



UNIVERSITY OF ILLINOIS
EXTENSION

**GROWING A NEW GENERATION
OF ILLINOIS FRUIT AND VEGETABLE FARMERS**

GAPS: GOOD AGRICULTURAL PRACTICES

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What is GAPs?

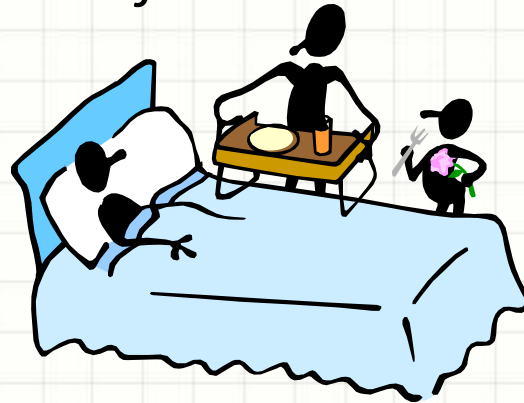
- Good Agricultural Practices
 - standard operational procedures to reduce microbial contamination of fruits and vegetables
- The goal
 - to reduce foodborne illness in consumers.



USA: Why do we care?

- Due to illnesses caused by contaminated produce:
 - about 1% of those affected die
 - about 10% of those affected are hospitalized

[Centers for Disease Control (CDC)]

