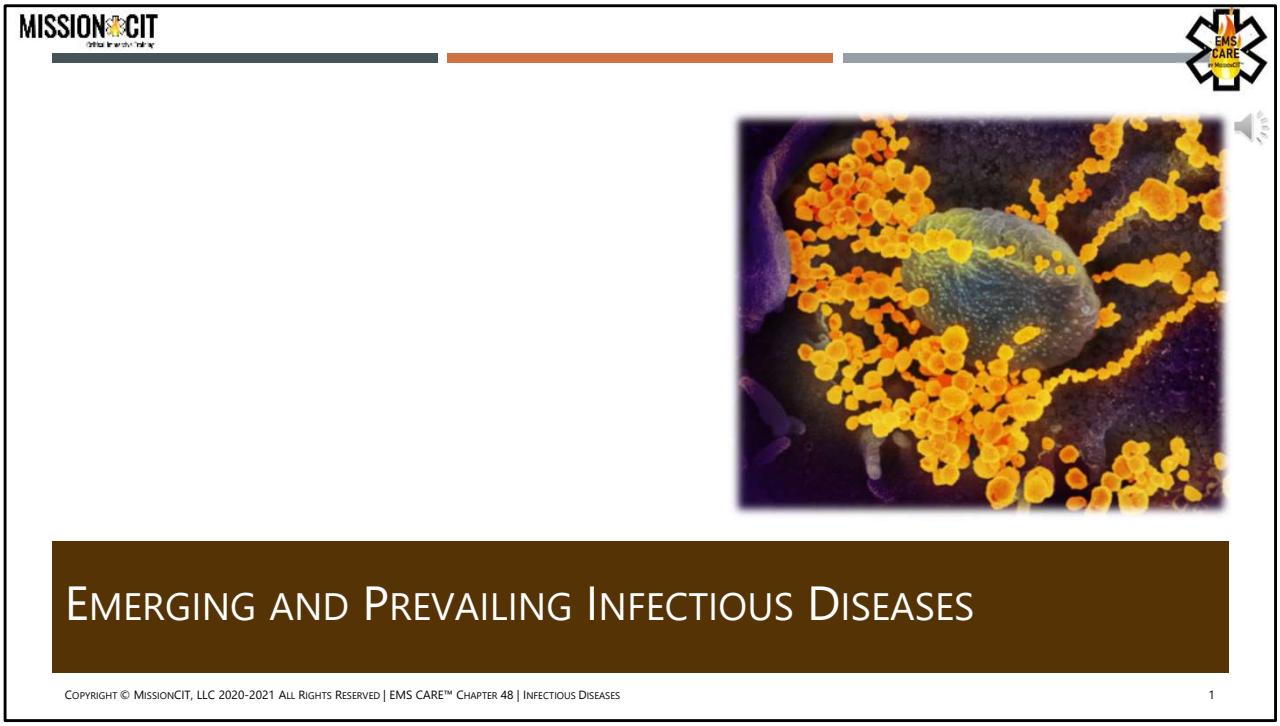
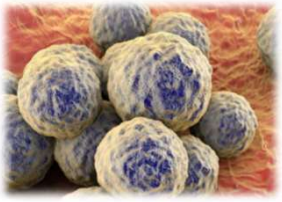



Welcome to the next lesson, here we will talk about some of the emerging and prevalent infectious diseases. WHO defines an emerging disease as “One that has appeared in a population for the first time, or that may have existed previously but is rapidly increasing in incidence or geographic range.” Understanding the prevalence of these diseases and the associated symptoms can vastly reduce their mortality rate.

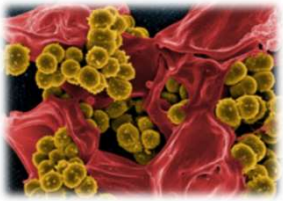
So, let’s look at these common infectious diseases.

## VRSA AND MRSA

- VRSA – Vancomycin Resistant Staphylococcus Aureus
  - ✓ Mild skin infection to even death
  - ✓ Transmitted by hand touch
- MRSA – Methicillin Resistant Staphylococcus Aureus
  - ✓ Highly resistant to antibiotics and mutates rapidly, impacting treatment
  - ✓ Spreads through community and hospitals



VRSA



MRSA

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The acronym VRSA stands for Vancomycin-Resistant Staphylococcus Aureus, a common bacterium resistant to the antibiotic vancomycin. Its impact can range from mild skin infections to severe invasive diseases that could even lead to death. It is transmitted by hands, typically when a person with a draining skin lesion or wound touches another person. While mild infections require regular wash with soap and water followed by an antibiotic cream, severe cases require antibiotics except for vancomycin.

