2022 Field to Fork

NDSU EXTENSION EXTENDING KNOWLEDGE » CHANGING LIVES

Upcoming Webinars

March 9

Honey: Safety and Use

Shannon Coleman, assistant professor and Extension food safety specialist, Iowa State University

March 16

Let's Not Waste Food: From Storing to Composting

Julie Garden-Robinson, professor and Extension food and nutrition specialist, NDSU


Zoom Webinar
You are viewing Scott Swanson's screen
View Options
2022
Field to Fork
NDSU
EXTENSION
EXTENDING KNOWLEDGE » CHANGING LIVES
Presenter
Audio Settings
Chat
Raise Hand
Q&A
Leave

- **Please complete the short online survey** that will be emailed to you after today's webinar. It will take just a couple minutes!
- Be sure to sign up for an opportunity to win a prize in the drawing. After submitting the survey, a form to fill out with your name/address will appear.

- ***Acknowledgement: This project was supported by the U.S. Department of Agriculture's (USDA) Agricultural Marketing Service through AM190100XXXG028. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the USDA.***

March 2

Good Gardening Practices: Safe and Healthy Produce

Barbara Ingham, professor and Extension food safety specialist, University of Wisconsin-Madison

Foodborne Illness

48 million Americans, 1 out of every 6 individuals, get sick from a foodborne illness each year

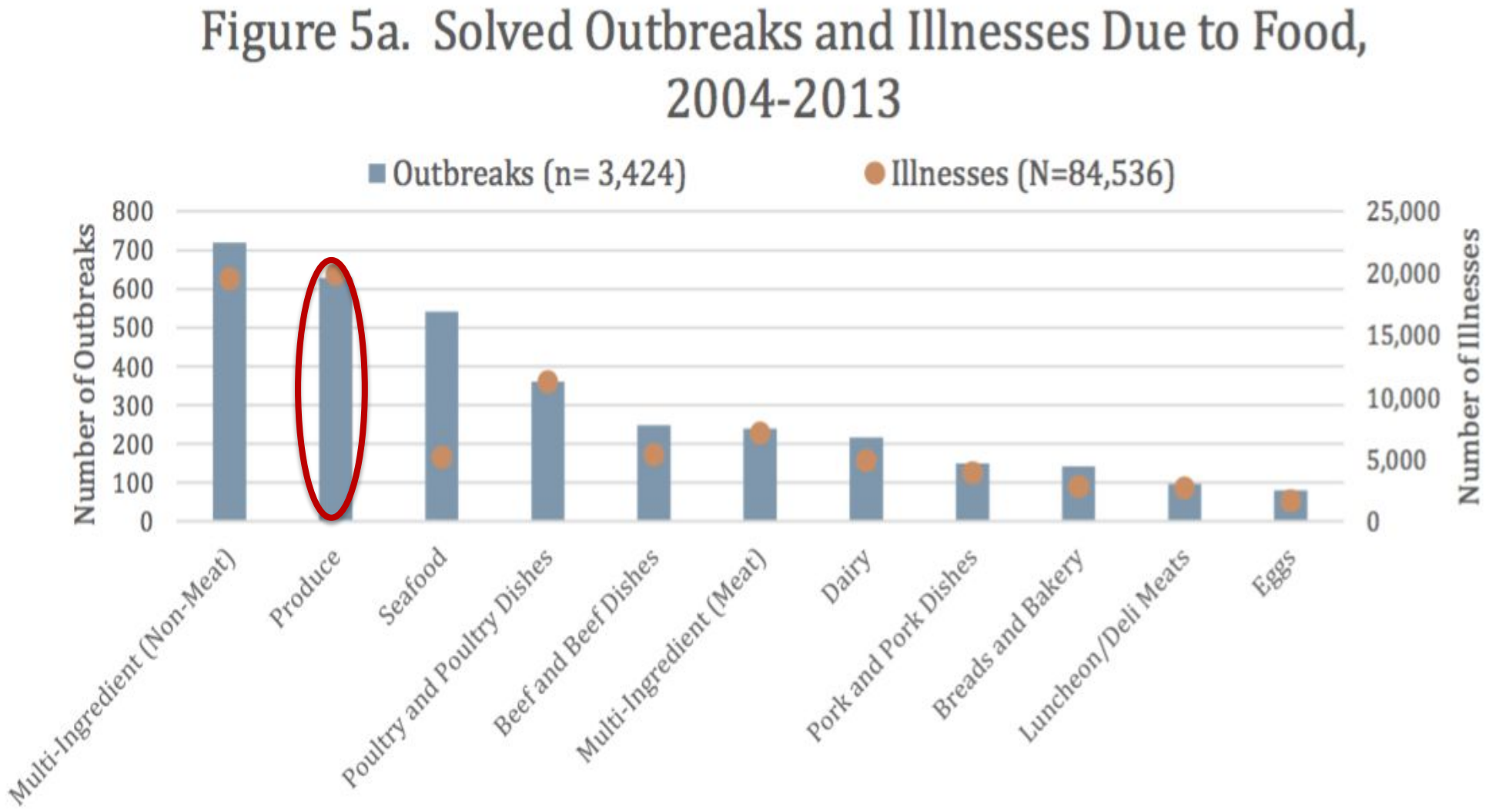
- 128,000 are hospitalized
- 3,000 die as a result

