

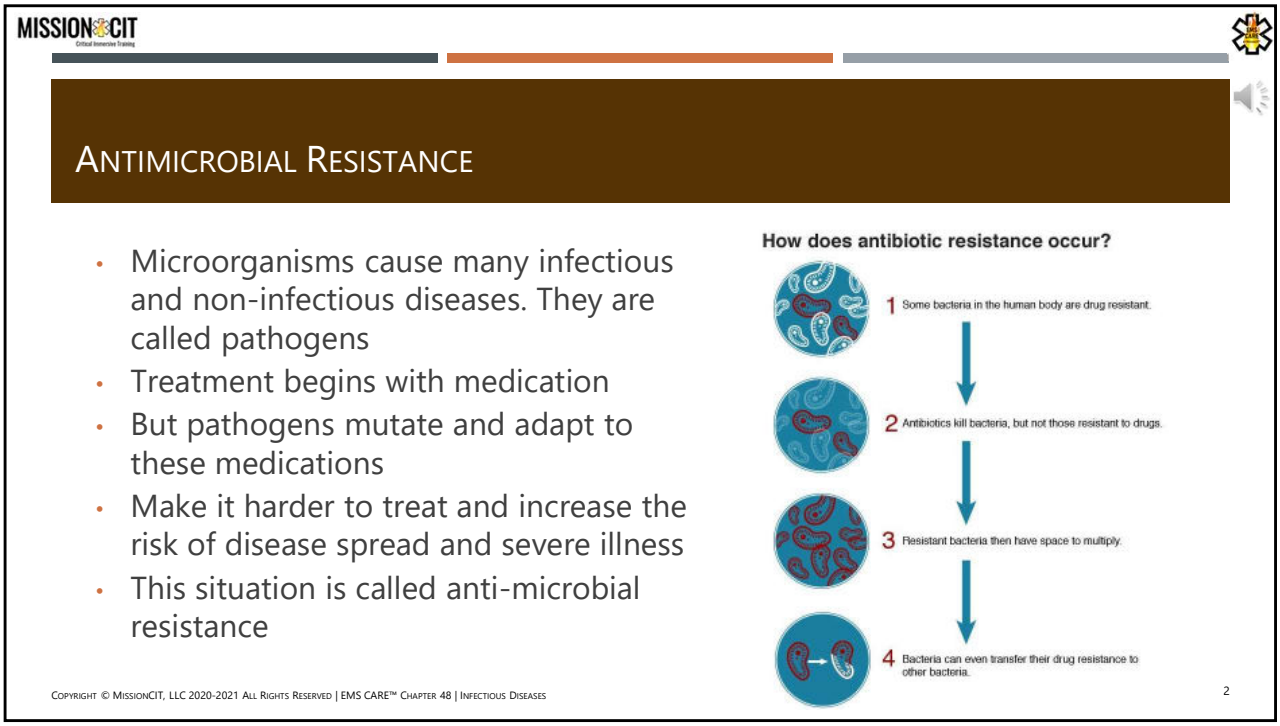
Infectious diseases are illnesses caused by germs (such as bacteria, viruses, and fungi) that enter the body, multiply, and can cause an infection.

Some infectious diseases are contagious (or communicable), that is, spread from one person to another. Other infectious diseases can spread by germs carried in the air, water, food, or soil. They can also be spread by vectors (like biting insects) or by animals.

Welcome to this lesson where we talk about infectious diseases and what makes them so critical for our health

and the community.

So, let’s get started.



Microorganisms such as bacteria, viruses, and fungi cause many infectious and non-infectious diseases. These disease-causing microbes are also called pathogens. What essentially happens is that these pathogenic microbes invade our body and multiply rapidly in it, thereby causing diseases or infections to some of the major organs in our body.

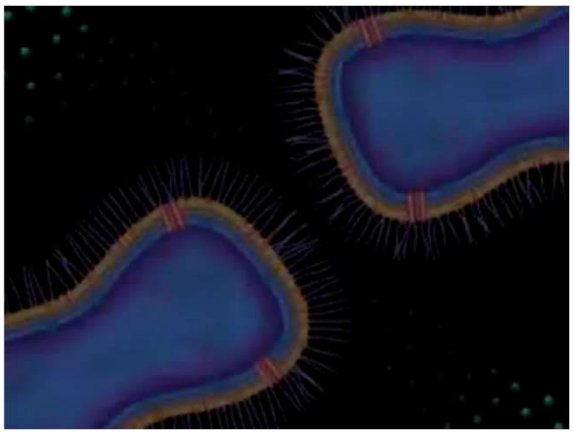
The treatment for such diseases will begin with medications that prevent the further multiplication of these microbes and kill the existing ones, thereby wiping them out of our bodies. But over time, these microbes

change and don’t respond well enough to the medicines. This makes it harder to treat and increases the risk of disease spread, severe illness, and even death.

