

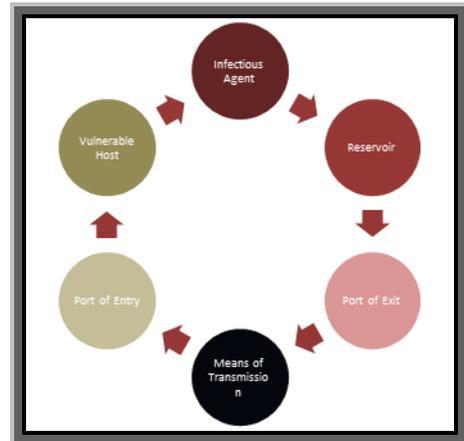
MICROORGANISMS & THE CHAIN OF INFECTION

The course presenter has chosen to replace PowerPoint note pages with this handout. Please use it to prepare for competency evaluation.

Learn it like your life could depend on it...

1. Introduction to four part presentation:
 - a. Microorganisms and the chain of infection
 - b. Bloodborne pathogens (BBP), Statistics & Pathophysiology
 - c. BBP Prevention
 - d. The OSHA BBP Standard
2. Microorganism
 - a. Plant or animal so small it can only be seen with a microscope
 - b. Includes bacteria, viruses, protozoa, fungi and their spores (eggs)
 - c. On all surfaces of body and surfaces around us; few areas not covered (brain, blood stream, deep in lungs, and areas surrounding internal organs)
3. Normal flora
 - a. When a microbe lives on us without harming us, or provide benefit or protection to us, they are called normal flora. Relationship is called mutually beneficial.
 - b. Large scale example: Clown fish/sea anemone
 - c. Microscopic example: Escherichia coli (E. coli), vitamin K
 - d. Normal flora can cause infection when transmitted to a place not normally found or right circumstances exist – Opportunistic (take advantage of ‘opportunity’ to infect)
4. Chain of infection
 - a. Visual representation of how microbe moves from one host to another
 - b. Infection occurs when allowed to go full circle
 - c. Jack in the box/Escherichia coli example
 - i. Link 1: Infectious agent (E. coli)
 - ii. Link 2: Reservoir (bowel of cow)
 - iii. Link 3: Port of exit (hoist, conveyor/leakage of entrails)
 - iv. Link 4: Means of transmission (burger ground/shaped/shipped; bacteria mixed in; center not adequately cooked)
 - v. Link 5: Port of entry (undercooked burgers consumed by customers)
 - vi. Link 6: Vulnerable host (four children died; hundreds more ill)
 - vii. Outcome: No further incidents. National movement: Restaurant warning of risks of undercooked meat and animal products.
 - d. Staphylococcus aureus example
 - i. Link 1: Infectious agent (S. aureus)
 - ii. Link 2: Reservoir (normal flora of skin, nose)

Reason for conversion from normal staph to Methicillin Resistant



staphylococcus aureus (stronger, harder to kill):

1. Overuse of methicillin based antibiotics (kill only bacteria; not common cold)
2. Not taking entire series of prescribed antibiotics (e.g. feeling better)
- iii. Link 3: Port of exit (caregiver provides care of wound, urine, lungs)
- iv. Link 4: Means of transmission (fails to wear gloves and/or wash before moving on to next patient)
- v. Link 5: Port of entry (touches new client's wound with contaminated hands)
- vi. Link 6: Vulnerable host (wound makes vulnerable – added factors might include age, nutritional status, stress, cancer, suppressed immune system)
- vii. Consequences of MRSA: Bankruptcy & complications!

“For Kerri Cardello McKoy, mother of four, a trip to the hospital to treat a broken nose in 2003 seemed routine. But what followed wasn't: a raging MRSA infection that cost her both legs below the knee, a collapsed lung and four months in a hospital bed, much of it in a drug-induced coma...” The Baltimore Sun, 3/1/08

- e. Thousands of subcategories of the four types of microbes!
- f. Comparing and contrasting 2 types: Bacteria vs. virus
 - i. Bacteria used to clarify chain of infection
 - ii. Two primary bloodborne pathogens are viruses:
 1. Human immunodeficiency virus (HIV)
 2. Hepatitis B and C viruses (HBV, HCV)

| Bacteria | Viruses |
|---|--|
| Larger of microbes | Smallest of life forms |
| Complex biology | Simplest life form |
| Live outside cells of host (can live on surfaces!) | Must live within cells of host to survive (blood on surface enough for hepatitis to live up to a week!) |
| Able to reproduce without host | Must use host's genetic material to reproduce |
| Many are beneficial to host | Most harmful |

- g. Continued online learning:
 - i. Infection Control: Break the Chain:
<http://www.youtube.com/watch?v=o9SxDFPUIA>
 - ii. MRSA Infection Threatens Us:
<http://www.youtube.com/watch?v=H6bbWpyT9jg&NR=1>
 - iii. Staph and MRSA:
http://www.youtube.com/watch?v=ZuybyjV_3Ko&feature=related

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