4-11-2011

Eat, Drink and Be Wary

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Citation of this paper:
Lannigan, Robert, "Eat, Drink and Be Wary" (2011). Pathology Presentations. 2.
https://ir.lib.uwo.ca/patholpres/2
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 (Demoic acid)
  – Diarrheal (Okadaic acid)
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• Production.
• Harvest.
• Sorting.
• Washing.
• Transport.
• Storage.
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- Production and harvest. Growing, picking, bundling.
- Initial processing. Washing, sorting etc.
- Final processing.
- Irrigation water, manure, lack of field sanitation.
- Wash water, handling.
- 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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- *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!