The cost to the U.S. economy is $80 billion

The most vulnerable are young children, the elderly, pregnant women, and those who are immunocompromised.

Data: https://www.cdc.gov/foodsafety/index.html

Fresh Produce Links to Foodborne Illness



Trends in Produce Related Outbreaks

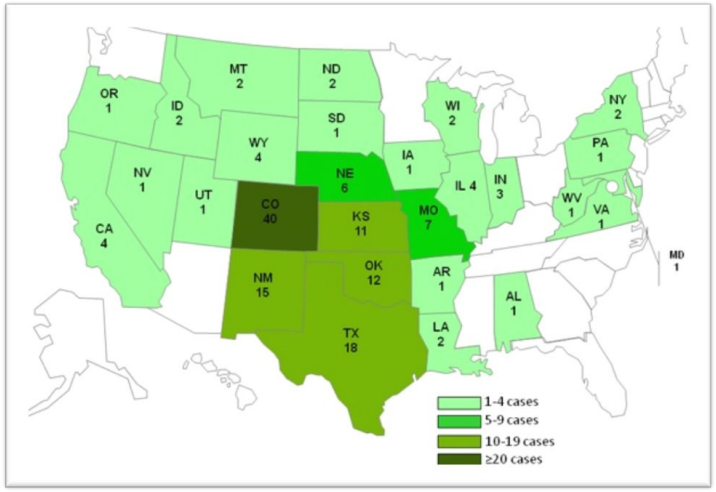
Time Frame	Produce Outbreaks	Illness	Hospitalizations	Deaths
2004 – 2010	163 (27.6% multistate)	4949	895	9
2010-2017	228 (37.3% multistate)	4748	1190	55

Human pathogens associated with fresh produce: Hepatitis A, Norovirus, *Cyclospora*, *Bacillus cereus*, *Campylobacter,* pathogenic *E. coli*, *Listeria, Salmonella, Shigella*, *Yersinia* and others

3 pathogens associated with multistate outbreaks (2010-2017):

- *E. coli* O157:H7 and other pathogenic EC
- *Listeria monocytogenes*
- *Salmonella* spp.