Such a situation is called antimicrobial resistance.

Antimicrobial Resistance | Process

- Bacteria develop resistance to antimicrobial agents
- Transfer this resistance to susceptible bacterial strains



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Here is a nine-minute animation produced by FDA explaining how antimicrobial resistance both emerges and proliferates among bacteria.

SUSCEPTIBILITY

- Some people are more susceptible than others
  - ✓ Those with weakened immune system
  - ✓ Open skin wounds
  - ✓ Recent invasive procedures like IVs
  - ✓ Recent surgery
  - ✓ Respiratory diseases
  - ✓ Pregnant women



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Antimicrobial resistance has made drugs ineffective, so the chances of disease spread are high. Some categories of people are more susceptible than others to this disease spread because of weak and compromised immunity, where the body is unable to fight these pathogens.

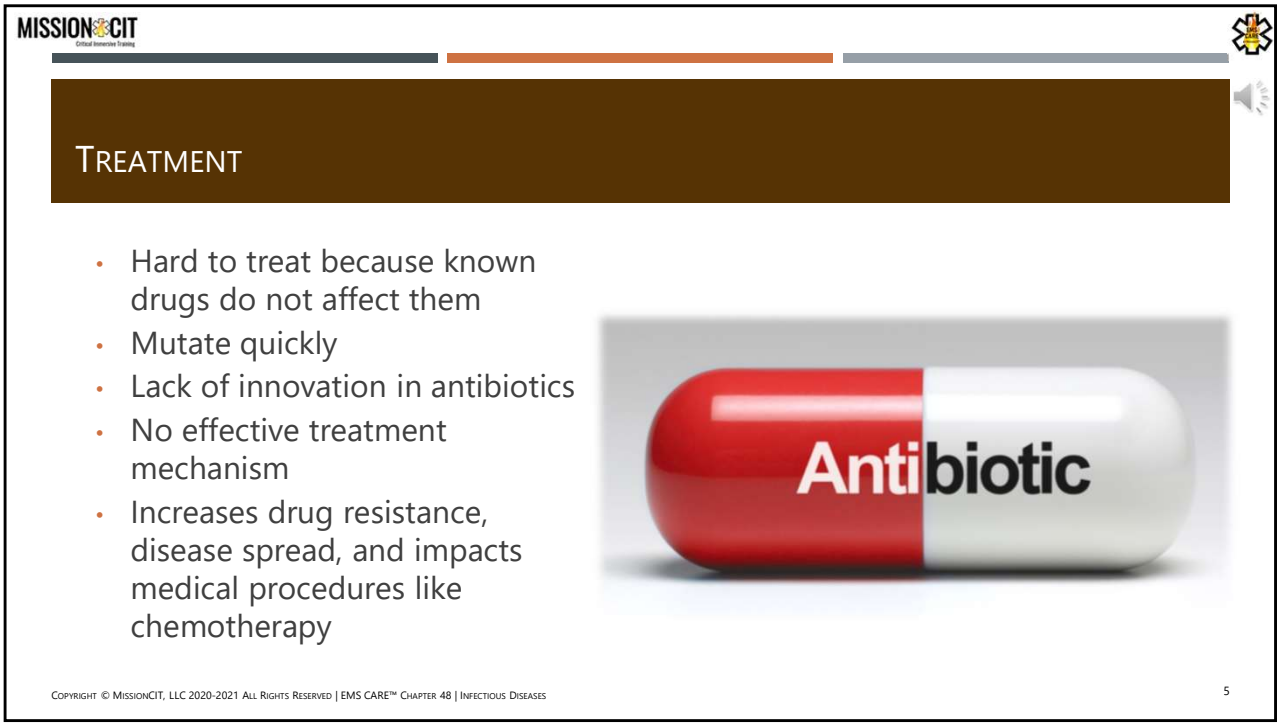
Some groups of people who are more susceptible to these diseases are those:

- With a weakened immune system.
- Who have open skin wounds.
- Who has undergone invasive procedures like IVs,

catheters, etc.

- Who had surgery recently.
- With respiratory diseases, and to those
- Who is pregnant.

To some extent, these diseases tend to impact children and seniors as well.