MRSA stands for Methicillin-Resistant Staphylococcus

Aureus, these bacteria are resistant to isoxazolyl penicillin, such as methicillin and oxacillin. Researchers are finding it hard to keep pace with it because it is adapting at a constant rate.

This bacterium spreads through hospitals or healthcare environments and infected people in the community. Out of the two, spread through hospitals is declining while community spread is increasing. Most times, people with a weak immune system are prone to infection. It often appears around surgical wounds and invasive devices like catheters and implanted feeding tubes.

MRSA starts with swollen or painful red bumps, and the infected area will be hard to touch, full of pus, accompanied by fever.

## Fighting Infection with Phages

- Bacteriophages – Naturally-occurring viruses that infect and kill bacteria
  - ✓ Basic structure of phages: head, sheath, tail fibers
  - ✓ Tail fibers mediate attachment to the bacterial cell
  - ✓ DNA stored in the head, travels down to sheath and injected inside the cell
  - ✓ Hijacks cellular machinery to multiply
  - ✓ New-assembled phages burst forth from the bacterium, resets phage life cycle and kills bacterium



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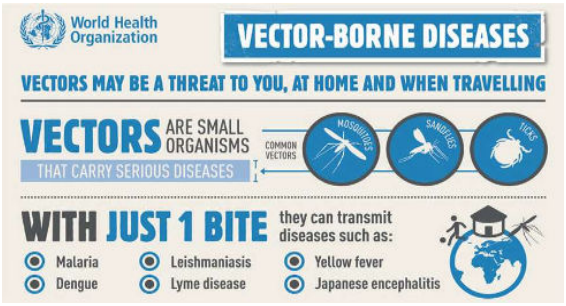
Antimicrobial resistance is a serious threat to modern medicine: As MRSA and other bacteria become immune to our most common antibiotics, researchers must develop new ways to fight these pathogens. One of these alternatives actually involves viruses called bacteriophages, which prey on bacteria. Though bacteriophages or “phages” are not currently approved for widespread human use within the United States, they are being used under Emergency Investigative New Drug FDA clearance and could one day be used in conjunction with antibiotics to treat the most stubborn bacterial

infections.

A 2018 video from National Institute of Allergy and Infectious Diseases (NIAID) explores how phages function, how phage cocktails are assembled, and more.

## Vector-Borne Diseases

- Vectors are mosquitoes, fleas, and ticks
- Vector-borne diseases:
  - ✓ Lyme
  - ✓ Dengue fever
  - ✓ West Nile
  - ✓ Rocky Mountain Spotted Fever
  - ✓ Plague
  - ✓ Tularemia
- Check for exposure to stagnant water, floods, camping or outdoor activities or any other potential vector breeding grounds




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Vectors are mosquitoes, fleas, and ticks that spread pathogens from an infected person to healthy people. The CDC states that the changing climate coupled with vector adaptations has increased the rate and geographic prevalence of these diseases.

Some of the vector-borne diseases seen in the U.S are Lyme, dengue fever, West Nile disease, Rocky Mountain spotted fever, plague, and tularemia. Let's take a brief look at the symptoms of these diseases for easy identification.

