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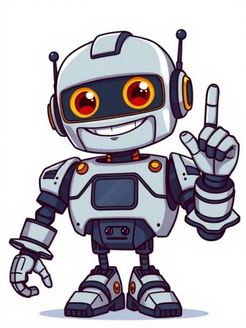

Bacterial and viral infections have many things in common. Both types of infections are caused by microbes -- bacteria and viruses, respectively -- and spread by things such as:Coughing and sneezingContact with infected people, especially through kissing and sexContact with contaminated surfaces, food, and waterContact with infected creatures, including pets, livestock, and insects such as fleas and ticksMicrobes can also cause:Acute infections, which are short-livedChronic infections, which can last weeks, months, or a lifetimeLatent infections, which may not cause symptoms at first but can reactivate over a period of months or yearsMost importantly, bacterial and viral infections can cause mild, moderate, and severe diseases.Bacterial and viral infections in the past COVID-19 is the most recent example of a worldwide pandemic caused by a viral or bacterial infection. (Photo Credit: iStock/Getty Images) Throughout history, millions of people have died of diseases such as bubonic plague or the Black Death (caused by Yersinia pestis bacteria) and smallpox (caused by the variola virus).In recent times, viral infections have been responsible for three major pandemics:The 1918-1919 Spanish flu pandemic that killed 20-40 million peopleThe ongoing HIV/AIDS pandemic, which has killed over 40.5 million people (as of 2023)The COVID-19 pandemic, which has killed more than 7 million people worldwide as of May 2024Bacterial and viral infections can cause similar symptoms, including:CoughingS neezingFeverInflammationVomitingDiarrheaFatigueCrampingThese are ways the immune system tries to get rid of infectious organisms.Although symptoms are similar, bacterial and viral infections are not alike in many other important respects. That's mostly because of the organisms' structural differences and the way they respond to medications.Although bacteria and viruses are both too small to be seen without a microscope, they're as different as giraffes and goldfish.Bacteria are relatively complex, single-celled creatures, often with a rigid wall and a thin, rubbery membrane surrounding the fluid inside the cell. They can reproduce on their own. Fossilized records show that bacteria have existed for about 3.5 billion years and can survive in different environments, including extreme heat and cold, radioactive waste, and the human body. Most bacteria are harmless, and some actually help by digesting food, destroying disease-causing microbes, fighting cancer cells, and providing essential nutrients. Fewer than 1% of bacteria cause diseases in people. Viruses are tinier; the largest of them are smaller than the smallest bacteria. All they have is a protein coat and a core of genetic material, either RNA or DNA. Unlike bacteria, viruses can't survive without a host. They can only reproduce by attaching themselves to cells. In most cases, they reprogram the cells to make new viruses until the cells burst and die. In other cases, they turn normal cells into malignant or cancerous cells.Also unlike bacteria, most viruses do cause disease, and they're quite specific about the cells they attack. For example, certain viruses attack cells in the liver, respiratory system, or blood. In some cases, viruses target bacteria.Common bacterial infectionsYou can get bacterial infections in many parts of your body, including your gut, skin, sinuses, and urinary tract. Common bacterial infections include:Strep throatLyme disease, which is spread by ticksC. diff, which affects your intestinesSalmonella and campylobacter, which cause food poisoningImpetigo, boils, and cellulitis (these affect your skin)E. coli, which causes many urinary tract infections (UTIs)Chlamydia and gonorrhea, which are sexually transmittedPneumococcal disease, which can cause sinus and ear infections, as well as some types of pneumoniaBacterial vaginosis, an excess of bacteria in your vagina Common viral infectionsViruses most often affect your respiratory and digestive systems, but they can cause problems in other parts of your body.Viral infections of your respiratory system include:Common coldFluCOVIDHuman metapneumovirus (hMPV)Respiratory syncytial virus (RSV)ParainfluenzaThese viruses can cause bronchitis, ear infections, pneumonia, and other conditions.Common viral infections of your digestive system include:RotavirusNorovirusAstrovirusHepatitisThe first three can cause gastroenteritis, which some people call "stomach flu." Hepatitis affects your liver and can be a chronic condition.Neurological viruses affect tissue in your brain or spinal cord. They can cause paralysis as well as dangerous swelling of your brain. They include:PolioRabiesWest Nile virus Congenital viruses pass to the fetus during pregnancy. They can cause vision and hearing loss and developmental delays. They include:ZikaCytomegalovirus (CMV)RubellaHow long do bacterial and viral infections last?If you have a bacterial infection, it will probably clear up in a week or two with antibiotic treatment. It's important to take all of your medication even if you start to feel better, otherwise, the bacteria might come back.How long a viral infection lasts depends on what type of virus causes it. Most respiratory viruses clear up in a week or two. Hepatitis can cause chronic health problems that last years. HIV can't be cured and is a lifelong infection, although there are treatments to manage it.You should consult your doctor if you think you have a bacterial or viral infection. Exceptions include the common cold, which is usually not life-threatening.In some cases, it's difficult to determine whether an illness is viral or bacterial because many ailments -- including pneumonia, meningitis, and diarrhea -- can be caused by either.But your doctor may be able to determine the cause by listening to your medical history and doing a physical exam.If necessary, they can also order a blood or urine test to help confirm a diagnosis, or a "culture test" of tissue to identify bacteria or viruses. Occasionally, a biopsy of affected tissue may be required.There are different treatments for bacterial and viral infections. Antibiotics will not treat a virus.Treating bacterial infectionsThe discovery of antibiotics for bacterial infections is considered one of the most important breakthroughs in medical history. Unfortunately, bacteria are very adaptable, and the overuse of antibiotics has made many of them resistant to antibiotics. This has created serious problems, especially in hospital