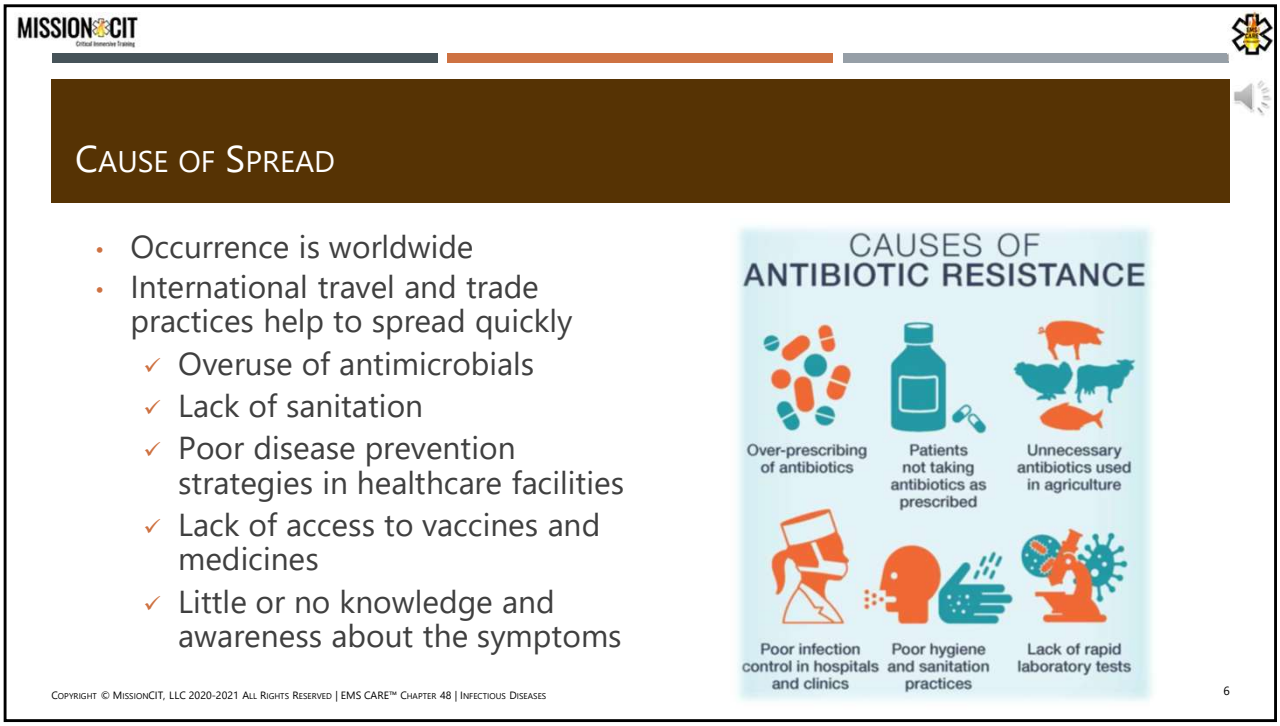


Infectious diseases, in general, are hard to treat because most known drugs do not affect them. Also, the fact that they mutate quickly makes treatment difficult.

This problem gets further complicated by the lack of innovation in antibiotics. According to the WHO, there are 32 antibiotics in clinical development, out of which only six can be classified as innovative.

This lack of effective treatment mechanisms makes it difficult to treat drug-resistant and infectious diseases, thereby causing increased mortality. Further, many medical procedures like chemotherapy and organ

transplantations are likely to be impacted as well.

