



SWEMCO

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PURO[™]
UV Disinfection Lighting

Infection Control 101

To help prepare our partners to sell disinfection solutions, we've created training to establish a foundation of knowledge that you can effectively communicate with the target audience. Powered by patented Violet Defense® Technology, our high intensity broad-spectrum UV disinfection fixtures rapidly kill up to 99.9% of viruses and bacteria, and can significantly reduce the growth of fungi such as yeasts and molds.

WHY DO WE NEED DISINFECTION?

In 1943 the first antibiotic, Penicillin was developed. 10 years later, a company figured out how to reliably produce Penicillin at scale and began the mass production of this efficient solution for dealing with bacterial infections. The next 10 years brought on what is referred to as "the golden age of antibiotics" where half of all the antibiotics used today were developed. Antibiotics were heralded as the end to all bacterial infections, however their over prescription and use on animals for food production the last 30 years has yielded unintended consequences.

- This 2 minute TED video tells the story of the rise of Superbugs, and how they evolved defenses to the most powerful antibiotics available today. <https://youtu.be/znnp-lvj2ek>
- This 2 minute video by Harvard Medical School demonstrates how bacteria are able to mutate in just 11 days to survive even the most intense concentrations of antibiotics. <https://youtu.be/plV4k4NVIUh8>
- This 3.5 minute video gives an overview of [Why Superbugs Thrive in Hospitals](#)

In clinical terms, Superbugs are called MDRO's, or Multidrug Resistant Organisms. MDRO's are bacteria that have become unusually resistant to many of the drugs that used to be effective against them. Since antibiotics are most commonly deployed in healthcare settings, hospitals have actually become breeding grounds for superbugs and have given rise to the phenomenon called Healthcare Associated Infections (HAI). HAI's are defined as an infection that was not found to be present or incubating at the time of admission to a healthcare facility.

These secondary infections are a massive economic burden on our healthcare system. In March 2009 the CDC studied the direct cost of HAI's, and estimated that the economic burden is between \$35 - \$45 billion annually.

Under Obamacare, the Center for Medicaid & Medicare Services (CMS) was given the authority to track the performance of hospitals and institute a system for fining underperforming healthcare facilities. One of the key metrics used to measure performance is the rate of Healthcare Associated Infections. If a facility is found to have above average HAI rates, they are subject to fines up to 1% of total CMS billings, which is a hefty amount of money. You can learn more about this system on the CMS website.

In addition to costing healthcare providers lots of money, drug resistant infections are a real threat to the health of the patients that come through the doors of the hospital seeking medical attention. The CDC estimates around 99,000 deaths annually from HAI's. The leading cause of HAI's are as follows:

- 32% of all healthcare acquired infections are urinary tract infections
- 22% are surgical site infections
- 15% are pneumonia (lung infections)
- 14% are bloodstream infections



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Patients who acquire infections from surgery spend, on average, an additional 6.5 days in the hospital, are five times more likely to be readmitted after discharge and twice as likely to die. Moreover, surgical patients who develop infections are 60 percent more likely to require admission to a hospital's intensive care unit.

For additional reading on the nature and scope of antibiotic resistant bacteria, visit <https://www.react-group.org/toolbox/understand/antibiotic-resistance/>

Below is a list of terms, and their definitions, frequently used in the discussion of Healthcare Associated Infections:

HEALTHCARE SUPERBUGS

- **C. diff - Clostridium difficile:** An intestinal illness caused by toxins that are produced by a specific type of bacteria named Clostridium difficile. Also known as: C. Difficile, C. diff., and CDI (clostridium difficile infection).
- **MRSA - Methicillin-resistant Staphylococcus aureus:** Methicillin is an antibiotic drug commonly used to treat Staphylococcus (staph) infections. Some strains of staph are not killed by methicillin. If the staph infection is not killed by methicillin then it is called methicillin-resistant Staphylococcus aureus, or MRSA.
- **VRE - Vancomycin-resistant enterococci:** A type of bacteria called enterococci that have developed resistance to many antibiotics, especially vancomycin. Enterococci bacteria live in our intestines and on our skin, usually without causing problems.
- **CRE - Carbapenem-resistant Enterobacteriaceae:** Strains of bacteria that are resistant to carbapenem, a class of antibiotic used to treat severe infections, as well as most other antibiotics commonly used today. In some cases, CRE are resistant to all available antibiotics.
- **C. auris - Candida auris:** A species of fungus first described in 2009, which grows as yeast. It is one of the few species of the genus Candida which cause candidiasis in humans.

NOROVIRUS

A very contagious virus that causes gastrointestinal illness. It is the most common cause of illnesses from contaminated food in the United States — an estimated 20 million Americans get sick with the virus each year, according to the Centers for Disease Control and Prevention (CDC).

FOOD RELATED BACTERIA

- **E. coli - Escherichia coli:** A Gram-negative, facultative anaerobic, rod-shaped, coliform bacterium of the genus Escherichia that is commonly found in the lower intestine of warm-blooded organisms.
- **Salmonella - Salmonellosis:** A common bacterial disease that affects the intestinal tract. Salmonella bacteria typically live in animal and human intestines and are shed through feces. Humans become infected most frequently through contaminated water or food.
- **Listeria:** A foodborne bacterial illness that can be very serious for pregnant women and people with impaired immune systems. Listeria infection is most commonly contracted by eating improperly processed deli meats and unpasteurized milk products.



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COMMON MEDICAL TERMS

- **Pathogen:** An agent of disease – that is, a disease producer. The term pathogen is used most commonly to refer to infectious organisms such as bacteria, viruses and fungi.
- **Epidemiology:** The study of the distribution and determinants of health conditions or events among populations and the application of that study to control health problems.
- **Healthcare-Associated Infection (HAI):** A localized or systemic condition resulting from an adverse reaction to the presence of an infectious agent(s) or its toxin(s) that:
 - occurs in a patient in a healthcare setting (e.g., a hospital or outpatient clinic),
 - was not found to be present or incubating at the time of admission unless the infection was related to a previous admission to the same setting, and
 - if the setting is a hospital, meets the criteria for a specific infection site as defined by CDC.
- **Long Term Acute Care Facility:** A healthcare facility authorized by the Department of Social and Health Services to specialize in twenty-four hour inpatient medical and rehabilitative care for patients who have medically complex needs. These patients typically are bed-bound, ventilator-dependent and require daily assessment by a physician. These facilities are not identical with chronic care, skilled nursing, acute rehabilitation or short-term acute-care hospital facilities.
- **Infection Control Practitioner, Infection Control Professional, Infection Preventionist:** A healthcare worker who specializes in infection surveillance, control and prevention, usually a nurse.
- **The Joint Commission:** An organization that accredits hospitals and other healthcare facilities based on their meeting published standards. Infection control practitioners have to meet the standards set by Joint Commission inspectors.
- **Nosocomial infection:** The term 'nosocomial' comes from two Greek words: 'nosus' meaning 'disease' + 'komeion' meaning 'to take care of'. Hence, nosocomial should apply to any disease contracted by a patient while under medical care. However, the meaning of 'nosocomial' has been whittled down over the years and now just refers to hospitals – it is now synonymous with hospital-acquired and refers to any infection that occurs during or after hospitalization that was not present or incubating at the time of the patient's admission.
- **Surgical Site Infections (SSI):** Infections that are directly related to an operative procedure. Some SSIs are minor and only involve the skin or subcutaneous tissue. Other SSIs may be deeper and more serious.

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