settings. Treating viral infectionsSince the beginning of the 20th century, vaccines have been developed to combat many viruses. Vaccines have drastically reduced the number of new cases of viral diseases such as polio, measles, and chickenpox. In addition, vaccines can prevent infections such as the flu, hepatitis A, hepatitis B, human papillomavirus (HPV), and others.But the treatment of viral infections has proved more challenging, mainly because viruses are relatively tiny and reproduce inside cells. Antiviral medications have become available for some viral diseases, such as herpes simplex virus infections, HIV/AIDS, and influenza. But their use has been associated with the development of drug-resistant microbes.Because viruses don't respond to antibiotics, many experts recommend against using antibiotics without clear evidence of a bacterial infection.Viral and bacterial infections can cause similar symptoms, making it tough to distinguish between the two solely based on symptoms. Your symptoms might affect your respiratory system, digestive system, skin, or other parts of your body. Your doctor may have to do some tests to determine whether your illness is caused by a virus or bacteria. If your infection is bacterial, you'll be treated with antibiotics. But these drugs don't work on viruses. Many viruses can be prevented with vaccines. Viral infections can be treated, in some cases, with antiviral drugs.How do you know if an infection is viral or bacterial?It might be hard to figure out what's making you sick. Your doctor may be able to make a diagnosis based on your symptoms. Sometimes, lab results are the only way to know. Your health care provider might take a sample from you and send it to the lab. For bacterial infections, these can include:UrinePoop (stool)BloodSkinSputum (the stuff you cough up)Fluid that your eyes produceFluid from around your brain or spinal cord (CNS fluid) If your internal organs are affected, you might have X-rays, ultrasounds, MRIs, or CT scans.If your doctor thinks you have a viral infection, you might need an X-ray, ultrasound, MRI, or CT scan to see how your illness is affecting your body. Scans and X-rays can't identify a viral infection, however. To do that, your health care provider may ask a lab to look for the virus itself, antigens, or antibodies in a sample taken from your body. Those samples can include:BloodSpitSputumCells from inside your noseSkinUrinePoop (stool)CNS fluidCells from your cervix taken during a pap smear Which is more serious, a viral infection or a bacterial one?Your immune system typically can clear a viral infection easier than a bacterial one. But viruses still can cause life-threatening illnesses, such as COVID.Is it harder to treat a viral or bacterial infection?You can treat a bacterial infection with antibiotics. Antiviral drugs are available for some viral illnesses, but they can only speed up your recovery. Viruses have to run their course. Some, such as HIV, never leave your body. The best way is to avoid getting it in the first place. Many viruses can be prevented by vaccines.Do antibiotics work on viral infections?No. Antibiotics aren't effective against viruses, and taking an antibiotic when your illness is viral can lead to bacteria becoming drug-resistant. Sometimes, viral illnesses lead to bacterial infections. For instance, a cold can cause fluid to build up in your respiratory system, and fluid in your ear can become infected with bacteria. In that case, an antibiotic will help clear the bacterial infection. But it won't do anything to the virus.Assoc. Prof. Vuslat Bonak Infectious Diseases MedicalPoint Gaziantep Hospital Asst. Prof. Mirkan Bulak Infectious Diseases MedicalPoint Izmir Hospital Asst. Prof. Sinan MermerInfectious Diseases MedicalPoint Izmir Hospital Spec. Afet ErbayInfectious Diseases MedicalPoint Izmir Hospital Spec. Erturul alayanInfectious Diseases MedicalPoint Izmir Hospital Spec. Kezban Sarca Infectious Diseases MedicalPoint Batman Hospital Infection occurs when germs enter your body and multiply, resulting in disease. The four main types of infections are viral, bacterial, fungal, and parasitic Infection occurs when germs enter your body and multiply, resulting in disease. There are four main types of infections: Viral Bacterial Fungal Parasitic In response to an infection, the immune system goes into overdrive, activating white blood cells and antibodies to fight the foreign invader. This can cause symptoms such as fever, headache, and rash. 1. Viral infection Viruses can cause a wide range of infectious diseases. Viruses cause illness by killing cells or interfering with cell function. The virus infiltrates a host's body and attaches itself to a cell, where it releases its genetic material. The virus multiplies as the cell replicates. When a cell dies, more viruses are released, infecting new cells. Some viruses alter the function of cells rather than killing them. Bodies frequently respond by inducing fever (heat inactivates many viruses), secreting a chemical called interferon (which prevents viruses from reproducing) or mobilizing the immune system's antibodies and other cells to target the invader. Most viral diseases are self-limiting, and the immune system may be able to fight them off. In rare cases, doctors may prescribe antiviral medications. Vaccinations can also help fight viral diseases. 2. Bacterial infection Bacteria cause a wide range of infectious diseases, including strep throat and urinary tract infections, meningitis, and tuberculosis. Bacteria are also to blame for many skin rashes. Bacteria can enter the body through wounds, scrapes, and surgical incisions, as well as the mouth and nose. Some bacteria proliferate so quickly that they crowd out host tissues and disrupt normal function. Some may kill cells and tissues right after they multiply. Sometimes, these produce toxins that can paralyze, destroy cells or trigger a massive immune response that is toxic. Antibiotics are the first-line defense against bacterial infections. 3. Fungal infection Fungal infections are often more bothersome than dangerous. However, some can cause serious illness. Inhaling fungal spores is one of the most common ways for an internal fungal infection to develop. Fungal spores are frequently found in decaying vegetation or on animal feces. Fungal cells can invade the healthy tissues and disrupt their function. The body often launches an immune response against fungal particles, which causes collateral damage to the cells. Infected people are treated with a combination of antibiotics and antifungal medications. 