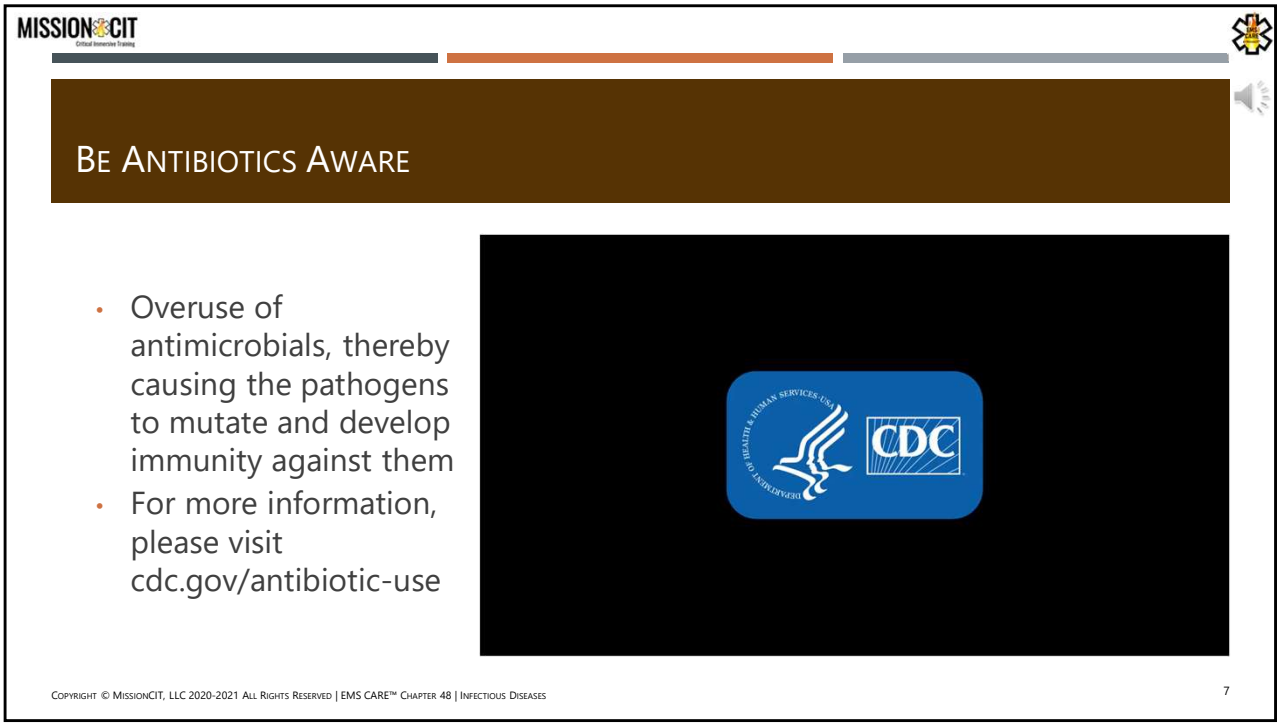


The occurrence of these infectious diseases is worldwide and not restricted to any particular region. Even if the pathogens originate elsewhere, international travel and trade practices spread it around quickly. This has led to ongoing battles in hospitals and clinics where doctors are persistently racing against time to fight these diseases.

Experts point out five reasons for the frequent occurrence of these pathogens, and they are:

- Overuse of antimicrobials, thereby causing the pathogens to mutate and develop immunity against them.

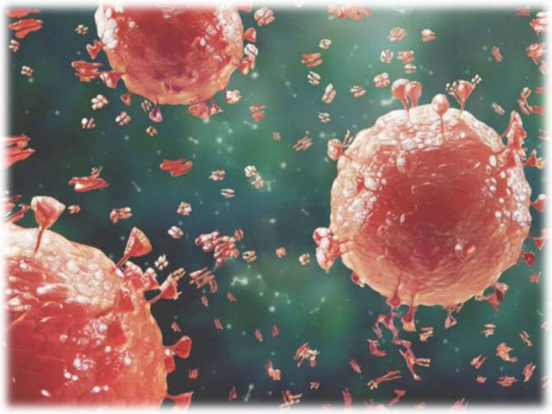
- Lack of sanitation and hygiene for both animals and humans.
- Poor infection and disease prevention strategies in healthcare facilities.
- Lack of access to vaccines and medicines.
- Little to no knowledge about the disease and its symptoms.



Antibiotics are the right tool to treat certain infections caused by bacteria. Antibiotics won't help you when they aren't needed. As an EMT, explain to your patients when an antibiotic is a right tool and when it's not. This video by CDC tells how to 'Be Antibiotics Aware'.

EXAMPLES

- Bacterial infections resistant to antibiotics:
  - ✓ UTIs, sepsis, and STDs
  - ✓ Klebsiella pneumonia
  - ✓ E.coli
  - ✓ Mycobacterium tuberculosis
  - ✓ Drug-resistant HIV
  - ✓ Fungi like Candida Auris
  - ✓ Coronavirus and other respiratory ailments



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Many bacterial infections such as urinary tract infections, sepsis, sexually transmitted diseases, and some kinds of diarrhea are known to have high levels of resistance to antibiotics. Klebsiella pneumonia is a common intestinal bacterium that can cause life-threatening infections such as pneumonia and bloodstream-related infections. E.coli is another bacterium that is highly resistant to antibiotics, thereby increasing the chances for digestive system-related diseases. Mycobacterium tuberculosis strains are causing a growth in the global tuberculosis epidemic.

Antiretroviral drugs are becoming inactive because of drug-resistant HIV. Similarly, drug-resistant parasites make it difficult to control malaria.

Some fungi like Candida Auris are widespread and are highly resistant to antibiotics.

And of course, we have the Coronavirus that is mutating rapidly and reducing the impact of vaccines. In light of this situation, infectious diseases are becoming more common and widespread.

With this, we come to the end of this lesson, and in the next one, Justin will talk extensively about a common viral infection, influenza.