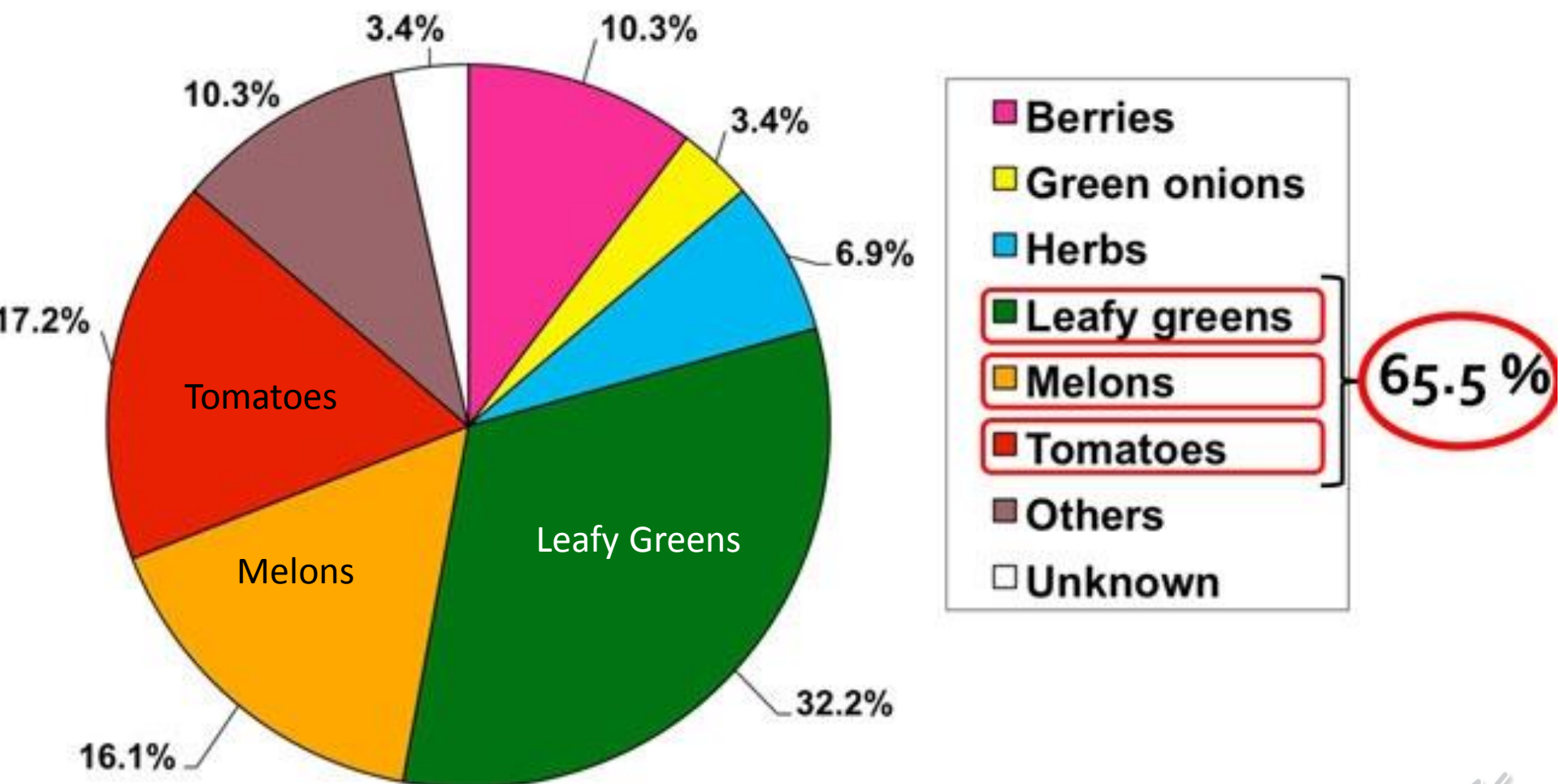


Why do we care?

As a result of foodborne illnesses:

- People lose jobs
- Farms could
 - incur heavy losses in farm income
 - become bankrupt
- Economic impact: losses up to \$80 billion
 - affected people are less/not productive
 - affected commodity loses market
 - affected people seek compensation

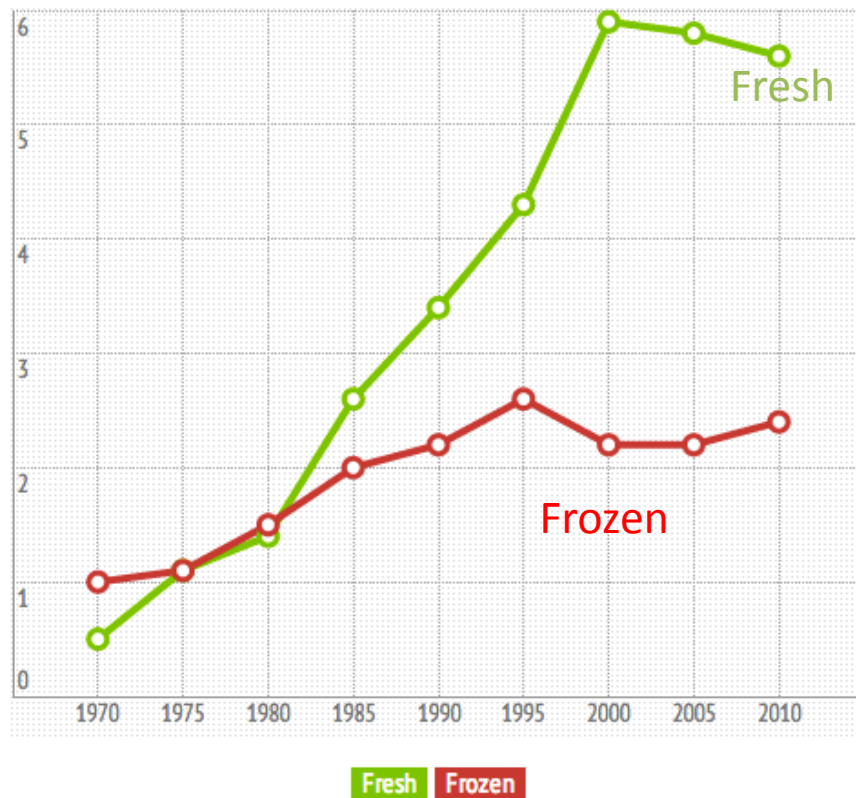
Types of produce Associated with Outbreaks, 1996-2009 (N=87)



Why The Increase in Illnesses?