4. Parasitic infection Protozoa are a type of parasite that thrive on moisture and frequently spread disease via water. Some protozoa cause intestinal infections, resulting in diarrhea, nausea, and stomach upset. In healthy people, parasites cause mild illness, but those with severely weakened immune systems can develop serious infections that can spread to major organs. Oral rehydration therapy is usually the first-line treatment. Antiparasitic drugs with a broad spectrum of action can be used to treat severe cases. Endogenous: Infection that develops within the body due to organisms already present in the body. Example: bacterial vaginosis Exogenous: Infection that starts outside the body, caused by foods, fluids, fomites, etc. Example: food poisoning due to contaminated food Nosocomial: Hospital-acquired infection that is typically resistant to antibiotics Example: sepsis due to methicillin-resistant Staphylococcus aureus Opportunistic: Infection that occurs when the body's defenses are compromised (acquired immune deficiency syndrome, cancer, diabetes). Examples: Kaposi's sarcoma and Clostridioides difficile diarrhea You can help prevent the spread of infection by following these tips: Practice hand hygiene Keep up-to-date with immunization Practice cough and sneeze etiquette Clean surfaces regularly Keep sick children at home as much as possible Prepare food safely Practice safe sex Do not share personal belongings Travel wisely and maintain social distancing Use masks and sanitizers frequently Bowel regularity means a bowel movement every day. See Answer Infectious diseases are illnesses caused by harmful organisms (pathogens or germs) that get into your body from the outside. Germs that cause infectious diseases include viruses, bacteria, fungi, parasites and, rarely, prions.We all get infectious diseases. You can get them from breathing in germs (like after someone coughs or sneezes), from bug bites, from contaminated food and from the environment around you. Respiratory infections (like colds, flu and COVID), stomach flu, STIs and even foot fungus are all examples of infectious diseases.By comparison, noninfectious diseases arent caused by germs, but by genetics, anatomical differences or getting older. You cant get noninfectious diseases from other people, a bug bite or your food. Cancer, diabetes, congestive heart failure andAlzheimers diseaseare all examples of noninfectious diseases.TypesTypes of infectious diseases include:Viral infections. Viruses are pieces of genetic information (DNA or RNA) inside a protective shell.Bacterial infections. Bacteria are single-celled organisms with their instructions written on a small piece of DNA.Fungal infections. Fungi live on your body and in the environment around you. When fungi get overgrown or get into places in your body where they shouldnt be, they can make you sick.Parasitic infections. Parasites live off the bodies of other organisms.Prion diseases. Prion diseases, also called transmissible spongiform encephalopathies (TSEs), are caused by faulty proteins that make other proteins become faulty, too. Prions are an extremely rare cause of infectious diseases.Common infectious diseasesThere are hundreds of infectious diseases. Some common ones include:Common coldCOVID-19FluHookwormsHPV (human papillomavirus)NorovirusPinwormsRingworm(like athletes foot)RSV (respiratory syncytial virus)Strep throatTuberculosisThese affect millions of people across the world each year. An infection is the invasion of the body by a disease-causing organism called a pathogen. Infections can be caused by a wide range of pathogens, including bacteria, viruses, fungi, and parasites, and can develop in any organ system of the body. Infections can be classified in a number of different ways. They may be localized (affecting a specific part of the body) or systemic (affecting the body as a whole). Verywell / Theresa ChiechiInfections can be caused by bacteria, viruses, fungi, and parasites in any organ system.General symptoms of an infection include fever, fatigue, and body aches. You'll have other symptoms depending on the body area that's infected. Some infections are contagious (spread directly or indirectly from person to person, like the flu). Others may be spread by an animal or insect or picked up from the environment. There are also primary infections in which healthy host tissues are invaded and secondary infections that arise as a complication of another disease or condition. This article discusses general symptoms of infections and symptoms when different parts of the body have an infection. The signs and symptoms of an infection can also vary. Some are generalized and nonspecific, like fever, fatigue, and chills. Others are specific to the body part, such as a rash, coughing, or swelling of a joint. When diagnosing an infection, doctors will want to hone in on the part of the body in which the infection was established. By recognizing the characteristic signs and symptoms, they can order tests and procedures to diagnose the cause and prescribe the correct treatment definitively. These include antibiotics for bacterial infections, antivirals for viral infections, antifungals for fungal infections, and antiparasitics for parasitic diseases. Whenever an infection is established, the body's first-line response is inflammatory. Inflammation is the body's way of defending itself against disease while promoting the healing of affected tissues. Inflammation is characterized by five cardinal signs: redness, swelling, heat, pain, and the temporary loss of tissue function. During an infection, people often experience nonspecific, generalized symptoms as a result of the underlying inflammatory response. The signs and severity can differ based on the affected organ system but may include:Acute infections can cause acute inflammation (characterized by rapid onset and resolution), while chronic infections can cause chronic inflammation (characterized by persistence and the progressive destruction of tissues by the inflammatory process). The respiratory tract is the passage through which air passes from the mouth and nose to the lungs. An infection can develop in the upper respiratory tract (involving the sinuses, nasalpassages, pharynx, and larynx) or the lower respiratory tract (involving the trachea and the bronchi, bronchioles, and alveoli of the lungs). Upper respiratory tract infections (URTIs) include the common cold, influenza (the flu), laryngitis (infection of the voice box), pharyngitis (sore throat), tonsillitis (infection of the tonsils), and sinusitis (sinus infection). Symptoms can vary based on the part of the tract affected but often include: SneezingRunny noseNasal congestionNasal dischargeScratchy or sore throatPain when swallowingCoughingSinus pain Fever, headaches, and malaise are also common. A lower respiratory tract infection (LRTI) is often used as a synonym for pneumonia but can apply to any infection in the trachea or lungs, including acute bronchitis and bronchiolitis. These infections can be bacterial, fungal, or viral, including influenza, tuberculosis, and COVID-19. Symptoms of an LRTI may include: Severe LRTIs can cause cyanosis, a condition in which the lips and skin can turn a bluish color due to the lack of blood oxygen. Theurinary tractis the system through which urine is excreted from the body and includes two kidneys, two ureters, abladder, and a urethra. A urinary tract infection (UTI) affects any part of this system, including urethritis (infection of the urethra), cystitis (bladder infection), or acute pyelonephritis (kidney infection). Symptoms of a UTI can differ based on the location of the infection but may include: Severe UTIs may cause fever with chills as well as nausea and vomiting. The central nervous system (CNS) is comprised of the brain and spinal cord. Infections of the CNS typically involve the brain (encephalitis) or the protective membrane around the brain and spinal cord (meningitis). Symptoms of a brain or spinal cord infection can differ by severity and may include:Sudden feverStiff neckSevere headacheDifficulty concentratingLight sensitivitySleepinessNausea or vomitingConfusionDifficulty walkingNo appetite or thirstSeizuresPrimary encephalitis is most often caused by viruses like herpes simplex virus (HSV). While viruses are also the most common cause of meningitis, bacterial causes tend to be more severe and even life-threatening. Bloodstream infections are most commonly associated with bacteria (bacteremia). They often develop as a secondary infection to pneumonia, meningitis, or cellulitis, or when bacteria enter the bloodstream during surgery or intravenous drug use. Septicemia is the term used to describe a serious blood infection. Sepsis occurs when the response to the infection causes organ damage. Symptoms of a blood infection may include:Fever and chillsRapid breathingRapid heart rateLow body temperatureClammy skinExtreme fatigue and weaknessNausea or vomitingDecreased urinationDifficulty breathingPale, blotchy, or bluish skinChanges in mental stateFainting or unconsciousnessIf not treated immediately and aggressively, sepsis can lead to septic shock in which an extreme drop in blood pressure can cause organ failure and even death. Liver infections are primarily viral in nature, caused by the viruses hepatitis A, B, C, D, or E. Some acute hepatitis infections resolve on their own without treatment. Others may become chronic and lead to progressive liver injury (particularly with hepatitis B and hepatitis C). Hepatitis simply describes the inflammation of the liver, whether by infection or other causes. Symptoms of viral hepatitis may include:FeverFatigueLoss of appetiteNausea or vomitingAbdominal painDark urineLight-colored stoolsJoint painJaundice (yellowing of the skin or eyes) Chronic hepatitis infection can lead to cirrhosis, liver failure, and liver cancer. The gastrointestinal tract is the passage through which food enters the body and exits as stool. It includes the mouth, esophagus,stomach, small intestine, large intestine (colon), and anus. Gastrointestinal infectionsare viral, bacteria, or parasiticinfectionsthat cause gastroenteritis, an inflammation of thestomachand intestines. The pathogens are often transmitted by contaminated food and shared personal items. Common causes of infectious gastroenteritis include bacteria like Escherichia coli and Salmonella, viruses like rotavirus and norovirus, and parasites like Giardia lamblia and Cryptosporidium. Symptoms of a gastrointestinal tract infection may include:Abdominal crampsDiarrheaNausea and vomitingFeverMuscle achesHeadacheFatigueDehydration is a common complication of diarrhea in people with severe gastroenteritis, sometimes requiring emergency medical care with intravenous fluids. Some bacteria and parasites are also known to cause infectious dysentery, a severe infection of the intestines causing vomiting and bloody stools. Otitis is the general term for an infection of the ear. It may involve the external ear (otitis externa or "swimmer's ear"), middle ear (otitis media), or inner ear (otitis interna or labyrinthitis). Ear infections can be caused by bacteria like Staphylococcus aureus or Pseudomonas aeruginosa, viruses like herpes simplex virus type 1, or fungi like Candida albicans or Aspergillus. Some ear infections are secondary to an upper respiratory tract infection like strep throat. Symptoms can vary by the location of the infection, with some causing minor discomfort and others resulting in severe pain and disability. Symptoms of an ear infection may include:Ear painEar redness or swellingMuffled hearingFeverHeadacheRinging in the earsDrainage of fluid from the earSwollen lymph nodes in the neckVertigo (a dizzy feeling like your surroundings are spinning)Loss of balance and fallingNausea or vomiting Symptoms are generally more severe the deeper the infection is within the ear. Some severe inner ear infections can cause nystagmus (uncontrollable eye movements), crippling vertigo, and even permanent hearing loss. Eye infections are common because the eye is vulnerable to pathogens that are easily transmitted by hand-to-eye contact or an eye injury. These include infectious conjunctivitis ("pink eye"), infectious keratitis (affecting the cornea), and infectious endophthalmitis (affecting the inner eye). Eye infections are frequently associated with viruses like adenovirus and herpes simplex virus. Bacterial causes include Staphylococcus aureus and Streptococcus pneumonaie as well as sexually transmitted infections (STIs) like gonorrhea and chlamydia. An eye infection often involves only one eye but can easily spread to both. Symptoms may include: Deep pink or red color in the white of the eyeEye swelling, itchiness, or burningEye painExcessive tearingA feeling of having something stuck in the eyeSwelling of the eyelidSensitivity to lightDecreased visionEye dischargeBacterial infections, particularly those affecting the cornea or inner eye, are especially worrisome because they can lead to permanent vision loss if not treated