Antibiotic-Antimicrobial Resistance in Bacteria and Organisms

What is meant by antibiotic or antimicrobial resistance?

Antibiotics are medicines that kill or slow the growth of bacteria, while antimicrobials kill or slow the growth of other organisms including bacteria, fungi, viruses, and parasites.

Antibiotic or antimicrobial resistance happens when the bacteria or organism develops a resistance to certain drugs. In other words, a particular drug is no longer able to kill or control the growth of a specific bacteria or organism.

Other terms used to describe this situation include antibacterial resistance, and drug-resistance organisms. When a bacteria or organism is resistant to more than one drug, the term multidrug resistant (MDR) is often used.

Examples of resistant bacteria and organisms include:

- Clostridium difficile (C. difficile)
- MRSA – Methicillin/oxacillin-resistant Staphylococcus aureus.
- CA-MRSA – Community-acquired methicillin-resistant Staphylococcus aureus.
- VRE – Vanomycin-resistant enterococci.
- ESBLs – Extended-spectrum beta lactamases (resistant to cephalosporins and monobactams).
- PRSP – Penicillin-resistant Streptococcus pneumoniae.
- GISA – Glycopeptide-intermediate Staphylococcus aureus.
- VISA – Vancomycin-intermediate Staphylococcus aureus.
- VSRA – Vancomycin-resistant Staphylococcus aureus.
- MDR-TB – Multidrug-resistant tuberculosis.
- MDRSP – Multidrug resistant Staphylococcus pneumoniae.

Is resistance a new problem?

No. Penicillin resistance to Staphylococcus aureus was first noted in the 1940s. Wide spread use of antibiotics plus the natural evolution of bacteria over time has led to a number of resistant strains emerging.

Will I get sick if I come in contact with a resistant bacteria or organism?

Antibiotic or antimicrobial infections can happen anywhere to anyone. Regulators states that certain groups of people, in general, are at a greater risk of infections, which also means that they are at a greater risk of having an infection caused by an antibiotic or antimicrobial agent.

At risk groups include:

- infants, especially premature babies,
- seniors, especially those living in long-term care or residences,
- people who are homeless or living in crowded or unhygienic conditions, and
- people with weakened immune systems due to illness or injury.

People who have occupations that may expose them to bacteria or infectious diseases may also be at risk, such as doctors, nurses, veterinarians, meat processing workers, and farmers.

How do resistant bacteria or organisms spread?

Resistant bacteria or organisms spread the same way as non-resistant ones. They can spread from person to person by touching, coughing, sneezing, or being exposed to bodily fluids. They can live on surfaces such as doorknobs, keyboards, or utensils. You may also be exposed if you handle, prepare or eat foods that are contaminated, such as meat, poultry, dairy, fruits and vegetables. Regulators also states that contaminated water or soil can also infect us through direct contact or by putting bacteria into our food. Some bacteria can be passed from animals to people, either through contact or by manure.

What are ways to control the spread of resistant bacteria or organisms?

The Center for Disease Control and Prevention (CDC) recommend using good hygiene practices to reduce the spread of infections and viruses.

- Wash your hands. Soap and water are effective. Wash for at least 15 seconds and use a good hand washing technique.
- Follow other good hygiene practices such as coughing or sneezing into a tissue or your elbow, and not touching your eyes, nose and mouth.
- Keep your vaccinations up to date.
- Clean shared surfaces, such as utensils, books, tables, doorknobs, etc. Soap and water are effective when cleaning.
- Store, handle, and prepare food safely. Follow good food and kitchen hygiene practices.
- If you vomit or have diarrhea, wash your hands and clean the washroom. Do not handle food if you are ill.
- Practice safe sex (some sexually transmitted infections are antibiotic resistant).
- If you use well water, test it regularly.

If you are admitted to a hospital or are under the care of a healthcare professional, talk to your healthcare professional. Tell them if you notice a

skin infection (especially at a surgical site) or if you have diarrhea. Ask that everyone clean their hands before touching you. Ask for tests to make sure the right antibiotic is being prescribed.

How can antibiotics be used responsibly?

Proper diagnosis is necessary. Not all illnesses can or should be treated with antibiotics. If you are prescribed antibiotics, use them responsibly by:

- Taking antibiotics exactly as directed by the healthcare professional. Always
- know how much to take
- when to take it, and
- how long to take it.
- Finish your antibiotics as instructed, even if you feel better.
- If your healthcare professional tells you to stop taking antibiotics, return the unused medicine to your pharmacy.
- Do not share antibiotics with anyone, do not use leftover antibiotics, and do not use antibiotics that were prescribed to another person. Talk to your healthcare professional if you have a bad reaction or side effect.

What precautions might be in place if I work in a health care setting?

Because a health care worker will help many patients during a shift, it is important to follow certain steps to control the spread of infection. You should check with your infection control department about routine practices and for any specific requirements.

In general, these methods include:

- Isolation – where the patient is given their own room, or share a room with others that have the same infection.
- Restrictions on where the patient can be transported or moved.
- Gloves and hand washing – wear gloves and wash your hands after contact, especially contact with body fluids. You may have to change gloves and wash your hands between procedures on the same patient to prevent cross-contamination to different body sites.
- Masks/gowns – depending on the level of contact with body fluids or feces, all or some of these protective clothing will be required.
- Use equipment properly – make sure that any equipment used is appropriately cleaned, disinfected, or discarded. Surfaces of equipment in the patient's room should also be cleaned and disinfected.
- Special "dedicated" equipment may be required. Use of instruments such as stethoscopes, bedside commodes or thermometers may only be allowed with one patient or one group of patients.
- Handle and clean laundry properly.
- Special procedures may be in place for testing and active surveillance to monitor the infection (e.g., identifying carriers of organism when patients are admitted to the hospital and isolating the patients even though they do not present symptoms but are only colonized with bacteria).