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Eat, Drink and Be Wary

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Eat, Drink and be Wary!

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- Impact of food associated illness.
 - USA 76m per year. 5,000 deaths.
 - Australia 5m per year. 80 deaths.
 - UK 17m per year. 700 deaths.

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- In high income countries
 - Catering facilities (restaurants, cafeterias, receptions etc) 20-60%
 - Hospitals and Long term care, 5-60%
 - Domiciles, 5-30%
 - Schools and Camps, 3-9%

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- When tracking the source, need to look at all points in the food chain.
 - Production (“Field and feed”)
 - Processing (“Slaughter and slice”)
 - Serving (“Cook and kitchen”)

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- Emerging hazards
 - Industrial production
 - Long distance transportation
 - International distribution (complex backtracking)
 - Consumer preference for “raw” foods
 - Antibiotic resistance

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- In low income countries benefits of small scale production and distribution offset by the lack of hygiene and enforced regulations.

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- Despite what you are about to hear our food is amazingly safe.
- For those of you who are already worried about the food we eat...leave now or forever hold your peace!

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- Types of Microbes
 - Bacteria
 - Fungi
 - Parasites
 - Viruses

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- “Food Poisoning” is a poor term
 - **True poisoning** is from consuming something, which may be food, contaminated by **toxins** which could be chemical or microbial in origin.
 - **Food associated infections** occur when food is the vehicle for the ingestion of a microbial organism, which may then establish itself in the host and cause disease, either by a toxin or by invasion.

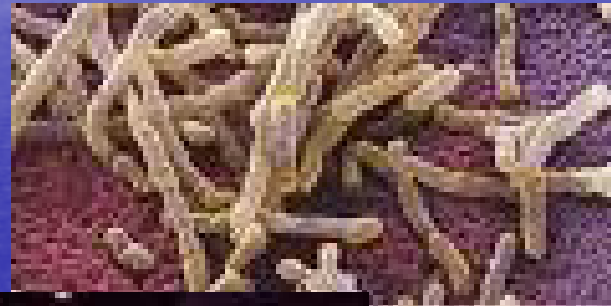
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- Importance of the previous concepts
 - Ingestion of food contaminated with a pre-formed toxin = rapid onset of symptoms. (hours).
 - Food associated infections = later onset of symptoms (usually day/s to weeks).

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- Classical examples of pre-formed toxins
- Bacterial
 - Clostridial
 - Staphylococcal
 - Bacillary

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- Classical examples of pre-formed toxins
- Fungal
 - Ergot poisoning (St Anthony's Fire).
 - Aflatoxin

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- Food Types
 - Meats and fish (including shellfish)
 - Eggs and Dairy
 - Grains
 - Fruits and vegetables
- Water is important in many aspects of production, preparation etc.

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- Shellfish “poisoning”
 - Paralytic (Saxitoxin)
 - Neurotoxic (Brevetoxin)
 - Amnesic (Domoic acid)
 - Diarrheal (Okadaic acid)



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- Production.
- Harvest.
- Sorting.
- Washing.
- Transport.
- Storage.

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- Production and harvest. Growing, picking, bundling.
- Irrigation water, manure, lack of field sanitation.
- Initial processing. Washing, sorting etc.
- Wash water, handling.
- Final processing.
- Wash water, cross-contamination.

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- Transportation
- Distribution
- Storage.
- Preparation.
- Cooking.
- Storage.
- Re-heating.

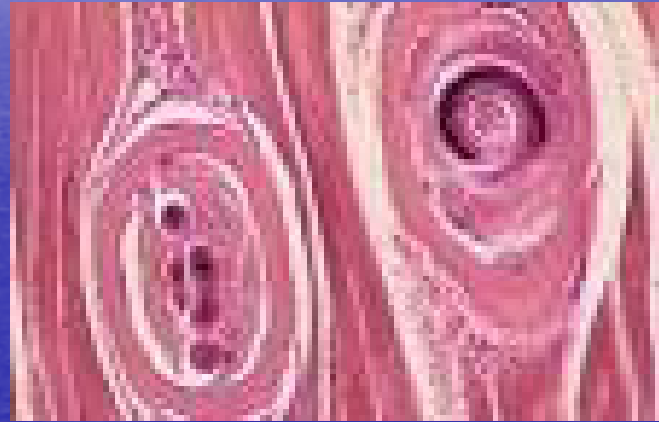
E. Coli O157 H7

- ~1985 Hamburger
- 1993 Apple cider.
- 1995 Leaf lettuce.
- 1996 Leaf lettuce.
- 1996 Apple juice.
- 2000 Waterborne.

