

Superbugs & Health Care Infection Control

Superbugs continue to be a challenge to physicians and health care workers worldwide. The list of offending bacteria resistant to antibiotics continues to grow within health care facilities, and some have spread into the community. Bugs have become increasingly resistant to available antibiotics with few new antibiotics on the horizon. Due to rising deaths, illnesses and associated costs, consumer groups and insurance companies are demanding that health care settings be accountable when an infection is acquired during a patient's stay in a health care facility. The good news is that the development and utilization of best practice standards in infection prevention have been making some headway in reducing and eradicating some health care-associated infections. Prevention of infection is crucial when treatment options are limited. In some cases, prevention can be surprisingly simple.

Multi-Drug Resistant Organisms (MDROs)

Bacteria are pretty ingenious small life forms that have mutated, under pressure from antibiotics, into toxic new strains. These new strains are tough to treat due to antibiotics that have been used in the past and are no longer effective. The combination of antibiotic overuse and fewer new antibiotics being developed have fueled the mutation and spread of MDROs.

Once MDROs are treated, they can remain colonized as germs living in the body, not causing illness to the host. The bacteria can be transmitted to another person if prevention measures are not used effectively. In most instances, MDRO infections target patients who are hospitalized, particularly in intensive care units (ICUs), and those who have a reduced ability to fight infection due to pre-existing medical conditions, recent surgeries and/or indwelling medical devices. Long-term care facilities have seen an increase in MDROs from patients either coming from the hospital or from the spread amongst their physically compromised patients.

Generally, a healthy person is far less likely to become infected, but can be colonized with no symptoms, potentially posing a risk to others. (A list of MDRO offenders are listed at the end of this article.)

Infection Prevention

Although infection prevention can be surprisingly simple, it



must be done without fail precisely because the stakes are high and the problems are complex. According to Peter Pronovost, M.D., a "ruthlessly simple" five-step checklist developed by his Johns Hopkins University team includes:

- washing hands with soap
- wearing sterile gowns and gloves
- cleaning the patient with an antiseptic
- using sterile drapes
- applying sterile dressings

Special attention to cleaning the environmental surfaces and equipment should also be part of infection prevention strategies. Private rooms are also suggested for infected patients. If a private room is not available, cohorting patients with similar infections and cohorting their care givers is suggested.

Infection Control Precautions fall into different categories depending on the identified infection. However, protecting the patient by preventing spread of any potential bug, known or unknown, is the goal. Infection Prevention Specialists can assign a particular precaution when warranted as a notice to health care workers, family and visitors. Personal protective equipment should be provided as needed.

Standard Precautions are used for all patient care contact, and includes thorough hand hygiene (washing your hands with soap and water or using alcohol hand rubs) and the use of gloves to control infection. Gowns, masks and eye protection are also

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recommended when a splash of body secretions is possible. Hand hygiene and personal protective equipment changes are recommended for care givers whenever they move between patients, and even when they perform procedures on the same patient to different areas of the body.

Contact Precautions are intended to prevent transmission of particular infectious agents, including Multi-Drug Resistant Organisms (MDROs) that are transmitted by direct or indirect contact with the patient or the patient's environment. In addition to Standard Precautions, wearing a gown and gloves upon entering the room and removal of the items before leaving the room is recommended. Using private rooms, avoiding sharing of equipment and having the patient stay in the room, are all strategies used with Contact Precautions. Masks and eye protection may also be required for splash potential.

Droplet and Respiratory Precautions are also implemented for airborne infections when warranted.

The majority of health-care associated infections can be prevented by utilizing appropriate hand hygiene. Health care consumers are encouraged to insist that their health care providers wash their hands and use gloves.

The bottom line is, infections are becoming more difficult to treat due to lack of available antibiotics. Health care facilities must not accept ongoing MDRO outbreaks or high infection rates as the status quo. With appropriate infection control measures, facilities can significantly reduce MDROs.

How are health care-associated infections defined?

Health care-associated infections, as defined by the Centers for Disease Control and Prevention (CDC), are infections that patients acquire during the course of receiving treatment for other conditions, or that health care workers acquire while performing their duties within a health care setting. Specific criteria must be met in order to define an infection as health care-associated. Hospitals are now being required in 25 states to report certain hospital acquired infections (HAI). Consumer advocate groups are putting pressure on hospitals to voluntarily report infection rates, giving consumers safety information when choosing a health care provider.

