The Role of Surface Disinfectants in Preventing Antibiotic Resistant Organisms

Clinical and Technical Services Specialist

Olivia Lattimore, BHSC.
Professional & Technical Services
Virox Technologies Inc

Antibiotic Resistance vs. Antimicrobial Resistance

"Antibiotic resistance refers specifically to the resistance to antibiotics that occurs in common bacteria that cause infections. Antimicrobial resistance is a broader term, encompassing resistance to drugs to treat infections caused by other microbes as well, such as parasites (e.g. malaria), viruses (e.g. HIV) and fungi (e.g. Candida)."

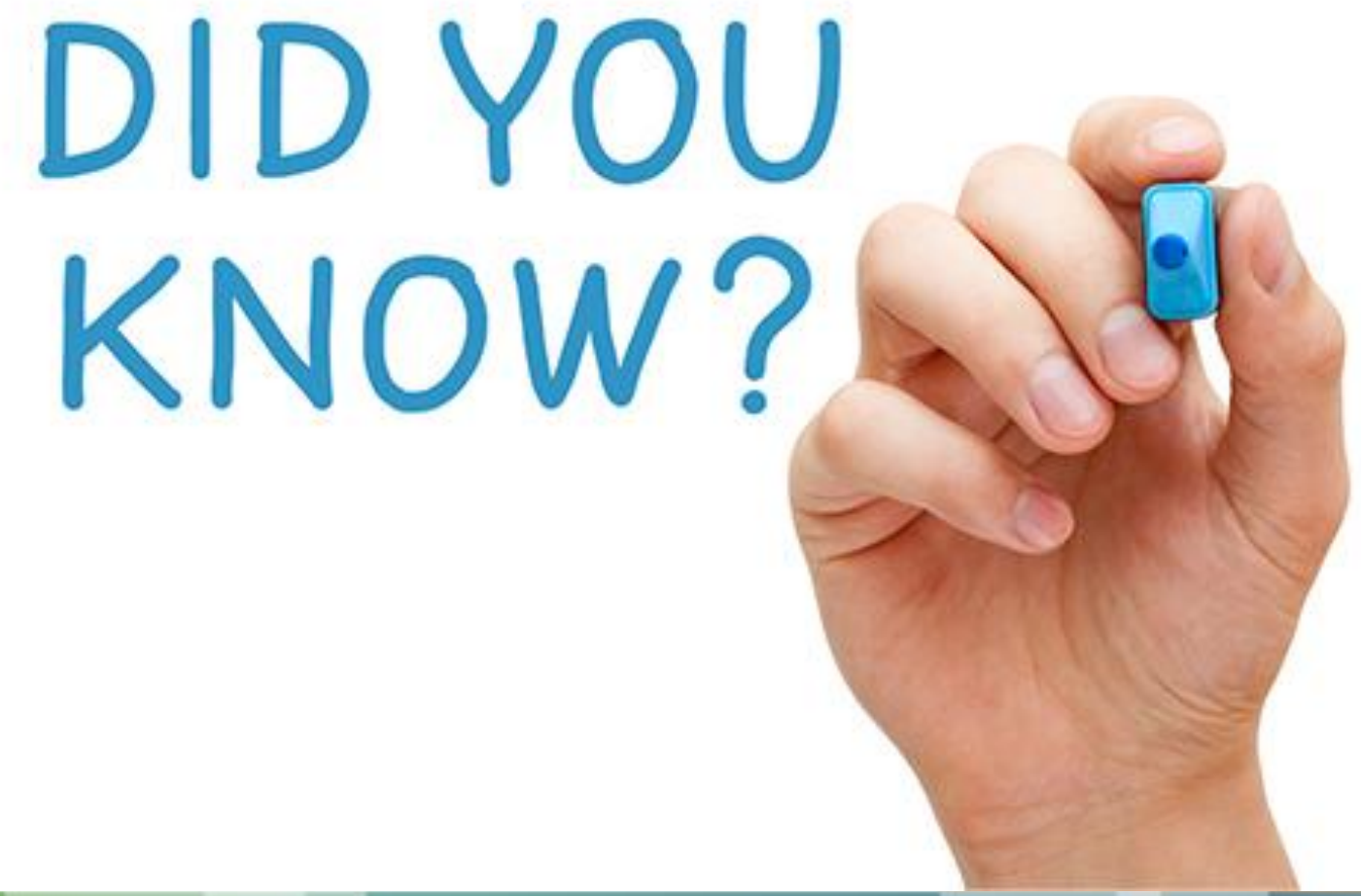
- World Health Organization (2015)

So What? Why Antibiotic Resistance Matters to You!