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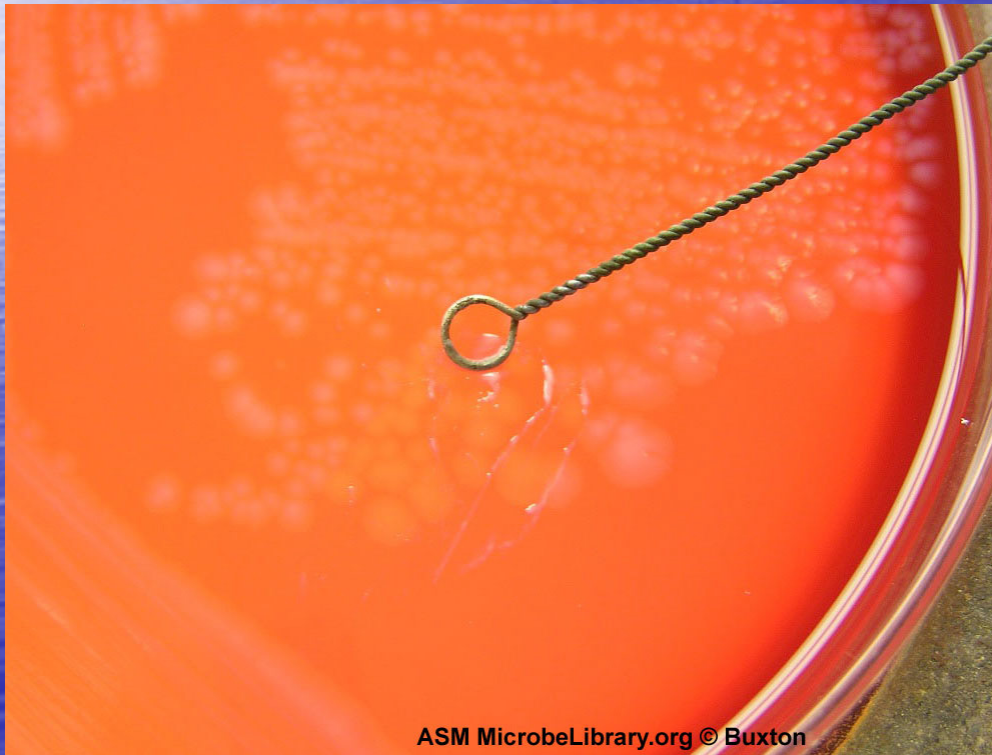


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- *Listeria monocytogenes*.



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- High risk groups:
 - Pregnant women (flu like illness).
 - Their neonates (septicemia/meningitis).
 - Adult Immunocompromised inc. diabetes and alcoholism. (sepsis/meningitis).
 - Any age: focal infection/gastroenteritis.

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- Found in many food types
 - Meats.
 - Unpasteurized cheeses.
 - Vegetables.
 - Seafoods.

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- Listeria
 - Likes the cold.
 - Asymptomatic carriers 1-5%, higher in abattoir workers 5-30%.
 - 0.7/10E5 in North America.
 - Case fatality 35% (worse in older ages).

How Safe is Our Food?

Why Might it be a Target for
Bioterrorism?

How Safe is our Food?

- What is the purpose of terrorism?
- Deliberate poisonings in the past.
- Techniques to avoid poisoning.
- Why did it become less popular?

How Safe is our Food?

- What Goals Might an Attack on Agriculture serve?
 - Attack the enemy's food supply.
 - Destabilize government by creating food shortages or unemployment.
 - Alter supply and demand for a commodity.

How Safe is our Food?

- Food from local sources.
- Food from sources further away.
- Food from distant sources.
- Exotic foods.

How Safe is our Food?

- Production and storage standards.
- Inspections.
- Surveillance.
- Education.
- Monitoring based on Epidemiology.

How Safe is our Food?

- What has changed in:
 - Production?
 - Epidemiology?
 - Inspections?
 - Surveillance?
 - Education?

How Safe is our Food?

- Production.
 - Food produced in many different countries.
 - Biodiversity of crops reduced.
 - Different standards.
 - Storage, transport and distribution.

How Safe is our Food?

- Epidemiology.
 - Many more types of outbreaks.
 - Many different types of organisms.
- Inspections and Surveillance more complex.

How Safe is our Food?

- How might our food be vulnerable?
 - At production
 - Monocultures.
 - Soil contamination.
 - Crop spraying.
 - Additives (eg the melamine story)
 - During storage or Transportation.
 - Preservatives.
 - Water.

How Safe is our Food?

- Distribution.
 - Widespread.
 - Source hard to determine.
 - Outbreaks may be sustained.

How Safe is our Food?

- What organisms?
 - Need to make it look like a natural event.
 - Organism needs to be hardy and easily handled.
- Need a food that is eaten raw, or an organism/toxin that resists cooking.
- Why bother at all?

How Safe is our Food?

- Special Features of Agricultural attack.
 - Agents are not hazardous to perpetrators.
 - Few technical obstacles to “weaponization”.
 - Low security of vulnerable targets.
 - Low moral barrier to cross.
 - Maximum effect does not require many cases.
 - Point source can mimic “natural causes”
 - Can be carried out far from effect.

How Safe is our Food?

- What groups might be involved?
 - Countries
 - Corporations
 - Organized Crime
 - Terrorist groups
 - Individuals

How Safe is our Food?

- Probably quite safe from bioterrorist actions.
- Ecological disturbances are another matter!