Produce – Pathogen Combinations



Listeria monocytogenes
Cantaloupe 2011
Jensen Farms
147 ill, 28 states,
33 deaths

Source: CDC, 2012

Outbreaks 1998-2008

Produce type	E. coli (ST)	Norovirus	Salmonella	Hepatitis A	Cyclospora	Shigella	Other	Total
Leafy greens	42	187	17	3	1	9	22	281
Sprouts	6	0	19	0	0	0	10	35
Tomato	0	7	22	1	0	1	1	32
Melons	0	6	7	0	0	1	16	30
Leafy green herbs	5	0	6	0	8	3	1	23
Carrots	0	5	3	0	0	2	1	11
Berries	0	2	1	2	0	1	4	10
Peppers	0	0	2	0	0	0	8	10
Fruit(s)	3	32	7	0	1	1	12	56
Vegetables (s)	3	20	7	3	0	0	16	49
Other	11	52	45	6	7	3		124
Total	70	311	136	15	17	21	91	661

CDC Investigation: *Listeria* and packaged salad

Dec 2021/ Jan 2022

- 3 on-going outbreak investigations
- Packaged salad by Dole or Fresh Express
- 13 states, including Iowa, Ohio, Michigan, Minnesota, Wisconsin
- 17 Illnesses/13 hospitalizations
  - 2 deaths (one in Wisconsin)

