


Lesson 10. Food



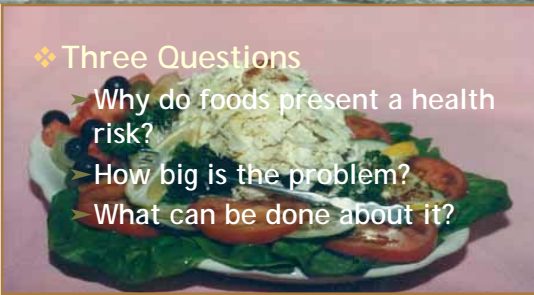
Food Protection

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Health Sciences

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Lesson Overview



❖ Three Questions


- Why do foods present a health risk?
- How big is the problem?
- What can be done about it?

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Lesson Objectives

❖ Know the four most important factors in preventing foodborne illnesses . . .

- Eliminate cross contamination
- Proper cooling of foods
- Proper cooking and reheating of foods
- Proper hand washing



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Food Properties

❖ Food should be . . .

- Safe
- Attractive
- Abundant
- Nutritious



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Food Properties Continued

❖ However, food is susceptible to:

- Spoilage
- Contamination
- Adulteration

❖ which can render it unfit to eat



E. coli Bacterium

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Foodborne Disease

❖ There are two types of foodborne illness

- Infections
- Intoxications



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Foodborne Disease *Continued*

- ❖ **Infections** are caused by:
 - The presence of micro-organisms in large numbers which multiply in the gut and overwhelm the body's defenses

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Foodborne Infections


- ❖ Amebic Dysentery
- ❖ Brucellosis
- ❖ Campylobacter enteritis
- ❖ Diarrhea(Acute)
- ❖ Viral gastroenteritis



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Foodborne Infections *Continued*

- ❖ Salmonellosis
- ❖ Shigellosis
- ❖ Trichinosis
- ❖ Typhoid Fever
- ❖ Infectious Hepatitis



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Mallon as she was portrayed in an illustration in the June 20, 1909, edition of The New York American.


Foodborne Disease *Continued*

- ❖ **Intoxications** are caused by chemicals or "toxins"
 - Produced by micro-organisms, *or by*
 - Contamination with natural or manufactured chemicals

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Foodborne Intoxications


- ❖ Botulism
- ❖ Staphylococcal food poisoning
- ❖ Clostridium perfringens
- ❖ Bacillus cereus



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Foodborne Intoxications *(con't.)*

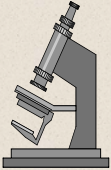
- ❖ Scromroid fish poisoning (Histamine)
- ❖ Ciguatera fish poisoning
- ❖ Paralytic shellfish poisoning (PSP)
- ❖ Amnesic shellfish poisoning (domoic acid)
- ❖ Puffer fish poisoning (tetrodotoxin)



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Types of Pathogens


- ❖ Sporeforming Bacteria
 - > Clostridium botulinum
 - > Clostridium perfringens
 - > Bacillus cereus
- ❖ Non-sporeforming Bacteria
 - > Salmonella spp.
 - > Campylobacter
 - > E. coli O157:H7
 - > Staphylococcus aureus
 - > Listeria monocytogenes
- ❖ Viruses
 - > Hepatitis A
 - > Norwalk Virus



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Usual Symptoms of Foodborne Disease


- ❖ Nausea
- ❖ Vomiting
- ❖ Diarrhea
- ❖ Cramps
- ❖ Headache
- ❖ Fever
- ❖ Chills
- ❖ Body Aches



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How Long Does It Take? (Incubation)

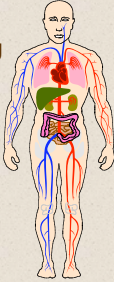
- ❖ Bacillus cereus (emetic) - <1 hour
- ❖ Staph. aureus - 2-6 hours
- ❖ Clostridium perfringens - 8-20 hours
- ❖ Salmonella - 5-72 hours
- ❖ Norwalk (Norovirus) - 24-48 hours
- ❖ E coli O157:H7 - 2-8 days
- ❖ Campylobacter 1-10 days
- ❖ Hepatitis A - 15-50 days



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Complications of Foodborne Illnesses

- ❖ Kidney Damage
- ❖ Blood Poisoning
- ❖ Pneumonia
- ❖ Arthritis
(2% will trigger)
- ❖ HUS
(5-20K cases/yr)
- ❖ Guillian Barre Syndrome