Lyme is characterized by fever, chills, headache, muscle

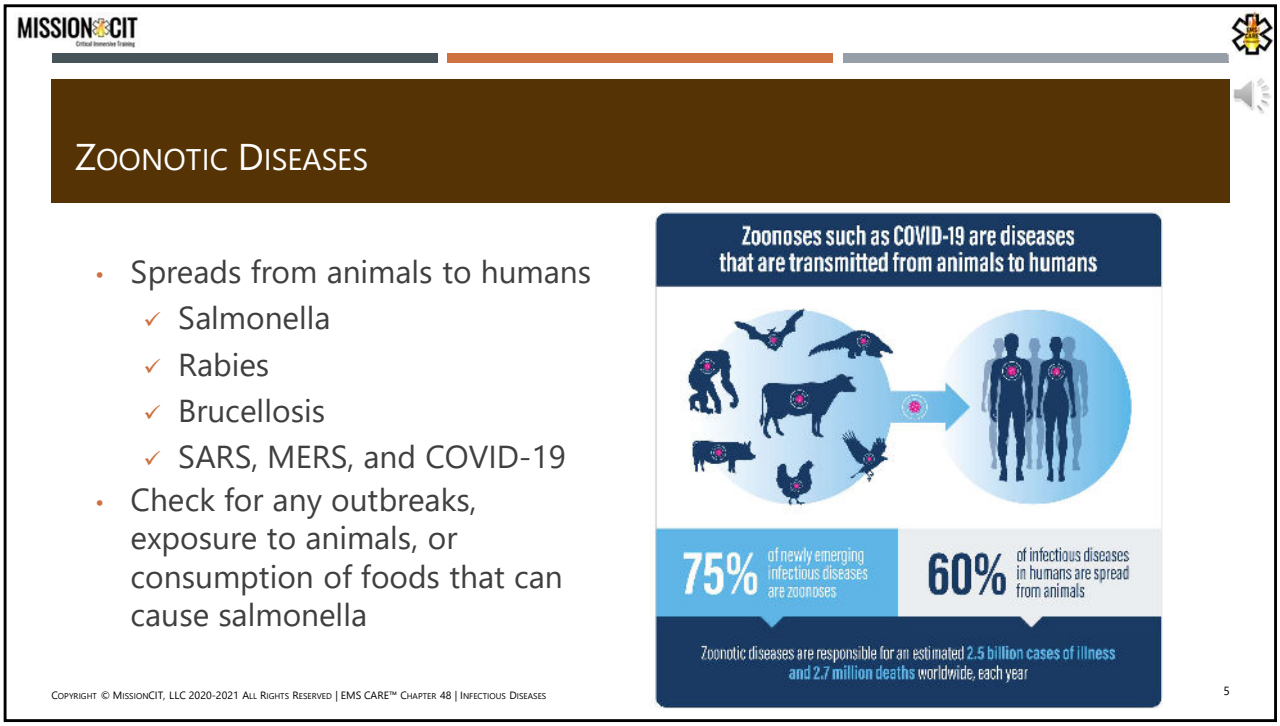
and joint aches, and swollen lymph nodes, along with Erythema migrans rash.

Dengue's symptoms include high fever, headache, rash, and muscle and joint pain. In severe cases, it can cause bleeding and shock and can be life-threatening as well.

West Nile's symptoms are high fever, headache, neck stiffness, disorientation, tremors, loss of vision, and possibly even coma and paralysis. Though it can occur in people of all ages, those over 60 years are at the highest risk.

As for Rocky Mountain spotted fever, you'll notice a lack of appetite, muscle and stomach pain, nausea, vomiting, headache, and rash.

Finally, plague and tularemia are relatively rare, and are characterized by flu-like symptoms. While mouth ulcers, inflamed tonsils, and swollen lymph nodes are symptoms of tularemia. Shock, bleeding, and extreme weakness characterize the plague.




Zoonotic diseases are those that spread from animals to humans. Besides the vector-borne diseases we discussed earlier, other zoonotic diseases include salmonella, rabies, brucellosis, SARS, MERS, and of course, COVID-19.

Salmonella can happen by unclean food prepared under not-so-ideal sanitation. The CDC estimates that an average of 450 people die each year from this disease, though most people recover with little to no treatment. Diarrhea, fever, and stomach cramps followed by nausea are its symptoms.

Rabies is a fatal viral disease that spreads from pets, especially if scratched or bitten by an animal that carries this virus. In the United States, rabies is common in wild animals like bats, raccoons, skunks, and foxes. It impacts the central nervous system and the brain, so the patient must get the appropriate treatment after a possible exposure. There is no other cure, and it can be fatal.

Moving on, Brucellosis is caused by bacteria when they come in contact with infected animals or consume products from these animals. Recurrent fever, arthritis, swelling of the testicles or heart, chronic fatigue, and depression are the other symptoms.

SARS, MERS, and COVID-19 are respiratory illnesses caused by the coronavirus and can quickly spread through droplets.

## Food-Borne Diseases

- Pathogens contaminate food
  - ✓ Norovirus, salmonella, Staph, E. coli
- More likely to affect older adults, young children, pregnant women, and those with compromised immune systems
- Most times, they get better naturally. Some people require hospitalization
- Document the foods consumed in the last 48 hours
- Check for outbreaks in the community