- "Antimicrobial resistance has cast a shadow over the medical miracle we take for granted, undermining every clinical and public health program designed to contain infectious diseases worldwide. In addition, community-acquired infections are emerging, both as independent epidemics and as primary sources of resistance in hospitals. If resistance to treatment continues to spread, our interconnected, high-tech world may find itself back in the dark ages of medicine, before today's miracle drugs ever existed. "

Reference: http://emerald.tufts.edu/med/apua/about_issue/antibiotic_res.shtml

Stop Bugging Out!



Antibiotic Resistance ≠ To Chemical Resistance

Fact #1: Antibiotics attack very specific targets on bacteria.

Fact #2: Antibiotics have limits to the concentration that can be used before it will cause harm.

Fact #3: Development of antibiotic resistance can occur within a few years after the introduction of a new antibiotic.

Antibiotic Resistance ≠ To Chemical Resistance

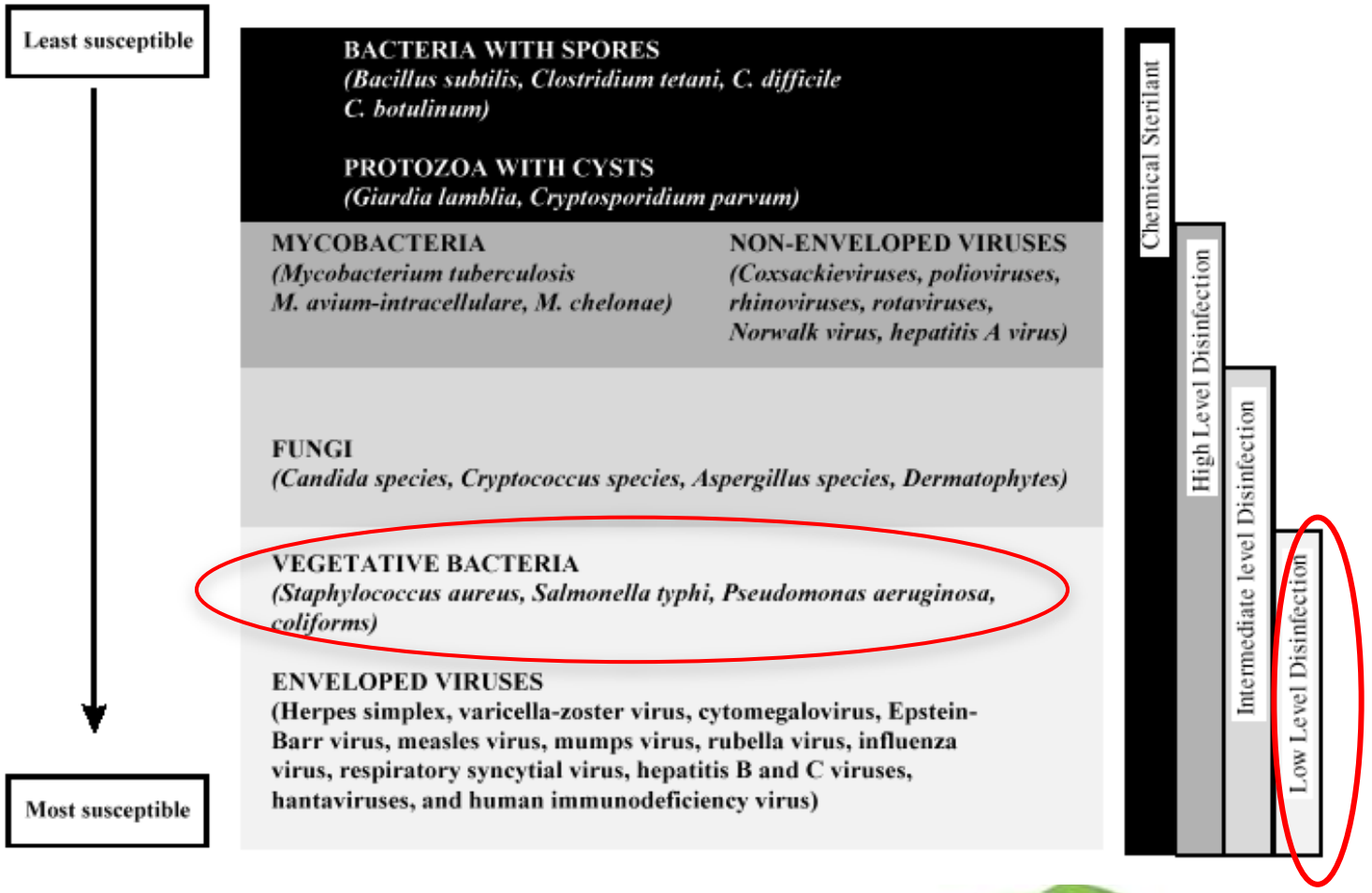
Fact #4: Disinfectants are not specific in their attack.