- ❖ Chronic Sporadic Toxoplasmosis
- ❖ Neurological Damage
- ❖ Pancreatic Infections
- ❖ Chronic Illness - likely to occur in 2-3% of FBIs

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High Risk Individuals

- ❖ Infants
- ❖ Children
- ❖ Pregnant Women
- ❖ Senior Citizens
- ❖ People taking medications:
 - > Antibiotics
 - > Antacids
 - > Immuno-suppressive drugs

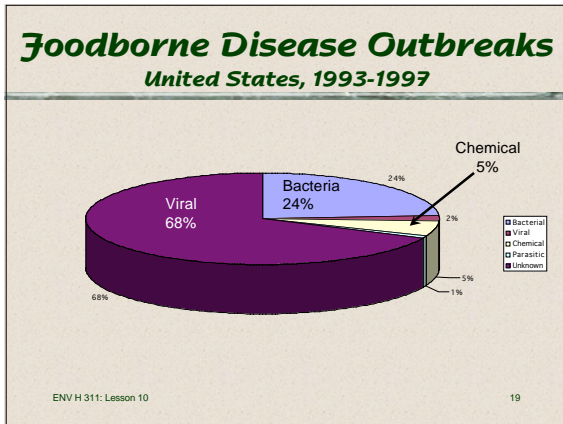
- ❖ Immuno-compromised people:
 - > Recent major surgery
 - > Pre-existing or chronic illness
 - > HIV / AIDS
 - > Diabetes
 - > Cancer
 - > Liver or Kidney Damage
 - > Ulcers

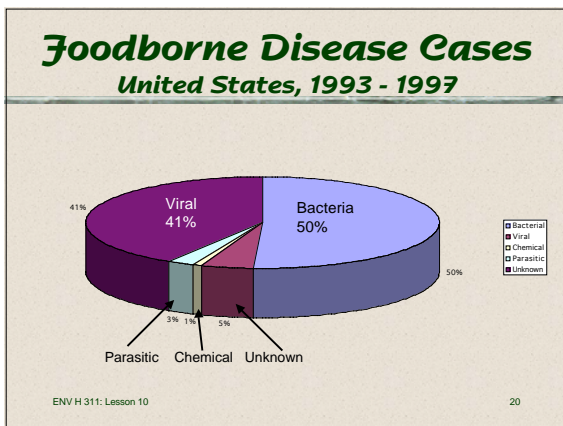
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Contributing Factors


- ❖ Factors Contributing to an increased risk of Foodborne Illness
 - > Aging Populations
 - > Lifestyles of the Public
 - > New and Emerging Pathogens
 - > Increase in High Risk Individuals
 - > New Processing Methods for Foods
 - > New Sources of Foods - Geographic

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Foodborne Illness

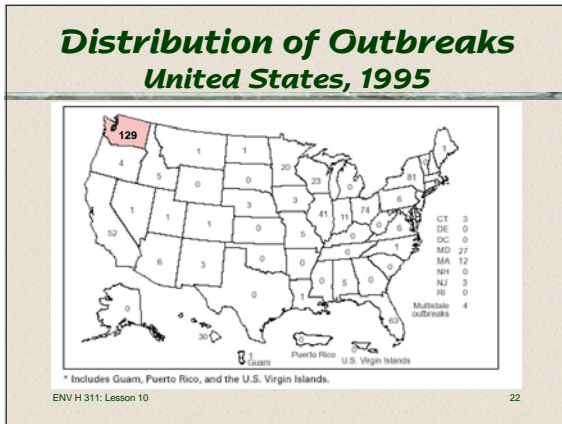


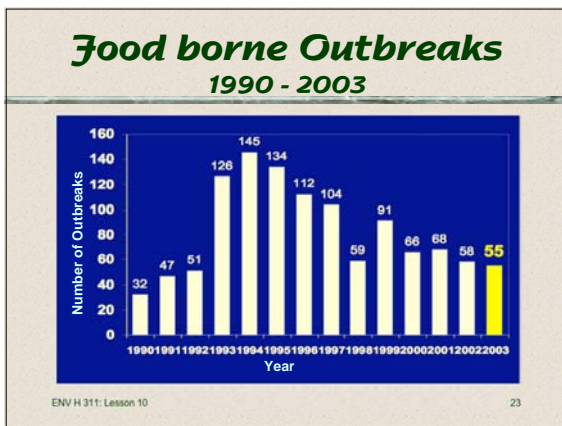
Estimated Annual Number of Foodborne Illnesses in Washington State
(extrapolated from CDC U.S. estimates- 2000)