appropriately. Vaginal infections typically involve the overgrowth of fungus or bacteria that commonly reside on vaginal tissues, leading to vaginal inflammation (vaginitis). These include yeast infections that arise from the overgrowth of the fungus Candida albicans and other types of Candida. Bacterial vaginosis (BV) similarly occurs when levels of a bacteria called lactobacillus are low, allowing "unfriendly" bacteria to thrive and proliferate. Some STIs can also cause vaginitis. Signs and symptoms of a vaginal infection may include: Vaginal redness and swellingItchiness, often intenseThick, white or gray vaginal dischargeBurning or pain when urinatingA strong, fishlike odor (especially with BV)Pain with sexSwollen lymph nodes in the groin A pelvic exam with a vaginal swab may be needed to positively diagnose the infection and dispense the appropriate treatment. Sexually transmitted infections are those that can be transmitted by vaginal sex, anal sex, or oral sex. These include chlamydia, genital herpes, gonorrhea, HIV, human papillomavirus (HPV), syphilis, and trichomoniasis. Symptoms vary not only by sex but also by the site of the infection. In some cases, there may be no symptoms at all. If you are sexually active, you may want to see a doctor about an STD screen if you develop some of the following telltale symptoms:Pain or burning when urinatingVaginal discharge, often with a bad odorDischarge from the penisSwollen or tender testiclesGenital itchinessRectal itch, discharge, or bleedingGenital sores or blistersGenital wartsPelvic painEnlarged lymph nodes (particularly those in the neck or groin)Pain and/or bleeding during sexBleeding between periodsMost of the symptoms of STIs can occur with nonsexually transmitted diseases as well as noninfectious conditions affecting the genitourinary tract. Even so, sexually transmitted infections should be considered if you have risk factors for STIs. Skin infections are caused by an almost encyclopedic array of pathogens. As the human body's largest organ, the skin is vulnerable to infection whenever it is broken or compromised or your immune system is suppressed. These include bacterial infections like impetigo and folliculitis, viral infections like shingles (herpes zoster) and warts, and fungal infections like athlete's foot (tinea pedis) and ringworm. Some are readily treatable with over-the-counter medications; others, like necrotizing fasciitis, are difficult to treat and require aggressive medical intervention. Signs of a skin infection may include: Fever and chills can sometimes accompany an acute skin infection, along with increasing pain, tenderness, and swelling. Skin infections can often be differentiated by the location and characteristics of rashes, lesions, and soresincluding whether they are generalized or localized, flat or raised, have well-defined or ill-defined borders, or cause crusting, itching, pitting, or flaking. These characteristics can help direct the diagnosis and ensure the correct treatment plan.TypesCausesSymptomsPreventionSummaryAn infection occurs when a microorganism such as bacteria, fungi, or a virus enters a persons body and begins multiplying. Infections can have a variety of effects, ranging from mild to severe.These infectious microscopic organisms are known as pathogens, and they can multiply quickly. Many symptoms of infections occur due to the immune systems response to the pathogen.In this article, we explain the different types of infections, how to reduce the risk of infection, and what symptoms they cause.Share on PinterestSilverV/Getty ImagesInfections can be bacterial, viral, fungal, or parasitic. The type of pathogen determines the type of infection, influencing how the infection progresses and how it may affect the body.Different types of pathogens can vary in their:sizeshapefunctiongenetic contenthow they act on the bodytreatmentFor example, viruses are smaller than bacteria. They enter a host and take over cells.Some pathogens have little effect at all. Others produce toxins or inflammatory substances that trigger negative responses from the body. This variation means that some infections are mild and barely noticeable, while others can be severe and life threatening. Some pathogens are resistant to treatment.The immune system is an effective barrier against infectious agents. However, pathogens may sometimes overwhelm the immune systems ability to fight them off.Viruses are the most common cause of infection in humans. Researchers estimate there may be 10 nonillion viruses on Earth, with around 270 of those affecting humans. A nonillion is a 1 followed by 30 zeros.Viruses contain a small piece of genetic code, and a coat of protein and lipid (fat) molecules protects them. The proteins on the outside of viruses, which are known as spike proteins, latch onto host cells and enter them.As viruses enter cells, they release their genetic material. This material forces the cell to replicate the virus, and the virus multiplies. When the cell dies, it releases new viruses, which infect new cells.Some viruses are self-limiting, meaning they run their course as the body attacks and removes them. Others are often deadly, while others still can remain dormant in the body and reactivate under certain circumstances.The following table shows some common viruses and the diseases they cause:Treatment for viruses often aims to relieve symptoms while the immune system combats the virus. For some viruses, there are vaccinations that may prevent or reduce the severity of the infection, or antiviral medications.Bacteria are single-celled microorganisms, also known as prokaryotes. Different types of bacteria can live in almost any environment, from extreme heat to intense cold, and some can even survive in radioactive waste.While some types of bacteria can cause infections, others do not harm humans. In fact, some types of bacteria are beneficial in certain circumstances.For example, the mouth, intestines, genitals, and skin are host to various bacteria and other microbes. This ecosystem of microorganisms is known as the human microbiome, and it plays a role in preventing infections.However, some bacterial diseases can be deadly. These include:some ear infectionssinus infectionsbronchitisHowever, any type of bacterial infection can become serious if it spreads. For example, urinary tract infections can become serious if they spread to the kidneys.Antibiotics are the main treatment for bacterial infections. Over time, some strains of bacteria have evolved resistance to antibiotics, making