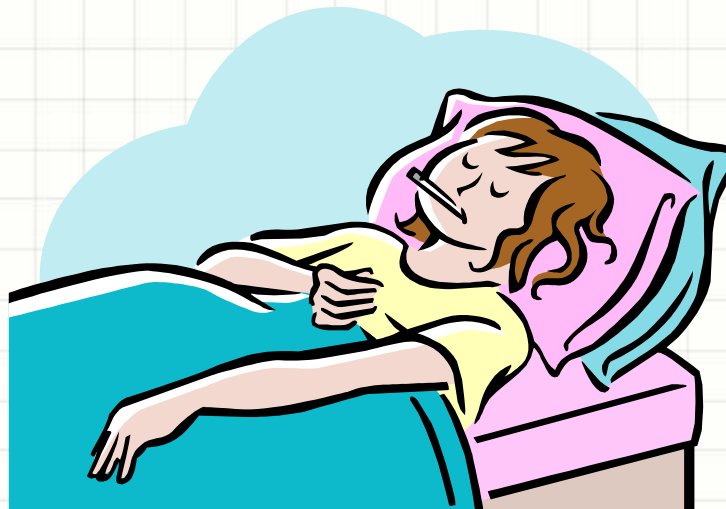
- more raw vegetables consumed

**Per capita consumption of
broccoli, 1970-2010 (pounds)**



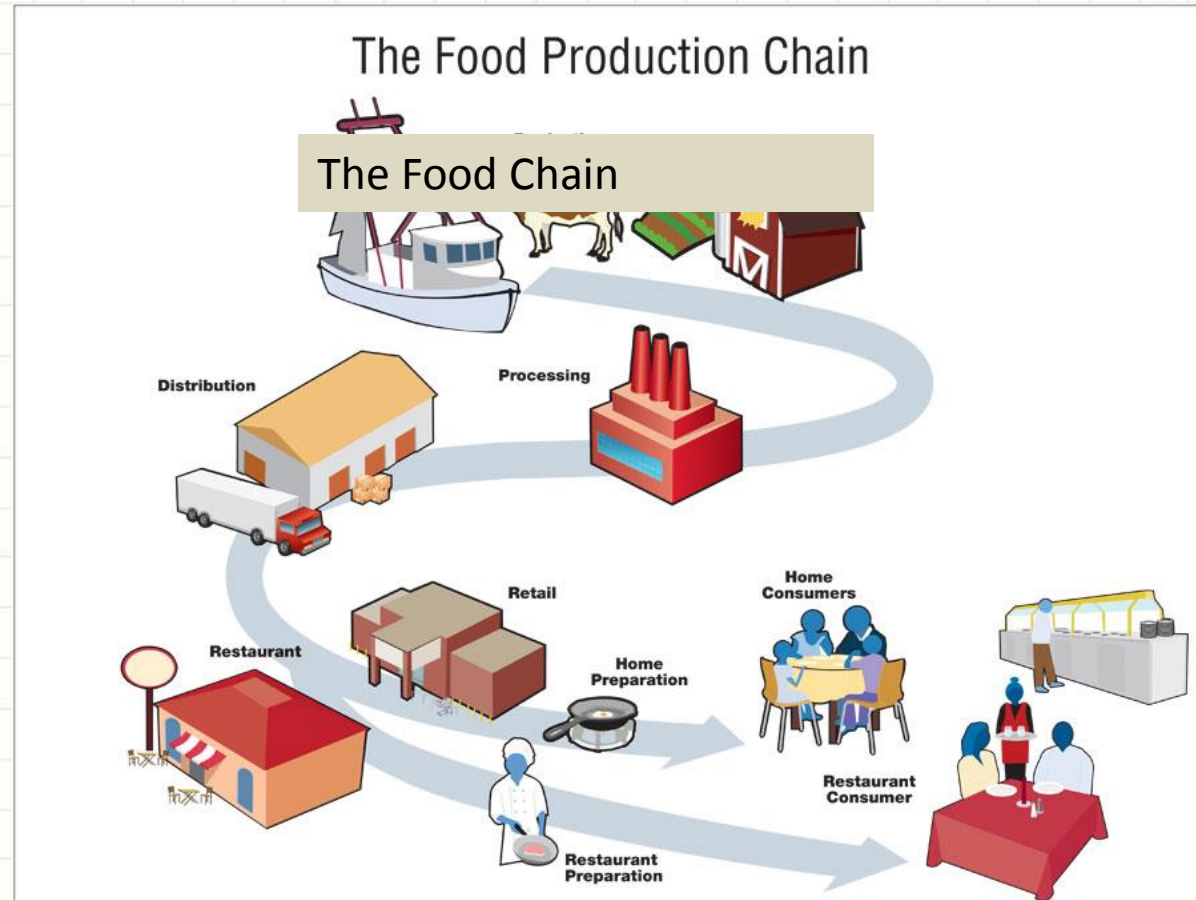
Why the Increase in Illnesses?