Example of a product code from the Soledad, CA production facility

Microorganisms on Fresh Produce

- Soil
- Water
- Humans/Animals

--

- Harvest
- Processing
- Transport
- Storage

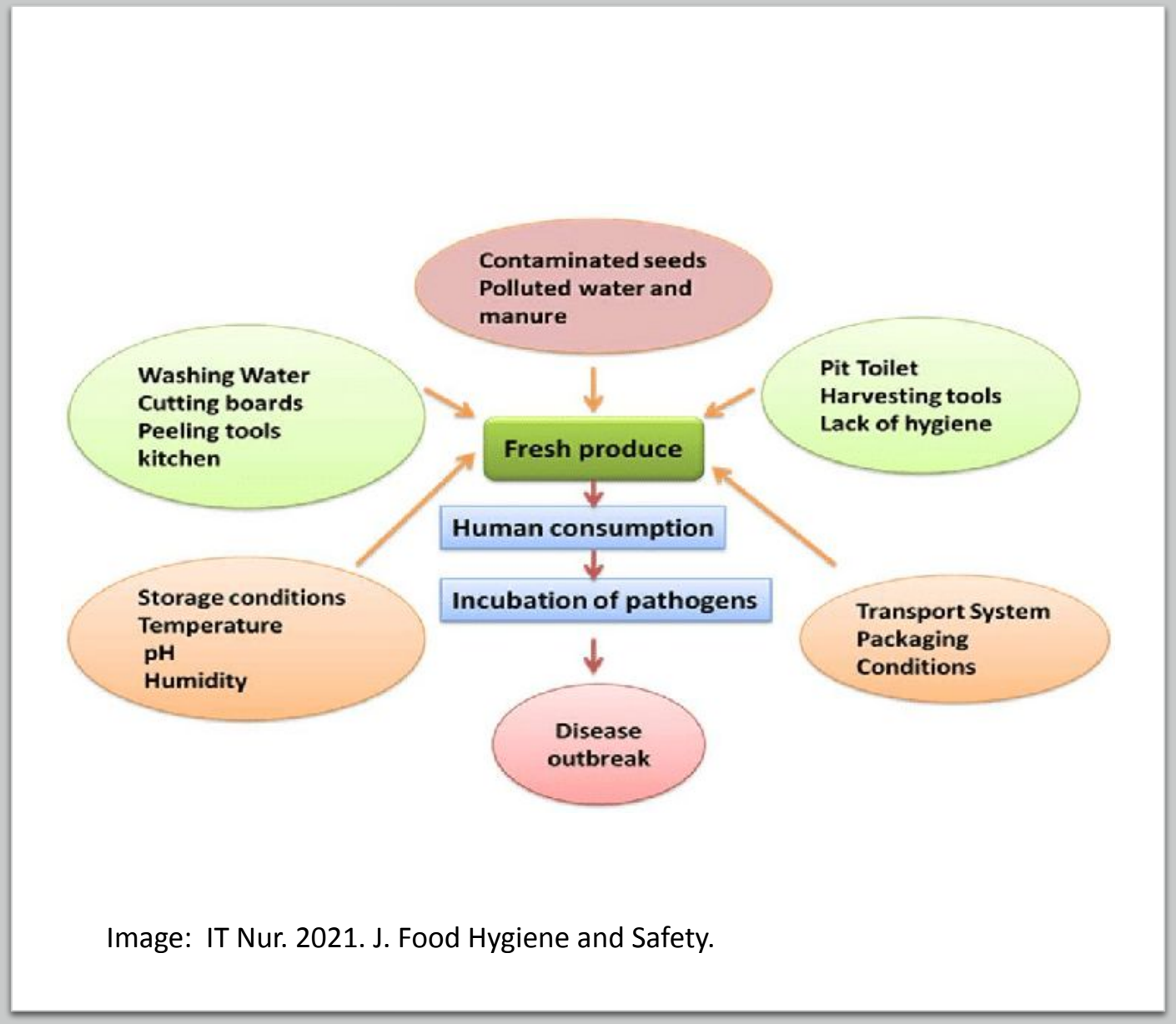


Image: IT Nur. 2021. J. Food Hygiene and Safety.

National Survey Results, 2004

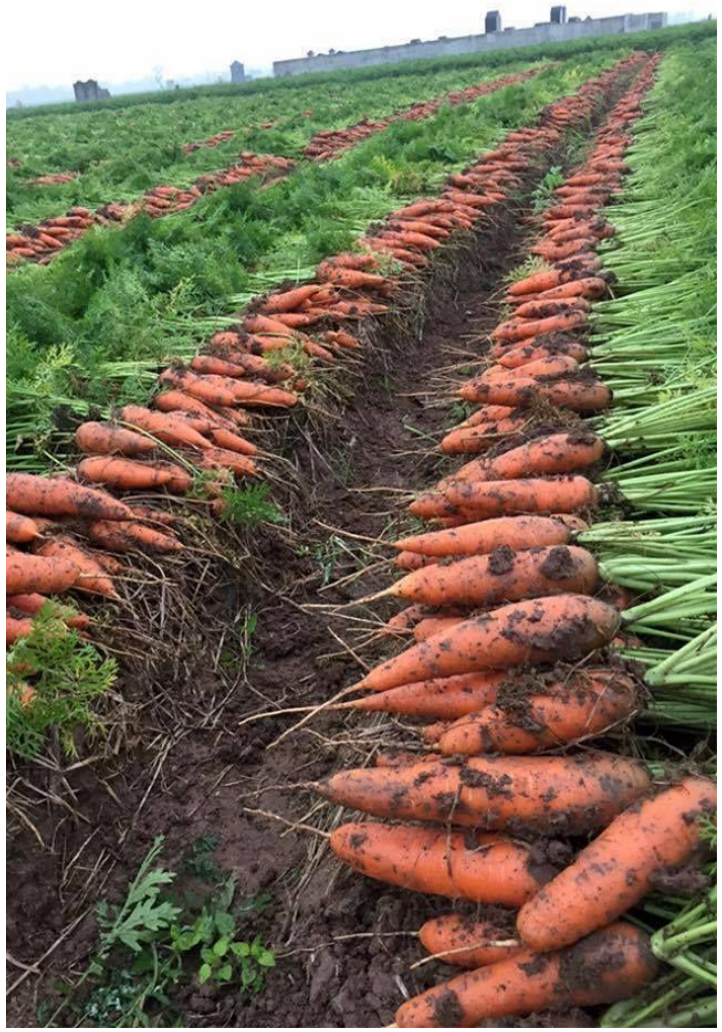
800 gardeners

- Gardeners did not understand that their garden produce could be contaminated with harmful bacteria and viruses
- Chemical residues from pesticides were viewed as the biggest concern
- Many gardeners did not use best 'composting practices'
- Gardeners thought that organically grown produce was safer than conventionally grown fruits and vegetables
- Gardeners did not consider water a source of harmful bacteria

Good Gardening Practices

Home gardeners face the same challenges as the agriculture industry, just on a smaller scale.

