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

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

• Enforce proper use of facilities.
Is worker training really a priority?

• Farm workers are sometimes the last/only people to handle the produce before the consumer.

• Workers are capable of learning about food safety issues.

• Effective training results in better employees and safer produce.
Harvest Sanitation

- Clean and sanitize storage facilities prior to harvest.

- Clean and sanitize harvest bins daily.

- Avoid standing in harvest bins.

- Clean and sanitize packing area, equipment, and floors daily.
Extruded or Collapsible Plastic Bins Are Used from Harvest to Distribution
One of the challenges to the industry will be to minimize “disinfectant demand” introduced by field soil on cartons, totes and pallets.
Growers Are Innovating Their Own On-Farm Sanitation Routines
Develop a System for
Maintaining Carton and Tote Hygiene
Field conditions may increase risks.
Juice House Sanitation

• Proper sorting and culling of fruit.
• Detectable Free Chlorine in Wash Waters (if used).
• Enforce Good Worker Hygiene.
• Exclude all animals from Shed, especially insects, birds and rodents.
• Clean and Sanitize Equipment.
Punctured or Bruised Fruit Provides the Entry for:

- Plant Pathogens
- Foodborne Illness Pathogens

So proper harvesting/culling is important to both safety and quality.
Control Sources of Rodent and Bird Contamination
Transportation and Distribution

Cleanliness and Sanitation

- Pre-clean and Pre-rinse
Local or Small-scale Distribution
Traceback and Positive Lot Identification
Farm Food Safety Plan Describes:

- Manure storage and handling
- Animal exclusion (domestic & wild)
- Irrigation and drainage management
- Harvest and post harvest handling
- Employee training program
- Restroom & hand washing facilities
- Crisis management strategy

Record It or Regret It!
Be Active and Be Ready

• Make changes to management practices as needed.

• Keep good records of all production practices.

• Teach employees the importance of prevention strategies and provide proper facilities.

• Work with upstream neighbors and local watershed committees on management goals.

• Update your plan regularly.
Potential Sources of On-Farm Contamination?

• Soil
• Irrigation Water
• Animal Manure
• Wild and Domestic Animals
• Inadequate Field Worker Hygiene
• Transport Containers (field to packing facility)
• Wash and Rinse Water
• Inadequate Processing Equipment Cleaning and Sanitation - equipment used to soak, pack, or cut produce
A Comprehensive Food Safety Program for Growers and Packers

- Grower’s Guide
- A Quick Look at GAPs
- CD-ROM
- Resource Manual
- Farm Checklist
- Exhibit & Posters
- Farm Worker Education Materials
How to Comment on the Proposed Rules

- http://www.regulations.gov
- Link to rules on http://www.fda.gov/fsma
- Comment period is 120 days; exact due date will be in the Federal Register
- Comment periods on major FSMA proposals will be coordinated to enable comment on how the rules can best work together.
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