- ❖ 1.5 million illnesses per year
- ❖ 6500 hospitalizations
- ❖ 100 deaths



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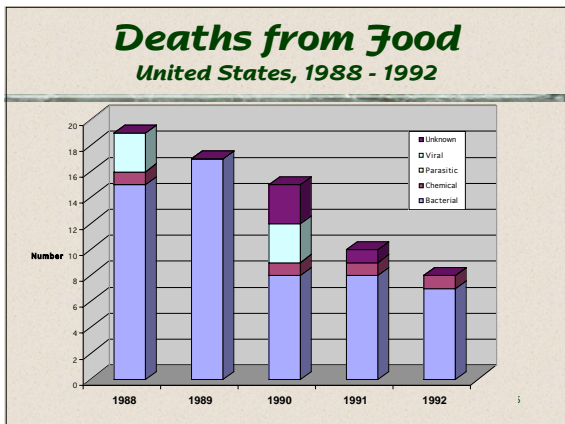
Foodborne Disease

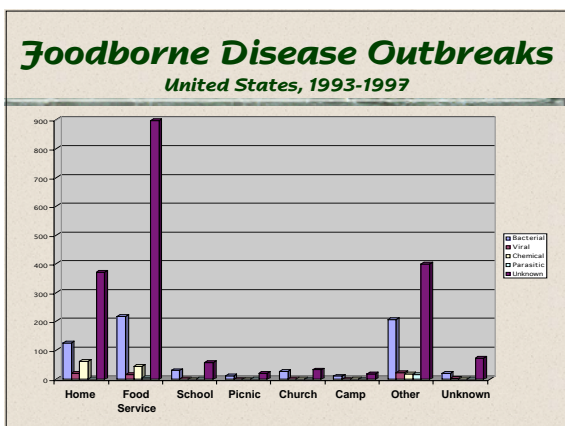
Reported Incidence

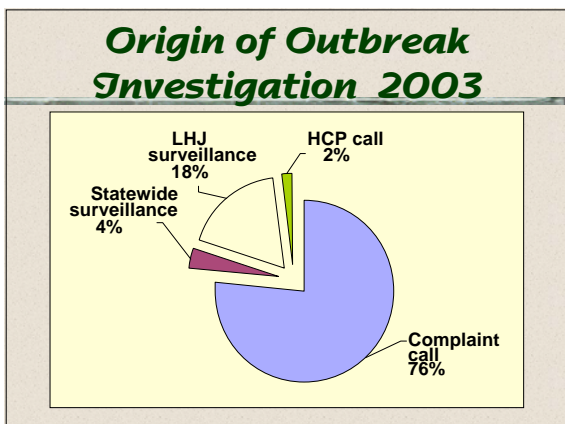
- ❖ Believed to be only the tip of the iceberg
- ❖ 1% or less are even reported
- ❖ 76 million cases annually

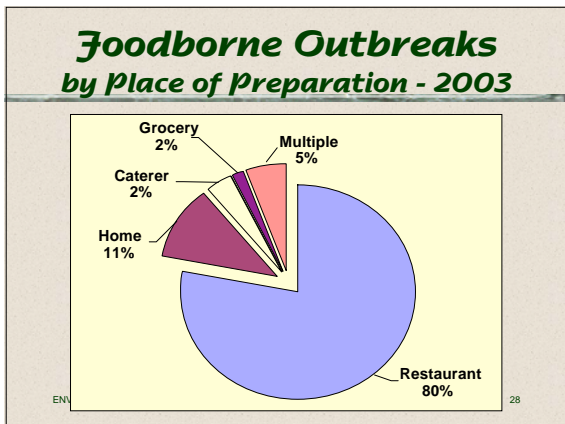
Image courtesy of Douglas Armand Digital Imaging
Used with permission