- Growing location
- Safe, healthy soil
- Safe water
- Preventing contamination



Growing Location

- Select a sunny garden location with well-drained soil
- Locate your garden away from animal waste storage
- Keep animals out of the garden
- Test soil for nutrients and heavy metals

 If a flooding event happens, contact your Extension office for information on what to do

Healthy Soil Grows Healthy Produce

- Healthy soil is rich in organic matter
- Use properly composted plant or animal waste for your garden
- Locate compost bins downhill or slightly away from the garden site; create barriers to prevent run-off into the garden
- Properly composed organic matter reaches 130°F for 5 days

Water for your Garden

Choose safe water sources. Acceptable water sources may be:

- City water
- Well water
- Rain water

If possible, chose potable water for watering late season crops or rinsing harvested produce.

Hand Washing

Wash hands before…..

- Harvesting and after touching pets or farm animals or using the restroom. Scrub in, scrub out!

Steps to clean hands:

- Wet hands with clean water and apply soap.
- Scrub well for 20 seconds.
- Rinse with clean water.
- Dry with a paper towel.

 Use hand sanitizer when soap and water aren’t available.

Cleaning and Sanitizing

- Tools used in the garden should be clean, free from excess soil
- Containers used for harvesting should be clean; sanitize when possible
- Sanitizing steps:
  - Clean with soap and water
  - Rinse with clean water
  - Dip in a dilute bleach solution
  - Let stand for 30 seconds
  - Allow to air dry or wipe with paper towels

Dilute bleach solution:
1 Tablespoon regular bleach per gallon of water

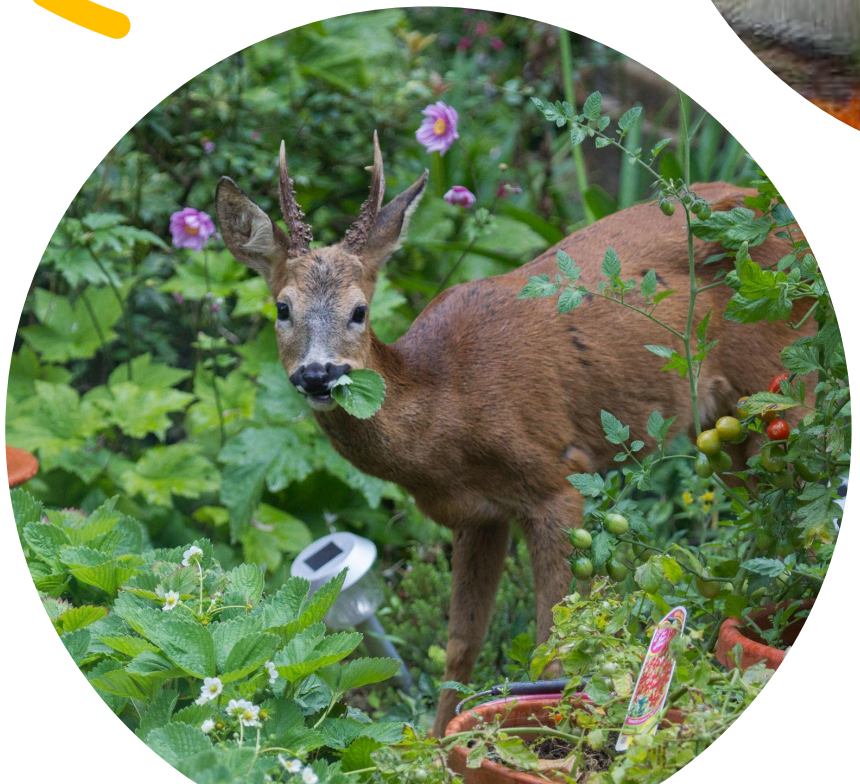
2 ½ teaspoons concentrated bleach per gallon

