Food Safety in the Garden
GAP

• **Goal**: reduce microbial risks in home grown fruits and vegetables to make produce safer.

• **Reduce** risk of foodborne illness

• **Integrate** food safety into home gardening practices
Produce Safety:

• 46% of foodborne illness linked to fresh produce. *

• Recent outbreaks have raised awareness

• What does this have to do with your home garden?

*2003-2006, CDC
GAP in the Home Garden

Home Gardens - many issues the same

- Water safety
- Domestic/Wild animals
- Use of compost
- Use of manure
- Personal hygiene/sanitation
- Post-harvest handling and temperature control
Unsafe/contaminated food is very hard to detect

- It can look fine
- It can smell fine
- It can taste fine
Foodborne Illness

**Symptoms**

- Nausea
- Vomiting
- Diarrhea
- Headache
- Fever

A “tiny taste” will not protect you ...

... as few as 10 *bacteria* could make you sick!
People at Greatest Risk

- Infants & children
- Pregnant women
- Elderly
- People with weakened immune systems
Potentially Hazardous Foods

- Undercooked meats
- Dairy
- Eggs
- Fresh produce
  - “ready to eat”
Food Safety Hazards

3 Types of Contamination

Physical
- Plastic
- Glass
- Metal
- Wood
- Bandages
- Jewelry

Chemical
- Allergens
- Pesticides
- Sanitizers
- Lubricants

Biological
- Parasites
- Viruses
- Bacteria
Food Safety Hazards

Chemicals:

• Pesticides: Use only according to manufacturer’s directions
• Keep chemicals in original labeled containers
• Toxins from mold
  • e.g. patulin in apples
Biological Food Hazards

- Parasites
  - Cryptosporidium parvum

- Viruses
  - Norwalk virus

- Bacteria
  - Salmonella spp.
Sources of Contamination

Biological Contamination

- Animals
  - wild and domestic
  - manure
- People
  - Contagions
- Environment
  - Water
  - Soil
Sources of Contamination

- Animal/human intestinal tract
  - *Salmonella*
  - *E.coli O157:H7*
- Human
  - *Shigella*
  - *Hepatitis A virus*
  - *Norovirus*
  - *Staphylococcus*
- Environment
  - *Listeria*
  - *Clostridium*
  - *E.coli O157:H7*
- Water
  - Most of the above
Bacterial Contamination

To Grow, Bacteria Need:

- Food source
- Moisture
- Low in acidity (high pH)
- Oxygen
- Correct temperature
- Time to grow
Bacterial Contamination

To Grow, Bacteria Need:

- **Correct temperature**
  - Cook foods to above 140º
  - Store below 40º

“Danger Zone”

- 140 º F
- 40 º F
Bacterial Contamination

Potential sources from the garden

• Soil
• Water
• Manure/Compost
• Wild and Domestic Animals
• Personal Hygiene/Sanitation
• Containers
• Wash and Rinse Water/Inadequate drying
• Post-harvest handling and temperature control
Good Gardening Practices

Keep safe throughout the garden year

- Preparing the garden for planting
- Planting → growing
- Harvesting garden produce
- Storing garden produce
- Preparing and serving produce
Personal Hygiene

Important at all stages of gardening

• Proper handwashing - after working in the garden, using the bathroom, and before preparing fruits and vegetables

• Be aware of illness symptoms. If ill, especially diarrhea, have someone else do the gardening.

• Cover open cuts and sores
Using Manure in the Garden

Animal manures

- provide nutrients
- add organic matter
- Source of human pathogens
  - *E. coli, Salmonella, Listeria*

Fresh manure *not* recommended for use, however......
Best practices for using manures:

• Manure should be thoroughly composted
• Apply manure in the fall, \textit{after} harvest
• Spring applications
  • \textbf{Not recommended}
  • Spread at least two weeks before planting
  • NO harvesting until 120 days after application
  • Incorporate into soil – NO sidedressing
  • Avoid root and leafy crops year of application
Proper composting can produce a safe product

• Adds nutrients
• Adds organic matter

Incomplete compost can harbor pathogens
Using Compost in the Garden

Practice safe composting to discourage pathogens

- Do not use animal waste or meat/dairy scraps

- Compost temperature should reach at least 140°F for 3 days to destroy pathogens

  - Need at least 27 cubic feet - smaller needs more attention to get heat.