Fact #5: Disinfectants are used at concentrations far more potent than the minimum inhibitory concentration (MIC) making it more unlikely for bacteria to develop resistance.

Fact #6: Disinfectants have been used for well over 100 years without loss of effectiveness.

The Good News!

Antibiotic resistant organisms are EASY to kill when an effective disinfectant is properly used!



What Role Does Cleaning & Disinfection Play?

Cleaning removes germs, dirt, and impurities from surfaces or objects. Cleaning works by using soap (or detergent) and water to physically remove germs from surfaces. This process does not necessarily kill germs, but by removing them, it lowers their numbers and the risk of spreading infection.

Disinfecting kills germs on surfaces or objects. Disinfecting works by using chemicals to kill germs on surfaces or objects. This process does not necessarily clean dirty surfaces or remove germs, but by killing germs on a surface after cleaning, it can further lower the risk of spreading infection.

Reference: http://www.cdc.gov/flu/school/cleaning.htm

It starts with proper disinfection selection

- Selecting the right disinfectant requires consideration of many factors:
  - Product should have **GOOD CLEANING PROPERTIES** and remain active in the presence of soils and debris
  - Product should exhibit **GERMICIDAL EFFICACY** against a broad spectrum of microorganisms
  - Product should exhibit this efficacy in a rapid and **REALISTIC CONTACT TIME**
  - Product should be **NON-TOXIC** and have low irritancy and allergenic properties
  - Product should be **ENVIRONMENTALLY PREFERABLE** and should not damage the environment on disposal
  - Product should carry wide **MATERIAL COMPATIBILITY**. It should not cause the deterioration of metallic surfaces, rubber, plastics and other materials

Disinfectant Selection – Chemistry

Disinfectants that leave an active residue on surfaces should be avoided in order to prevent resistance

What to look for on a product label

ACTIVE INGREDIENTS:
n-Alkyl (68% C_{12}, 32% C_{14}) dimethyl ethylbenzyl ammonium chlorides.....0.25%
n-Alkyl (60% C_{14}, 30% C_{16}, 5% C_{12}, 5% C_{18}) dimethyl benzyl ammonium chlorides.....0.25%
OTHER INGREDIENTS.....99.50%
TOTAL.....100.00%

Watch out for sneaky marketing

Most surface disinfectants work for the moment. But germs can be quickly reintroduced just by touching and handling the surface again. New [redacted] 24 Hour Sanitizing Spray kills 99.9% of bacteria for 24 hours ** even after multiple touches.

Disinfectant Selection – Efficacy & Speed

Don't be fooled by the claims game! If a disinfectant can kill the hard bugs, it can kill the easy bugs!

TUBERCULOCIDAL: 3 Min.
Mycobacterium terrae (ATCC 15755)

VIRUCIDAL: 3 Min.
Proven effectiveness against the Poliovirus Type 1, Sabin strain type 1 (ATCC VR-192) which allows for a Broad-Spectrum Virucide claim against most enveloped and non-enveloped viruses.

HIV-1 Human Immunodeficiency virus (HIV), Strain HTLV-IIIB (HIV-1)

Human Coronavirus 229E (ATCC VR-740)

Feline Calicivirus, F9 Strain (ATCC VR-782), as a surrogate for Norwalk and Norwalk-like viruses

This product has demonstrated effectiveness against Poliovirus and is expected to inactivate all Influenza A viruses including 2009 (H1N1) pandemic Influenza A virus

FUNGICIDAL: 3 Min.
Trichophyton mentagrophytes (ATCC 9533)

BACTERICIDAL: 3 Min.
Pseudomonas aeruginosa (ATCC 15442)
Staphylococcus aureus (ATCC 6538)
Salmonella enterica (ATCC 10708)
Methicillin-resistant Staphylococcus aureus (MRSA) (ATCC 29247)
Vancomycin-resistant Enterococcus faecalis (VRE) (ATCC 51299)

BROAD-SPECTRUM SANITIZING: 30 Sec.
Pseudomonas aeruginosa (ATCC 15442)
Staphylococcus aureus (ATCC 6538)
Salmonella enterica (ATCC 10708)
Klebsiella pneumoniae (ATCC 13882)
Escherichia coli 0157:H7 (ATCC 43888)
Campylobacter jejuni (ATCC 33560)