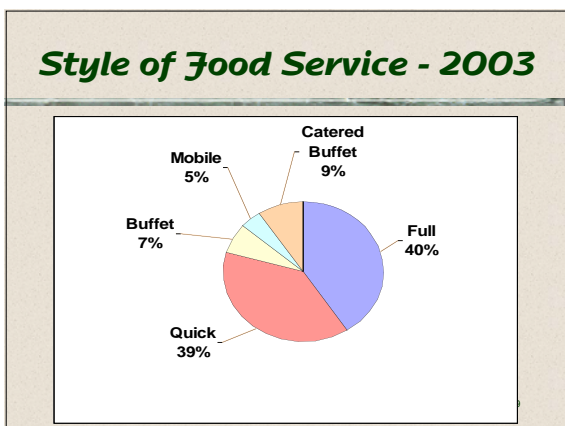
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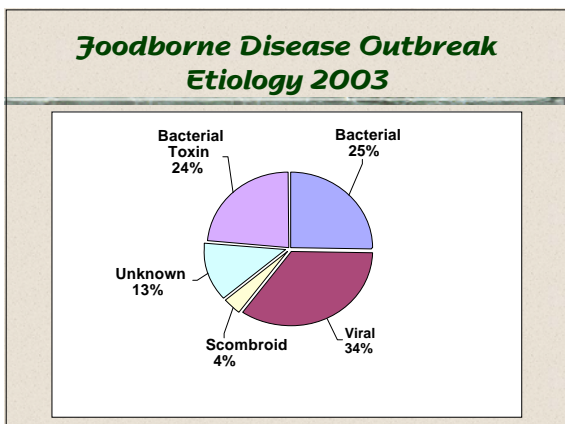




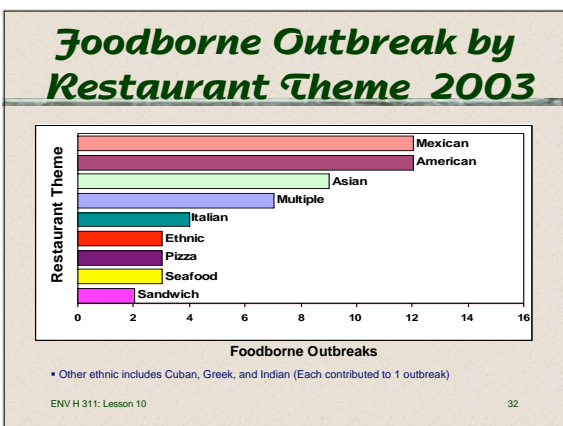


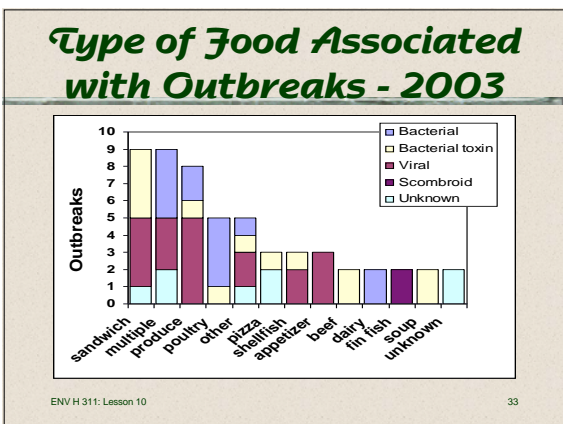








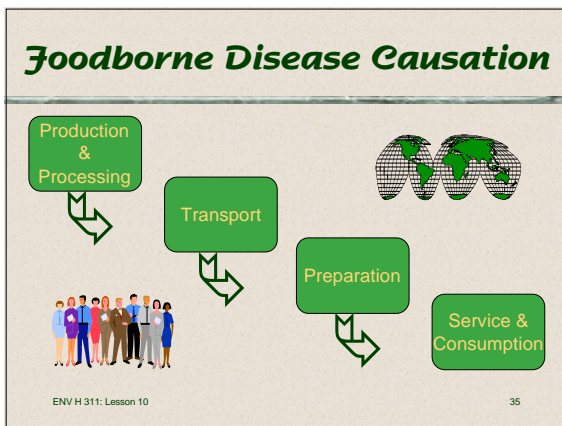




Trends

<p>❖ In the 80's...</p> <ul style="list-style-type: none">> Was beef> Was turkey> Was roast beef and turkey ...> Some viruses> Was Salmonella> Some Mex/Chinese> Was cooling> E. coli emerged> No Fruit/Veg outbreaks	<p>❖ In the 90's...</p> <ul style="list-style-type: none">> Now hamburger> Now chicken> Now RTE foods & Starchy foods> Now nearly 1/2 the cases are viral> Still Salmonella> Increased M/Ch + others> Now handwashing> O157:H7, Crypto, ETEC, V.p., S. DT104> Lots of F/V - sprouts, juice, melons, green leafys, etc.
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Disease Causation Factors