the treatment of these infections more difficult.Learn more:What to know about antibiotic resistanceThere are millions of different types of fungi, but only several hundred cause disease in humans. They are typically multicellular parasites that can decompose and absorb organic matter using an enzyme. However, some types, such as yeasts, are single-celled.Fungi almost always reproduce by spreading single-celled spores, which can come into contact with humans via the skin, inhalation, or ingestion. Their structure is usually long and cylindrical, with small filaments branching from the main body.Similarly to bacteria, not all types of fungi are harmful to humans. Some fungi species exist naturally in the human microbiome. However, even these fungi can become opportunistic and cause infection under the right circumstances.Those with a higher risk of developing a fungal infection include people who:use antibiotics for a long timehave a weakened immune system, due, for example, to living with HIV or diabetes or receiving chemotherapy treatment have undergone a transplant, as they take medications to prevent their body from rejecting the new organSome examples of fungal infections include:Antifungal medications can treat fungal infections.While the forms of infection listed above are the main types, there are others that can affect the body. This includes parasitic infections.There are several types of parasitic infection, such as:Protozoan: Protozoa are single-celled organisms with a nucleus that can survive outside the human body. Examples of protozoan infections include malaria, giardiasis, and amebic dysentery.Helminth: Helminths are larger, multicellular organisms that tend to be visible to the naked eye when fully grown. This type of parasite includes flatworms and roundworms.Ectoparasite: Ectoparasites, such as mites, ticks, lice, and fleas, can cause infection by attaching or burrowing into the skin.The cause of an infection is whichever type of organism has entered the body. A specific virus, for example, will be the cause of a viral infection.How an infection spreads and its effects on the human body depend on the type of pathogen. They can spread in many ways, including through:skin contactthe transfer of bodily fluidsingesting contaminated food or waterinhaling airborne particles or dropletstouching an object that a person carrying the pathogen has also touchedThe symptoms of an infection, such as swelling or a runny nose, often occur as the immune system attempts to get rid of the invading organism.For example, a wound fills with pus when white blood cells rush to the site of an injury to combat foreign bacteria.The symptoms of an infection can vary widely depending on the organism responsible and the site of the infection.a runny or stuffy nosemuscle achesheadachefatiguecoughsore throatHowever, other viruses target the digestive system, reproductive system, or other parts of the body. The rabies virus, for example, targets the nervous system.Bacterial infections can be more localized if they occur in a specific part of the body or affect a cut or wound. At the site of infection, a person may have pus, heat, swelling, and pain.However, bacterial infections can also spread or become systemic, meaning they cause body-wide symptoms, such as fever, malaise, or more serious symptoms.A rash can indicate a fungal infection of the skin. However, viruses and bacteria may also cause skin conditions and rashes.There is no single method that can prevent all infections. However, people can take the following steps to reduce the risk of transmission:Wash the hands often, especially before and after preparing food and after using the bathroom.Cover the mouth and nose when coughing or sneezing.Clean high-touch areas, such as door handles, phones, and light switches, regularly.Disinfect places that may have high concentrations of bacteria, such as the kitchen and bathroom.Avoid contact with people who have infections that spread easily, such as colds and flu.Follow food safety guidelines, cooking food to a safe temperature, and throwing it away if it has expired.Keep wounds clean and covered with sterile dressings or band-aids.Brush the teeth twice daily and get checkups every 6 months.Receive any recommended vaccinations and keep them up to date.Only take antibiotics when necessary with a prescription and be sure to complete the recommended course, even if symptoms improve at an earlier stage.Reduce the risk of sexually transmitted infections (STIs) by receiving regular STI checks and using barrier methods of contraception.Avoid sharing personal items, such as toothbrushes, combs, razor blades, cutlery, and makeup brushes.Avoid touching or sharing used needles.Follow a doctors advice about traveling overseas, such as getting travel vaccinations or only drinking bottled water.Follow precautions while living with an infection to avoid passing it on to others.Following an active lifestyle, minimizing stress, and eating a balanced diet can help keep the immune system strong.There are many types of infection that can affect humans, but they all involve microorganisms entering the body and reproducing. How they do this can vary depending on the specific pathogen.Infections can be viral, bacterial, fungal, or parasitic. Many infections are common and mild, but some can be severe and life threatening. In people with weakened immune systems, even mild illness can become serious.Following safety guidelines for hygiene, wound care, food preparation, vaccination, and safer sex can help prevent infections.Infectious Diseases / Bacteria / VirusesThere is a close connection between microbes and humans. Experts believe about half of all human DNA originated from viruses that infected and embedded their nucleic acid in our ancestors egg and sperm cells.Microbes occupy all of our body surfaces, including the skin, gut, and mucous membranes. In fact, our bodies contain at least 10 times more bacterial cells than human ones, blurring the line between where microbes end and humans begin. Microbes in the human gastrointestinal tract alone comprise at least 10 trillion organisms, representing more than 1,000 species, which are thought to prevent the gut from being colonized by disease-causing organisms. Among their other beneficial roles, microbes synthesize vitamins, break down food into absorbable nutrients, and stimulate our immune systems.The vast majority of microbes establish themselves as persistent colonists, thriving in complex communities within and on our bodies. In many cases, the