  - Turn pile regularly to aerate
Using Water in the Garden

Water can be a source of a variety of pathogens

- E. coli
- Listeria

Know the source of water used for your garden.
Using Water in the Garden

- Municipal or public water systems
  - best source and lowest risk.
- Surface water (lakes, ponds, streams, rainwater)
  - more likely to have microbial contaminants
- Private wells from ground water
  - safe if tested annually
- Use only clean, potable/drinking water to water garden close to harvest and during post-harvest handling.
Using Water in the Garden

Protect your well water

• Keep away from pollution sources
  • Septic systems, animal pens
• Check well casing, cap, age, type, depth
  • Dug vs. drilled, access
• Test 1/year
Protect your well water

• Backflow
  • Occurs when contaminated water (non-potable) gets drawn into or flows back into clean water (potable) supply
  – Example: Back Siphoning
Protect your well water

• Backflow prevention

• Disconnect sprayers or chemical containers from hose after use

• Purchase backflow prevention devices
  • Hardware store, plumbing supply
  • Hose bib for end of hose
  • Consult plumber, check building codes
Animals in the Garden

Animals are a source of pathogens

• Keep pets out of garden
• Deter wild animals
  ✓ Minimize vegetation around gardens
  ✓ Deterrents - fencing, noise
  ✓ Call Cooperative Extension for help
Microbial food safety issues are a problem whether a gardener uses organic or conventional gardening methods. Microorganisms are in the environment - air, soil or water. Follow safe gardening practices.
Harvesting Produce

Humans are the major source of disease transmission in food.

• Personal hygiene – washing, covering wounds

• Change, wash dirty clothes/shoes after working in the garden

• Harvest using clean, food-grade containers
Harvesting Produce

Harvest Time

• Handle produce as little as possible
• Dispose of damaged fruit
• Don’t eat directly from the garden!
  • Properly wash all fruits and vegetables prior to eating
Harvesting Produce

Harvest Time

- Don’t eat directly from the garden!
Keys to storage: focus on safety and quality

- Ripen some produce before refrigeration e.g. apples, tomatoes, melons.
- Store certain produce in cool, dry, well ventilated, clean places e.g. onions, potatoes.
- Look for signs of spoilage - throw out
- Store produce above meat, poultry, fish - avoid cross-contamination by separation.
- Refrigerate raw pre-cut or cooked produce in covered containers
Post-Harvesting Handling

Washing produce

• If washing before storage thoroughly dry to prevent spoilage and mold growth
• If not washing before storage - brush dirt off
• Refrigerate in clean, plastic bags.
• Some produce should not be washed before storage (e.g. berries)
• Always wash just prior to eating
Washing produce

• Very cold water may cause pathogens to be absorbed into the produce through stem or blossom end

• Wash water should not be more then 10 degrees colder than the produce.
Preparing produce

• Practice good personal hygiene.
• Wash hands before preparation
• Wash produce in cool, clean running water to help remove filth and bacteria
Post-Harvest Handling

Preparing Produce

• Do not use soap or detergent
• Bleach not recommended for home use
• Wash produce skin with brush to help minimize filth or bacteria transfer to eatable portion
Preparing-serving fresh produce

• Cut away bruised or damaged areas
• Avoid cross-contamination
  • Knives, cutting boards, plates, containers
• Keep work area and utensils clean.
• Refrigerate leftovers in covered containers
Resources

National Center for Home Preservation:  
http://www.uga.edu/nchfp/index.html

Home Food Preservation:  
Resources for Safe Food Preservation  
http://foodsafty.cas.psu.edu/preserve.html

Home Canning.com (Ball/Kerr)  
http://www.homecanning.com/usa/

UMaine Cooperative Extension  
Beth Calder, Jason Bolton
Key Food Safety Principles

• Practice safe soil preparation prior to planting

• Practice safe garden maintenance during planting and growing of fruits/vegetables

• Practice safe harvest and post-harvest handling including:
  • Good personal hygiene
  • Time and temperature control
  • Cross-contamination prevention
Good Agricultural Practices

Gardening is fun and good for you!

Keep it safe through every step

• Preparing the garden
• Maintaining the garden
• Harvesting the produce
• Storing the produce
• Preparing the produce
Good Agricultural Practices

Master Gardeners Role

• Spread the word to home gardeners!

• Where:
  • Fairs, Garden Shows, Clubs, etc.

• How:
  • Handouts, Display, PowerPoint presentation
Questions ???