In October 2008, Medicare indicated that it will no longer reimburse health care facilities for treatment of certain hospital acquired infections. Other insurance companies such as CIGNA, Wellpoint and United Health Care are following suit. Among the targeted hospital acquired infections are:

- vascular catheter-associated infection
- catheter-associated urinary tract infection
- certain surgical site infections

Health care organizations are responding by instituting rigorous prevention measures and systematizing processes for care. The CDC currently recommends a four-pronged approach including:

- infection prevention
- accurate/prompt diagnosis and treatment
- prudent use of antimicrobials
- prevention of transmission

Some facilities are preemptively screening patients upon admission and implementing contact precautions until negative screening results are found for target MDROs. Surveillance programs are monitoring targeted infections in the hospital and studying the effectiveness of strategies put into practice. Sharing information between health care facilities has also been helpful.



Multi-Drug Resistant Organisms (MDROs)

The following is a list of MDRO offenders that cause infections and deserve special attention in health care facilities.

Methacillin Resistant Staphylococcus Aureus (MRSA) is spread by contact with infected secretions, colonization on the skin or contaminated environmental surfaces. MRSA has been around for about 40 years in its antibiotic-resistant form. The non-resistant form has been around for many centuries. It is found in soil, on

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common household surfaces and on the skin.

MRSA is easily killed with hospital grade disinfectants and is easily washed off hands. It is one of the leading causes of sepsis (blood infection) in hospitals, but has also been commonly found in wounds. MRSA is treatable, but can be tough to eradicate. Community-acquired MRSA can be spread on surfaces such as athletic equipment and school desks when bare skin and/or open wounds come in contact with contaminated surfaces. Treatment and prevention of this strain is similar to MRSA found in health care settings.

Acinetobacter Baumannii (XMDR-ACB) is a gram-negative (see sidebar at right), rod-shaped (bacillus) bacteria commonly found in soil and water, and can also be found on the skin of healthy people. The resistant form is rarely found outside of health care settings. It can cause a variety of problems ranging from pneumonia, wounds or blood infections, urinary tract infections or meningitis. It can be colonized for long lengths of time in tracheostomy tubes and is spread by person-to-person contact, contaminated surfaces or contaminated environmental exposure. It can survive on surfaces for several days and can be very difficult to treat due to some strains being almost completely resistant to antibiotics. It has been nicknamed “Iraqibacter” as many soldiers wounded in Iraq acquired the infection while in military hospitals.

Vancomycin Resistant Enterococci (VRE) is a cocci (spherical shaped), gram-positive bacteria. VRE can cause infection in the urinary tract, bloodstream, intestine or in wounds. People at risk are those previously treated with Vancomycin, hospitalized patients with weakened immune systems, recent surgeries and/or indwelling medical devices. VRE is spread person-to-person by the hands or from contaminated surfaces. It can live on environmental surfaces for up to one week. Hospital grade disinfectants will kill VRE and it can easily be washed off hands.

Klebsiella Pneumoniae (MDR - K. Pneumoniae or CRKP) is a gram-negative bacteria that can cause pneumonia, bloodstream infection, wounds, urinary tract infections and meningitis. Klebsiella is normally found in the mouth, on the skin, in feces and in the intestinal tract (where they do not cause disease.) People at risk are those previously treated with certain antibiotics, hospitalized patients with weakened immune systems, and those with recent surgeries and/or indwelling medical devices. Healthy people usually do not get Klebsiella infections. It is spread person

to person, on the hands of caregivers or from contaminated ventilators, catheters, wounds or contact with feces. This bacteria is not spread through the air. Klebsiella Pneumoniae can be highly resistant to Carbapenim antibiotics which often are the last line of defense against gram-negative infections. Contact precautions are necessary for patients with this infection due to the high resistance to available treatments.

Clostridium Difficile (C-Diff) is not considered a MDRO but can become a problem as a result of antibiotic overuse. It is bacteria commonly found in the intestine, which can cause mild to moderate diarrhea – or in more serious cases, colitis. It is usually kept in check by other intestine bacteria, but after antibiotic use, bacteria reduction can give the C-Diff an opportunity to take hold and cause infection.

These bacteria produce spores that can live on surfaces for months and are difficult to kill. Active cleaning of surfaces and diligent hand washing is essential to stop its spread. The bacteria have become more toxic as time goes on and can cause damage to the intestines, and on rare occasions, even death.

C-Diff is not resistant to antibiotics and is generally treated with Flagyl or Vancomycin. Re-treatment is sometimes needed to eradicate this bacteria and is important to prevent re-infection. Alcohol hand rubs and alcohol-based cleaners are not as effective as soap and water, high-level disinfectants or bleach. Friction for cleaning hands or surfaces is important because the spores are tough to remove. ❖

About the Author...

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