- Weak immunity of young, old and immuno-deficient individuals
- Food systems are complex



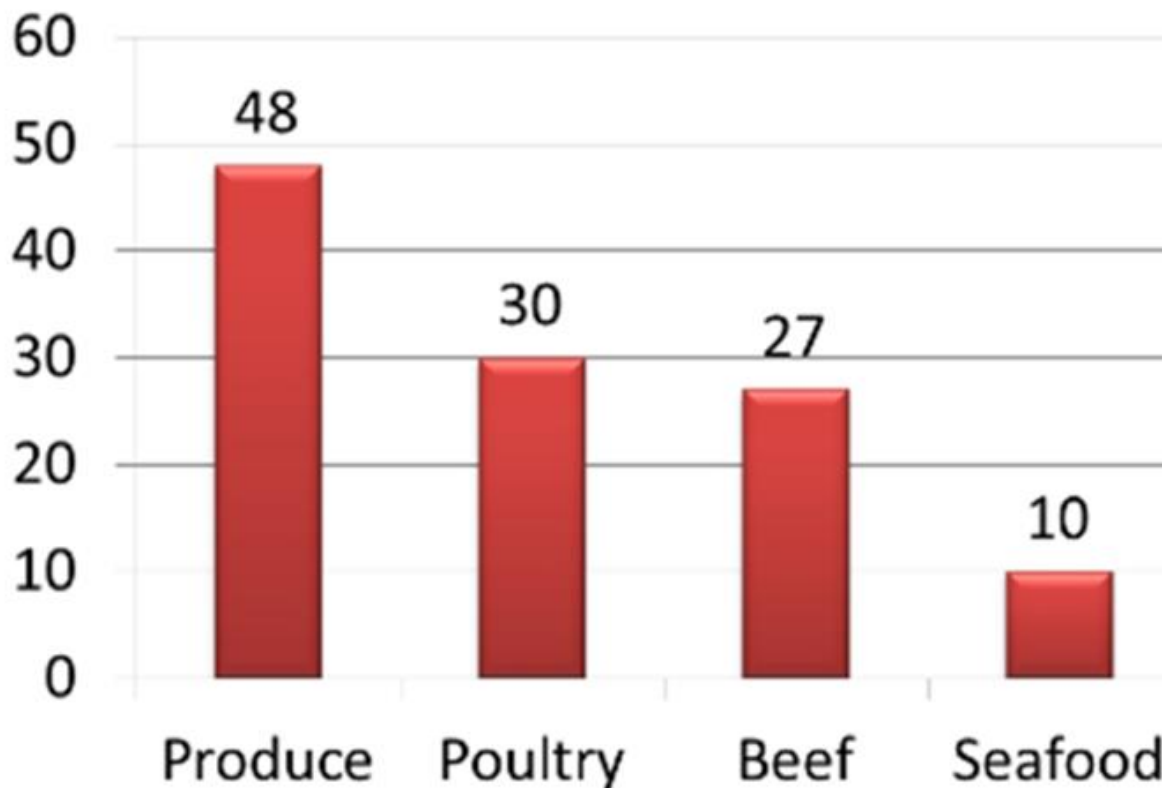
Sometimes, Food Travels A Looooong Way

- Time reduces quality of produce
- Many hands handle the food item
- Many opportunities for microbial contamination



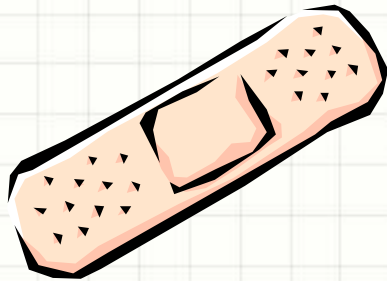
Why Should We Care?