Animal Control

Animals can cause damage to crops and be a source of contamination

Try to prevent animal access to the garden

- Keep weeds under control
- Place garden in an open, sunny location
- Add barriers such as fences



Harvest to Maintain Quality and Safety

- Avoid harvesting after a heavy rain
- Using clean hands and clean tools, harvest directly into clean containers
- Rinse in clean water to remove soil, if desired. Allow to dry!
- Sort as you go, composting rotting, diseased, or heavily damaged items
- Time the harvest to maximize quality
  - Avoid the heat of the day, whenever possible
- Sort produce by type for ease of storage

Tips for Produce Storage

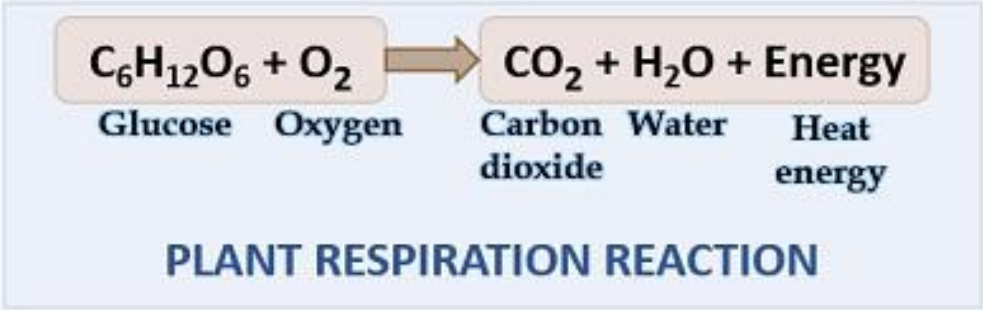
- Rinse before storage only if necessary to remove field soil
- Sort and trim, if necessary, before storage
- Avoid storing damp or wet items
- Store at a temperature and humidity level for maximum quality
- All cut produce should be refrigerated

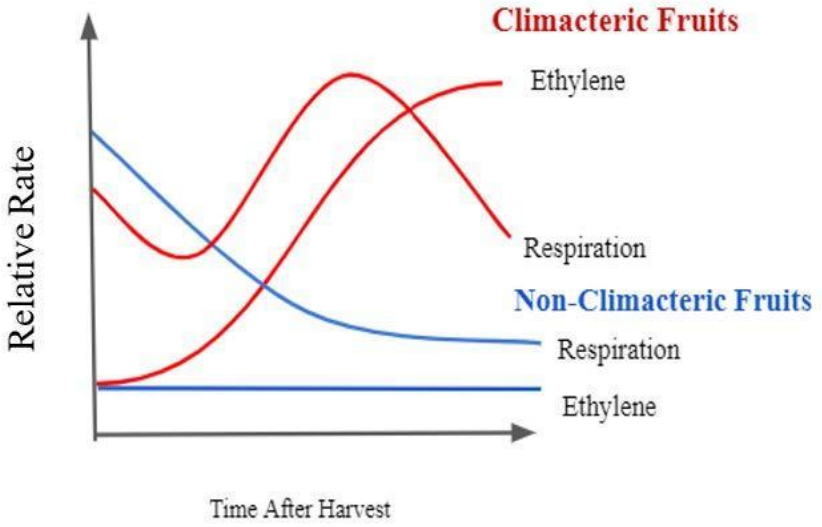
Temperature and Humidity are key!