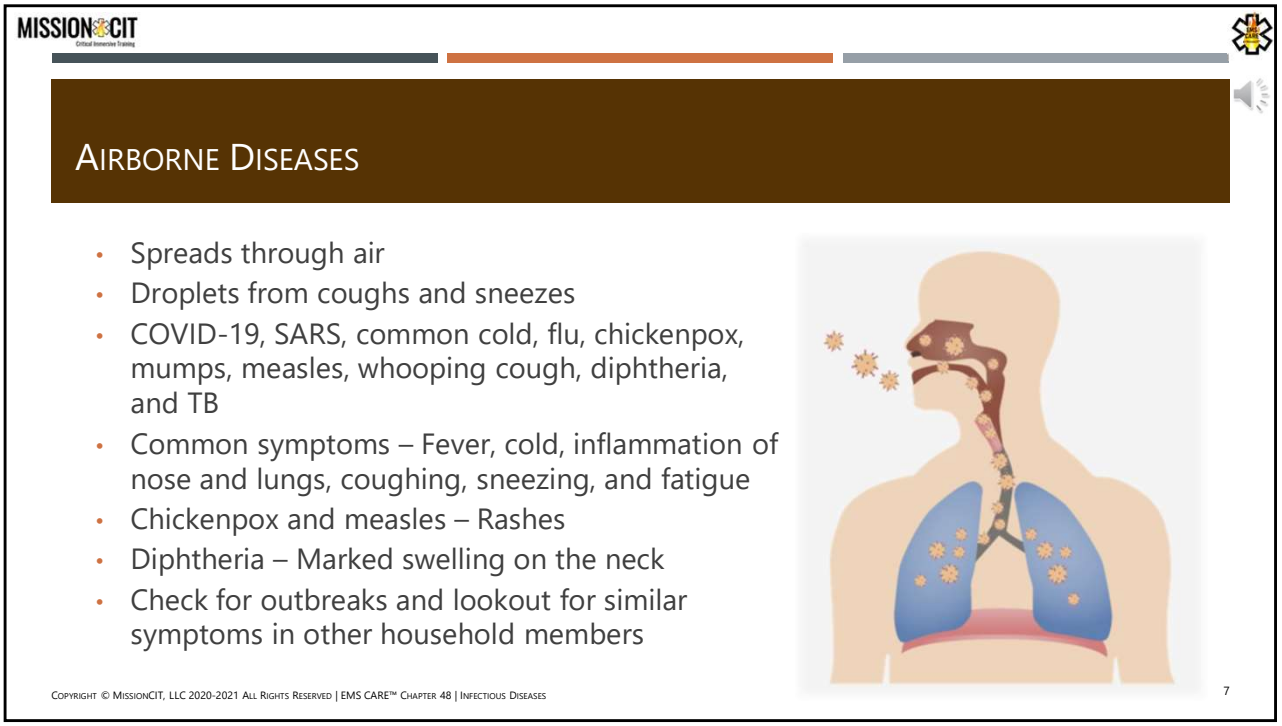



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Many pathogens can contaminate foods and cause infections. Though researchers have identified more than 250 different foodborne diseases due to a diverse range of bacteria, viruses, and pathogens, the most common are norovirus, salmonella, clostridium perfringens, E. coli, campylobacter, and Staph. These pathogens can infect anyone. But older adults, young children, pregnant women, and people with a weakened immune system are more likely to be impacted.

Most times, the symptoms get better on their own, though severe cases may require hospitalization.




People can get affected by some diseases just by breathing! And these are called airborne diseases.

Typically, when an infected person sneezes, coughs, or talks, they tend to spew nasal or throat secretions into the air in the form of droplets. The virus and bacteria present in these droplets hang in the air and infect people who breathe them.

Some common airborne diseases are COVID-19, SARS, common cold, influenza, chickenpox, mumps, measles, whooping cough, diphtheria, and tuberculosis. Though the exact symptoms may vary, there are many common

symptoms such as inflammation of the nose and lungs, coughing, sneezing, runny nose, fever, fatigue, body ache, and sore throat. Chickenpox and measles will also have rashes, while tuberculosis is characterized by coughing up sputum or blood.

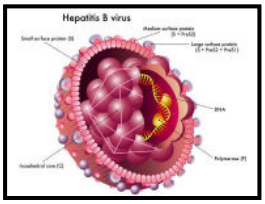
Diphtheria will have marked swelling on the neck and whooping cough. It is easily distinguished by a severe hacking cough.

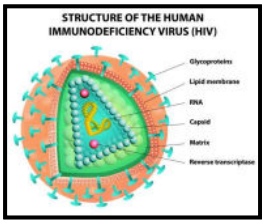
It tends to impact young and old people more than others. Those with compromised immunity are at risk as well.

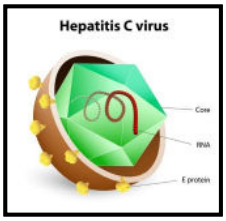
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## BLOODBORNE DISEASES

- Pathogen spread through blood and other body fluids
- Hepatitis B, Hepatitis C, and HIV are common
  - ✓ Hep B symptoms – jaundice, pale stools, dark urine, tenderness in upper right side of stomach
  - ✓ Hep C symptoms – jaundice, nausea, loss of appetite, tiredness
  - ✓ HIV symptoms – swollen gland, muscle ache, headache, sore throat, and fever
- Check for contact with others' body fluids
- Sexual contact with strangers in the last 2-4 weeks




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Sexual contact with strangers in the last 2-4 weeks
With this disease, it all about handling these infectious diseases and in the