**Average Number of Sick People
Per Outbreak (1996-2007)**



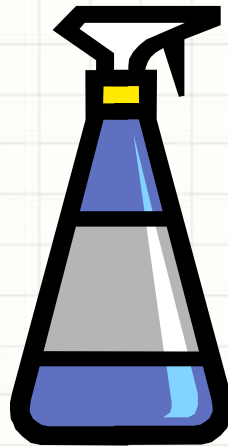
Vegetables and Fruits

Food Safety Hazards: 3 Types of Contaminants



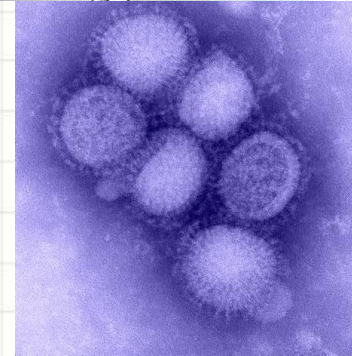
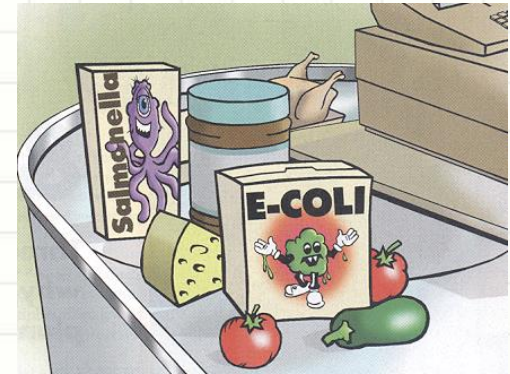
Physical

Plastic
Glass
Metal
Wood
Bandages
Jewelry & other
personal items



Chemical

Allergens
Pesticides
Sanitizers
Lubricants



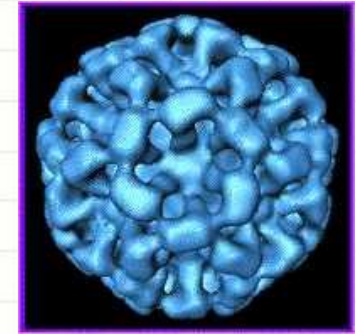
Biological

Parasites
Viruses
Bacteria

Biological Food Safety Hazards

Pathogens = Disease-causing organisms

➤ Viruses



Norwalk virus

Norovirus

➤ Bacteria

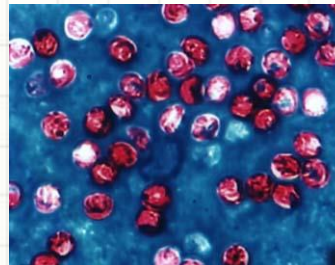
➤ (most important)



Salmonella spp.



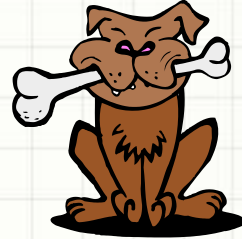
➤ Parasites



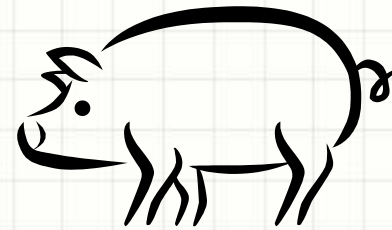
Cryptosporidium parvum

Sources of Biological Contaminants

- Animals (wild and domestic - manure)



- People



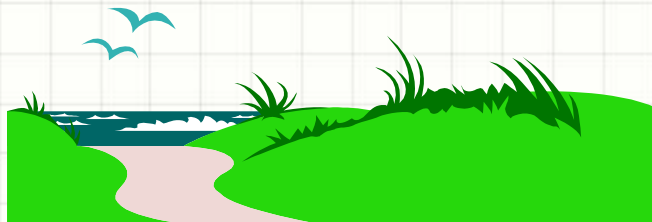
- Illness, fecal matter



- Environment



- Water



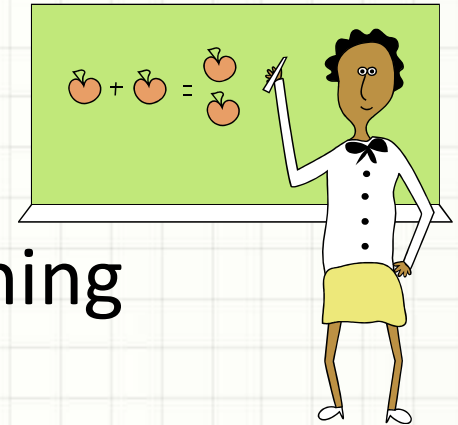
What is Covered in GAPs Training?