Respiration, Ethylene

Fruits and vegetables actively respire as they grow and this continues after harvest: using oxygen and sugar, emitting CO_2, water vapor, and heat

- Temperature is important to control respiration
  - Warmer temperature = higher respiration rates
- Some fruits release a burst of gas, ethylene, toward the end of maturation/ripening (climacteric)
  - Ethylene is a hormone and will accelerate ripening
  - Climacteric fruits: tomatoes, avocadoes, apples, pears, peaches, kiwi, banana, melons
  - All fruits and vegetables will respond to ethylene to some degree (generally by spoiling more rapidly)
- Packing and/or storage location can be important





Relative Respiration Rate

Chill Injury

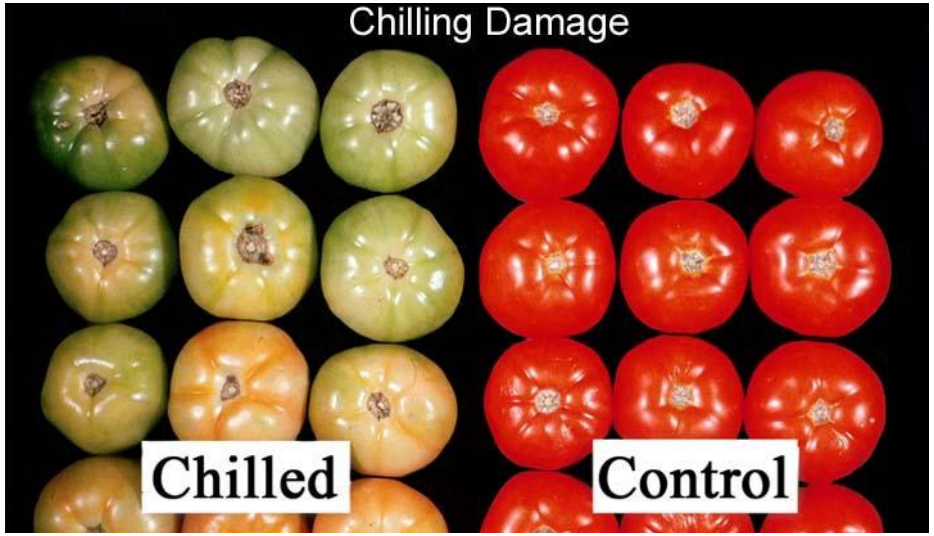
How low (temperature) can you go?