microbes derive benefits without harming us; in other cases, both host and microbe benefit.And though some microbes make us sick and even kill us, in the long run they have a shared interest in our survival. For these tiny invaders, a dead host is a dead end.The success of microorganisms is due to their remarkable adaptability. Through natural selection, organisms that are genetically better suited to their surroundings have more offspring and transmit their desirable traits to future generations. This process operates far more efficiently in the microbial world than in people. Humans produce a new generation every 20 years or so; bacteria do it every 20 to 30 minutes, and viruses even faster. Because they reproduce so quickly, microorganisms can assemble in enormous numbers with great variety in their communities. If their environment suddenly changes, the communitys genetic variations make it more likely that some will survive. This gives microbes a huge advantage over humans when it comes to adapting for survival.There are five major categories of infectious agents: Viruses, bacteria, fungi, protozoa, and helminths.Viruses are tiny, ranging in size from about 20 to 400 nanometers in diameter (see page 9). Billions can fit on the head of a pin. Some are rod shaped; others are round and 20 sided; and yet others have fanciful forms, with multisided heads and cylindrical tails.Viruses are simply packets of nucleic acid, either DNA or RNA, surrounded by a protein shell and sometimes fatty materials called lipids. Outside a living cell, a virus is a dormant particle, lacking the raw materials for reproduction. Only when it enters a host cell does it go into action, hijacking the cells metabolic machinery to produce copies of itself that may burst out of infected cells or simply bud off a cell membrane. This lack of self-sufficiency means that viruses cannot be cultured in artificial media for scientific research or vaccine development; they can be grown only in living cells, fertilized eggs, tissue cultures, or bacteria.Viruses are responsible for a wide range of diseases, including the common cold, measles, chicken pox, genital herpes, and influenza. Many of the emerging infectious diseases, such as AIDS and SARS, are caused by viruses.Bacteria are 10 to 100 times larger than viruses and are more self-sufficient. These single-celled organisms, generally visible under a low-powered microscope, come in three shapes: spherical (coccus), rodlike (bacillus), and curved (vibrio, spirillum, or spirochete).Most bacteria carry a single circular molecule of DNA, which encodes (or programs) the essential genes for reproduction and other cellular functions. Sometimes they carry accessory small rings of DNA, known as plasmids, that encode for specialized functions like antibiotic resistance. Unlike more complex forms of life, bacteria carry only one set of chromosomes instead of two. They reproduce by dividing into two cells, a process called binary fission. Their offspring are identical, essentially clones with the exact same genetic material. When mistakes are made during replication and a mutation occurs, it creates variety within the population that couldunder the right circumstanceslead to an enhanced ability to adapt to a changing environment. Bacteria can also acquire new genetic material from other bacteria, viruses, plants, and even yeasts. This ability means they can evolve suddenly and rapidly instead of slowly adapting.Bacteria are ancient organisms. Evidence for them exists in the fossil record from more than 3 billion years ago. They have evolved many different behaviors over a wide range of habitats, learning to adhere to cells, make paralyzing poisons and other toxins, evade or suppress our bodies defenses, and resist drugs and the immune systems antibodies. Bacterial infections are associated with diseases such as strep throat, tuberculosis, staph skin infections, and urinary tract and bloodstream infections.The other three major types of infectious agents include fungi (spore-forming organisms that range from bread mold to ringworm to deadly histoplasmosis), protozoa (such as the agents behind malaria and dysentery), and helminths (parasitic worms like those that cause trichinosis, hookworm, and schistosomiasis).A newly recognized class of infectious agentsthe prions, or proteinaceous infectious particlesconsist only of protein. Prions are thought to cause variant Creutzfeldt-Jakob disease in humans and mad cow disease in cattle. These proteins are abnormally folded and, when they come in contact with similar normal proteins, turn them into prions like themselves, setting off a chain reaction that eventually riddles the brain with holes. Prions evoke no immune response and resist heat, ultraviolet light, radiation, and sterilization, making them difficult to control.Microbes have inhabited the earth for billions of years and may be the earliest life forms on the planet. They live in every conceivable ecological nichesoil, water, air, plants, rocks, and animals. They even live in extreme environments, such as hot springs, deep ocean thermal vents, and Antarctic ice. Indeed microbes, by sheer mass, are the earths most abundant life form and are highly adaptable to external forces.Any changes that create new intersections between microbes and people pave the way for disease-causing agents to enter our species. One such change that has put us at risk is the global human population explosionfrom about 1.6 billion people in 1900 to nearly 7 billion today. Humans have cleared forests for agriculture and suburbanization, leading to closer contact with environments that may harbor novel (or newly introduced) pathogens. Through much of the worlds developing tropical regions, the massive expansion of roads and human settlements has also created transition zones filled with opportunities for contact with potential disease-causing agents.Human travel and commerce have brought other risks. Almost 2 million passengers, each a potential carrier of infection, travel daily by aircraft to international destinations. International commerce, especially in foodstuffs, adds to the global traffic of disease-causing microbes. Because the transit times of people and goods are often shorter than the incubation periods of infection, carriers of disease can arrive at their destination before the infection they harbor is detectable. International trade and travel are associated with the emergence of such infectious agents as the SARS coronavirus and West Nile virus.Changes in human demographics and