- ** Human Health & Hygiene
- ** Soil Amendment
- ** Water Quality & Pesticides
- ** Harvest & Post-Harvest Handling
 - Wildlife Management
 - Traceability, Recall & Recordkeeping
 - Written Food Safety Plan
 - standard operating procedures (SOPs)
 - 3rd Party Audits and Certification



Worker Health & Hygie

- Most fruits & vegetables
 - are harvested by people
- Workers on the farm need training
 - educate about food safety risks
- Toilet & Hand washing facilities
 - Human waste should never leave the toilet



Soil Amendments – Manure Use

- Animal manure has harmful microbes
- Vegetables and fruits can get microbes from soil
- Growers: protect both crops and water
- Compost properly to reduce risk



Preparing Garden for Planting: Compost

Properly managed compost
can produce a **safe product**



Maintaining the Garden: Water Safety

- Water can be a source of a variety of pathogens.
- Know the source of water used for your garden.



Water Quality & Use

- Water carries pathogens
- Potable water used on the farm reduces risk
- Maintain water safety
- Drip irrigation reduces risk
- Water disinfection in post-harvest handling



Pesticide Use

- ALWAYS! Read and follow instructions on **LABEL!**
- Proper pesticide use, handling, storage & disposal
- Keep records



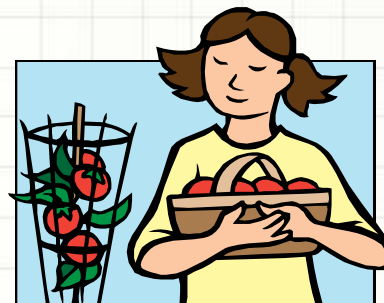
Wild Animal Management

- Domestic and wild animals carry pathogens e.g. *E. coli*
- Exclusion in field & packing house (and delivery vehicle)
 - do your best



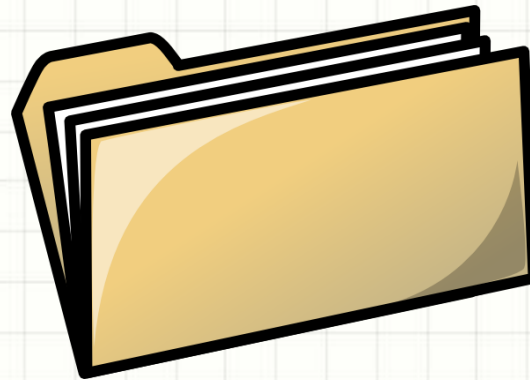
Harvest Handling

- Use clean and sanitary equipment
- Pick intact, undamaged fruits & vegetables
- Avoid picking produce with or near fecal matter
- Use deterrents to keep wildlife away



Post-Harvest Handling

- Contamination can occur
- Cool produce quickly
- Trained workers are valuable
- Keep records



U-Pick Operations and Petting Zoos

- Implement GAPs
- Visitors should be hygienic
- Provide sanitation amenities
- Keep equipment sanitary
- Vaccinate and keep animals clean



Records

- Used to trace back origin of food item
- Today's food system is complex
- Document all activities
- Records indicate due diligence
- Recordkeeping is a valuable business tool