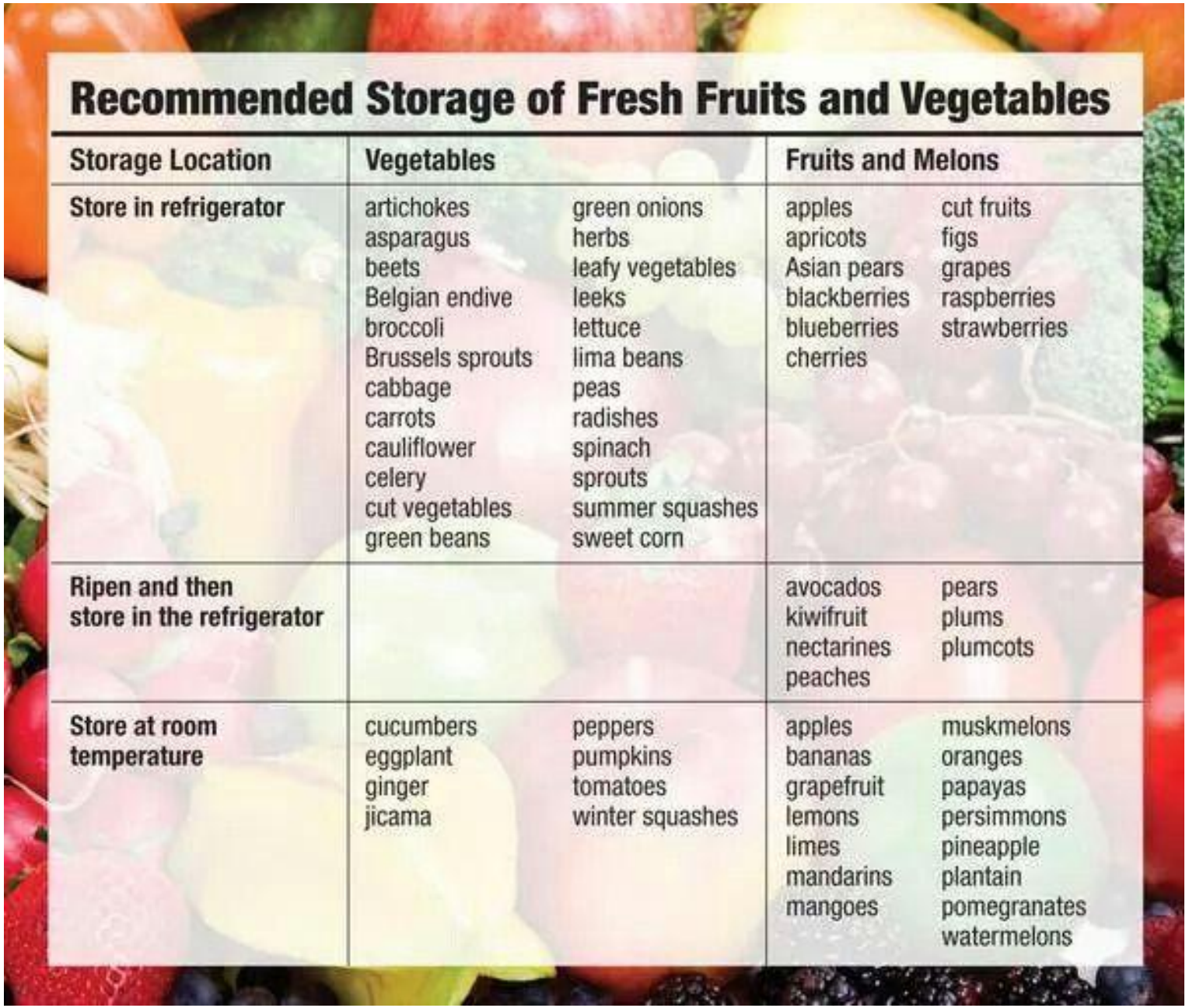
- Sometimes chill injury happens in the garden (early frost)
- Chill injury may happen on storage
  - Peppers, sweet potatoes, cucumbers, eggplant, tomatoes, asparagus, green beans
  - Bananas, melons

Respiration Chill Injury

Balance

- Symptoms of chill injury: pitting and softening, loss of flavor, failure to ripen





Recommended Storage of Fresh Fruits and Vegetables

Storage Location	Vegetables		Fruits and Melons	
Store in refrigerator	artichokes asparagus beets Belgian endive broccoli Brussels sprouts cabbage carrots cauliflower celery cut vegetables green beans	green onions herbs leafy vegetables leeks lettuce lima beans peas radishes spinach sprouts summer squashes sweet corn	apples apricots Asian pears blackberries blueberries cherries	cut fruits figs grapes raspberries strawberries
Ripen and then store in the refrigerator			avocados kiwifruit nectarines peaches	pears plums plumcots
Store at room temperature	cucumbers eggplant ginger jicama	peppers pumpkins tomatoes winter squashes	apples bananas grapefruit lemons limes mandarins mangoes	muskmelons oranges papayas persimmons pineapple plantain pomegranates watermelons

University of California – Davis https://postharvest.ucdavis.edu/files/230110.pdf

Storage for Safety & Quality

- Do not wash (rinse) produce prior to storage
- Package to maintain moisture and quality
- Refrigerate all cut, peeled, or trimmed fruits and vegetables
- Rinse in clean water prior to eating or preparing*

*A rinse with water can not be counted on to ensure safe produce

Questions

Barb Ingham
Food Safety Extension Specialist
608-263-7383
bhingham@wisc.edu

Extension
UNIVERSITY OF WISCONSIN–MADISON