behavior are linked with the emergence of infections such as AIDS and hepatitis C, through sexual activity and intravenous drug use. More broad-scale changes that raise the risk of infectious disease include the breakdown of public health systems, poverty, war, and famine.Microorganisms capable of causing diseasepathogensusually enter our bodies through the mouth, eyes, nose, or urogenital openings, or through wounds or bites that breach the skin barrier. Organisms can spreador be transmittedby several routes.Contact: Some diseases spread via direct contact with infected skin, mucous membranes, or body fluids. Diseases transmitted this way include cold sores (herpes simplex virus type 1) and sexually transmitted diseases such as AIDS. Pathogens can also be spread by indirect contact when an infected person touches a surface such as a doorknob, countertop, or faucet handle, leaving behind microbes that are then transferred to another person who touches that surface and then touches his or her eye, mouth, or nose. Droplets spread by sneezes, coughs, or simply talking can transmit disease if they come in contact with mucous membranes of the eye, mouth, or nose of another person. SARS, tuberculosis, and influenza are examples of diseases spread by airborne droplet transmission.Common vehicles: Contaminated food, water, blood, or other vehicles may spread pathogens. Microorganisms like E. coli and Salmonella enter the digestive system in this manner.Vectors: Creatures such as fleas, mites, ticks, rats, snails, and dogscalled vectorscan also transmit disease. The most common vector for human infection is the mosquito, which transmits malaria, West Nile virus, and yellow fever.Airborne transmission: Pathogens can also spread when residue from evaporated droplets or dust particles containing microorganisms are suspended in air for long periods of time. Diseases spread by airborne transmission include measles and hantavirus pulmonary syndrome.Bacteria and viruses are almost unimaginably small. Bacteria are usually measured in microns (abbreviated m, 1 micron equals 1 one-millionth of a meter), while viruses are measured in the even more miniscule unit of nanometers (abbreviated nm, 1 nanometer equals 1 one-billionth of a meter, or 1 one-thousandth of a micron). To give a sense of these measures, consider that the period at the end of this sentence is about 350 microns, or 350,000 nanometers, in diameter. If we magnify the period to one thousand times its actual size (see far left), a nearby Pseudomonas aeruginosa, the bacterium that causes hospital-acquired pneumonia and bloodstream infections, becomes visible. If, in turn, we magnify Pseudomonas 75 more times, or to 75,000 times its actual size, an adjacent influenza virus particle also becomes visible.Infection does not necessarily lead to disease. Infection occurs when viruses, bacteria, or other microbes enter your body and begin to multiply. Disease, which typically happens in a small proportion of infected people, occurs when the cells in your body are damaged as a result of infection, and signs and symptoms of an illness appear.In response to infection, your immune system springs into action. White blood cells, antibodies, and other mechanisms go to work to rid your body of the foreign invader. Indeed, many of the symptoms that make a person suffer during an infectionfever, malaise, headache, rashresult from the activities of the immune system trying to eliminate the infection from the body.Pathogenic microbes challenge the immune system in many ways. Viruses make us sick by killing cells or disrupting cell function. Our bodies often respond with fever (heat inactivates many viruses), the secretion of a chemical called interferon (which blocks viruses from reproducing), or by marshaling the immune systems antibodies and other cells to target the invader. Many bacteria make us sick the same way, but they also have other strategies at their disposal. Sometimes bacteria multiply so rapidly they crowd out host tissues and disrupt normal function. Sometimes they kill cells and tissues outright. Sometimes they make toxins that can paralyze, destroy cells metabolic machinery, or precipitate a massive immune reaction that is itself toxic.Other classes of microbes attack the body in different ways:Trichinella spiralis, the helminth that causes trichinosis, enters the body encased in cysts residing in undercooked meat. Pepsin and hydrochloric acid in our bodies help free the larvae in the cysts to enter the small intestine, where they molt, mature, and ultimately produce more larvae that pass through the intestine and into the bloodstream. At that point they are free to reach various organs. Those that reach skeletal muscle cells can survive and form new cysts, thus completing their life cycle.Histoplasma capsulatum, a fungus that transmits histoplasmosis, grows in soil contaminated with bird or bat droppings. Spores of the fungus emerge from disturbed soil and, once inhaled into the lungs, germinate and transform into budding yeast cells. In its acute phase, the disease causes coughing and flu-like symptoms. Sometimes histoplasmosis affects multiple organ systems and can be fatal unless treated.The protozoa that cause malaria, which are members of the genus Plasmodium, have complex life cycles. Sporozoites, a cell type that infects new hosts, develop in the salivary glands of Anopheles mosquitos. They leave the mosquito during a blood meal, enter the hosts liver, and multiply. Cells infected with sporozoites eventually burst, releasing another cell form, merozoites, into the bloodstream. These cells infect red blood cells and then rapidly reproduce, destroying the red blood cell hosts and releasing many new merozoites to do further damage. Most merozoites continue to reproduce in this way, but some differentiate into sexual forms (gametocytes) that are taken up by the female mosquito, thus completing the protozoan life cycle.These and many other ingenious pathways to causing disease demonstrate pathogens rich evolutionary legacy and their continued inventiveness. In the next section, we look more closely at how some of these organisms have learned to thriveoften at humans expense.

What infection control. What is infection control protection plans. What infection control procedures. What is the goal of infection prevention and control plans. What are the five basic principles for infection control. What is infection control practices. How to write an infection control plan.

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