❖ Inherent properties of food:

- > Most foods are grown or raised in proximity to bacteria and other micro-organisms in the soil and water
- > A nutrient source by definition
- > Moisture + Nutrients
 - a substrate for bacteria and other micro-organisms

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Disease Causation Factors
Continued

- ❖ Diversity in the Food Industry
 - Changes in eating habits
 - More types of foods (ethnic, seasonal)
 - Greater shelf life (transportation)
 - More foods are imported
 - New food products are coming out
 - New food processes

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Disease Causation Factors
Continued

- ❖ Increasing Demand Leads to:
 - Greater use of pesticides
 - Greater use of fertilizers
 - Use of growth promoters
 - Use of growth regulators
 - "Bio-engineered" foods

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Disease Causation Factors
Continued

- ❖ Nature of the Food Service Industry
 - Employee turnover
 - Insufficient supervision & training
 - Improper food handling
 - Time/Temperature abuse
 - Poor sanitation practices

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Disease Causation Factors

Continued

- ❖ Food Handling Practices:
 - > Poor Handwashing
 - > Cross Contamination
 - > Improper Heating
 - > Improper Cooling

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Why Food Safety?

- ❖ High risk populations are most susceptible
- ❖ A strong food safety emphasis will save lives
- ❖ Regular inspections - emphasizing critical issues
- ❖ Appropriate enforcement / Follow-up
- ❖ Rapid response to food emergencies - including recalls and outbreaks
- ❖ Make Food Safety Education a priority
- ❖ On-going training for inspection staff (things keep changing!!)
- ❖ Food safety impacts the entire community

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Hazardous Foods

- √ 6.1 Potentially Hazardous Food.
- ❖ (a) "Potentially hazardous food" means a food that is natural or synthetic and that requires temperature control because it is in a form capable of supporting:
 - > (i) The rapid and progressive growth of infectious or toxigenic microorganisms;
 - > (ii) The growth and toxin production of *Clostridium botulinum*; or
 - > (iii) In raw shell eggs, the growth of *Salmonella Enteritidis*.
- ❖ (b) "Potentially hazardous food" includes an animal food (a food of animal origin) that is raw or heat-treated; a food of plant origin that is heat-treated or consists of raw seed sprouts; cut melons; and garlic-in-oil mixtures that are not modified in a way that results in mixtures that do not support growth as specified under Subparagraph (a) of this definition.

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Hazardous Foods *Continued*

- ❖ (c) "Potentially hazardous food" does not include:
 - (i) An air-cooled hard-boiled egg with shell intact;
 - (ii) A food with an *A_w* value of 0.85 or less;
 - (iii) A food with a pH level of 4.6 or below when measured at 24°C (75°F);
 - (iv) A food, in an unopened hermetically sealed container, that is commercially processed to achieve and maintain commercial sterility under conditions of non-refrigerated storage and distribution; and
 - (v) A food for which laboratory evidence demonstrates that the rapid and progressive growth of infectious or toxigenic microorganisms or the growth of *S. Enteritidis* in eggs or *C. botulinum* can not occur, such as a food that has an *a_w* and a pH that are above the levels specified under Subparagraphs (c)(ii) and (iii) of this definition and that may contain a preservative, other barrier to the growth of microorganisms, or a combination of barriers that inhibit the growth of microorganisms.
 - (vi) A food that does not support the growth of microorganisms as specified under Subparagraph (a) of this definition even though the food may contain an infectious or toxigenic microorganism or chemical or physical contaminant at a level sufficient to cause illness.

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Food Protection

- ❖ We need to do something to reduce the burden of foodborne disease in our state
- ❖ High risk establishments are extremely important
- ❖ If we know what is causing the people to become ill then we can effect change (regulatory, inspectional and educational emphasis)
- ❖ Concentrate our efforts where they will do the most good -the most bang for the buck!

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Disease Causation Factors

- ❖ Food Handling Practices:
 - Poor Handwashing
 - Cross Contamination
 - Improper Heating
 - Improper Cooling

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What Can Be Done?

*" Food Safety:
You Make the Difference"*

Video designed and produced by the Seattle-King
County Department of Public Health for food service
workers

Shows how these four simple concepts are
put into practice

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Lesson Summary

- ❖ Foods inherently present a health risk.
- ❖ The problem is huge, but not usually fatal.
- ❖ What can be done about it?
 - > Movie
 - > To be continued tomorrow

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Questions



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Next Lesson

Midterm Examination

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