Look for disinfectants with a broad spectrum of efficacy

Disinfectant Selection - Safety

- Disinfectant users are more likely to properly use a disinfectant if they aren't afraid to use it!
- Disinfectants should be non-irritating to the eyes, skin, and non-respiratory sensitizing
- Refer to the SDS!
- Disinfectants should also be environmentally sustainable! Look for chemistries that readily degrade to prevent resistance such as:
  - Hydrogen Peroxide
  - Citric Acid
  - Peracetic Acid

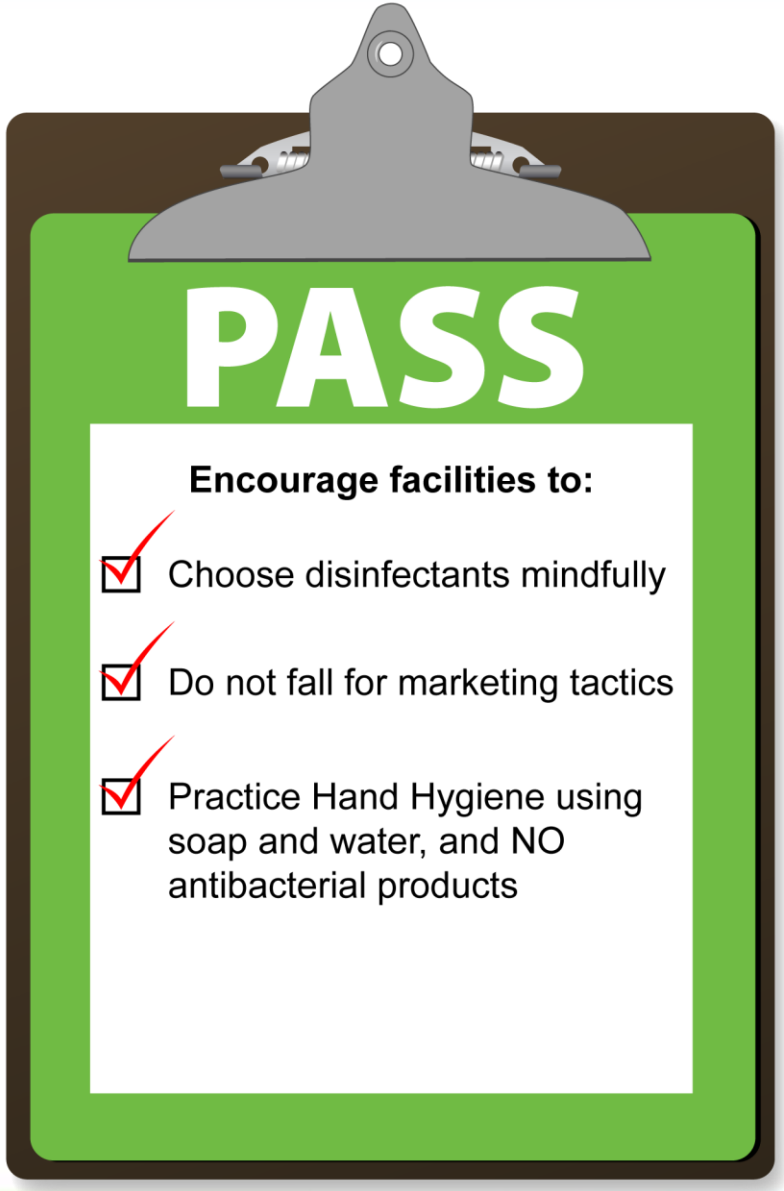
Disinfectants and Medication Analogy

- We accept that medication comes with some unwanted side effects (drowsiness, nausea, increased heart rate, headaches etc.)
- This is also the case with disinfectants. Side effects can include skin, eye or respiratory irritation, environmental impacts or surface and equipment compatibility issues.
- Side effects can be prevented by following directions or minimized by following a specified procedures

Wash Your Hands!

- 80% of germs are spread from hands alone! Hands spread germs to surfaces AND instruments
- Only 1 in 5 people wash their hands, of those, only 30% use soap!
- Hand washing helps prevent antibiotic resistance and can prevent
  - 30% of diarrhea-related sicknesses
  - 20% of respiratory infections. Antibiotics are often prescribed unnecessarily for these health issues
- Use soap and water or hand sanitizer

References:
Deb Group: http://info.debgroup.com/blog/top-10-germiest-places
CDC: http://www.cdc.gov/handwashing/why-handwashing.html



How Can You Help?

Questions?

Olivia Lattimore, BHSC

Clinical and Technical Services Specialist

Phone: 1-800-387-7578 x185

Email: olattimore@virox.com

Twitter: @olivialattimore

Website: infectionpreventionresources.com

Blog: http://blog.virox.com/blog

www.TalkCleanToMe.com