Write a Food Safety Plan



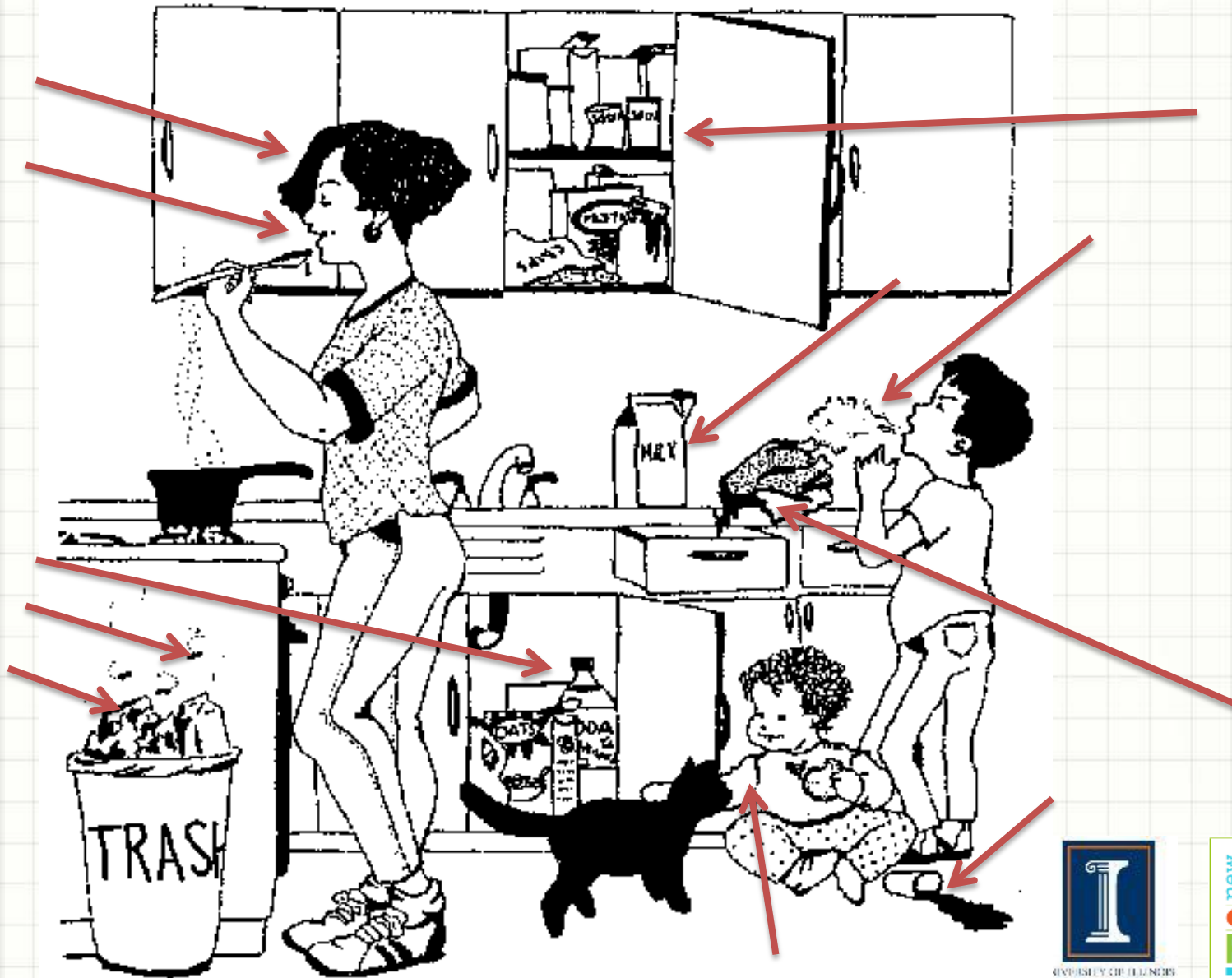
A food safety plan should be seen as a living document that serves to demonstrate that you are controlling food safety risks on an ongoing basis in your facility.

GAPs Audit

- Apply for Food Safety Audits
- Conducted during growing season



Identify Unsafe Practices



Resources

- ✓ **Good Agricultural Practices for Small Diversified Farms -**
http://www.carolinafarmstewards.org/wp-content/uploads/2013/07/CFSA_GAPS-web.pdf
- ✓ **Farm Food Safety -**
<http://www.extension.iastate.edu/foodsafety/resources/index.cfm?listID=4>
- ✓ **Good Agricultural Practices –** <http://www.uky.edu/Ag/CCD/introsheets/gap.pdf>
- ✓ **Good Agricultural Practices Webinar Series April 7-28, 2014**
Webinar series will begin on Monday, April 7, 2014 and will run every Monday through April 28, 2014.
<https://webs.extension.uiuc.edu/registration/?RegistrationID=9624>
- ✓ **U of I GAPs Audit Cost Share Application -**
<http://web.extension.illinois.edu/smallfarm/downloads/49511.pdf>



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