HIV/AIDS: Transmission & Infection Control Considerations

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- [Katrinna] My name is Katrinna Matthews. I'm the Managing Editor for Social Work at conTinuED. And it is my pleasure to welcome today's session titled HIV AIDS: transmission and infection control considerations by Dr. A.U. Bankaitis. Social Work at continued.com is excited to welcome Dr. Bankaitis here today to share her knowledge and expertise with us. A.U Bankaitis is a clinical audiologist and vice president of Oaktree Products, Incorporated of st. Louis Missouri, a multiline distributor of hearing health care products. Dr. Bankaitis earned her doctorate from the University of Cincinnati in 1995, where her funded research investigated the effects of varying degrees of HIV on the auditory system. Her research interests required an in depth understanding of HIV AIDS and naturally led to a niche expertise in the area of infection control. Without further ado, I'm going to turn it over to Dr. A.U Bankaitis.

- Hi, everybody, A.U. Bankaitis here from St. Louis Missouri. And the goal of this two-hour presentation is to provide a general overview of HIV/AIDS and some key points that are pertinent to anyone providing care or services to patients. So just to give you a couple housekeeping issues here, some copyright and permissions that all images, and charts, and photos, are owned by the presenter. In addition, some disclosures where I do work for a distributor that offers infection control products, and the learning event does not focus exclusively on products, and this course is presented by Continued Social Work. Having said that, the learning outcomes for this course, after this course, participants will be able to identify at least two ways that HIV is transmitted, differentiate HIV infection from AIDS based on accepted disease classification systems, and list at least three Standard Precautions related to infection control. So in terms of our general objectives, I'll be touching on a variety of concepts pertaining to HIV/AIDS, all of which basically fall into one of three categories, including an overview of HIV and AIDS, the immune system and HIV, as well as infection control.

So let's begin with an overview of HIV/AIDS, which will include a definition as well as addressing some historical milestones, global and domestic facts, transmission and prevention. So in terms of definition, the terms HIV and AIDS, although sometimes used interchangeably, are certainly not the same thing. HIV refers to Human Immunodeficiency Virus, whereas AIDS specifically refers to Acquired Immunodeficiency Syndrome. So in other words, HIV is a microorganism or more specifically a retrovirus, whereas AIDS refers to a disease state of an individual who has been infected with HIV and is exhibiting specific disease manifestations, or has reached an objective level of immunocompromise that meets established criteria. So individuals infected with HIV do not necessarily have AIDS. On the contrary, any individual who has AIDS is HIV-positive. In terms of types, there are actually two types, there's HIV-1 and HIV-2, both are transmitted in the same manner, and for practical purposes, really differ from one another in terms of their geographic concentration.

So worldwide, the predominant virus is HIV-1, and generally when people refer to HIV without specifying the type, they're usually referring to HIV-1. The more uncommon type is HIV-2, which is concentrated mainly in West Africa and rarely found elsewhere. And not to complicate matters more, but it is appropriate to note that there are also different subtypes, or clads, or strains of HIV-1 that are classified into one of two groups, M being the Major group, O being the Outlier group, and N being the New group. And then more than 90% of HIV infections belong to the HIV-1 group N, and within the group M, there are at least nine different genetically distinct subtypes of HIV. So for purposes of this presentation, reference to HIV includes HIV-1 type virus that's classified in the major M, or the M sub group.

So let's take a look at some historical milestones. And in order to do that, we need to dial it back to the year 1981, when the first official documentation of what only later became known as AIDS was published on June 5th, 1981, in the Centers for Disease Control and Prevention's weekly bulletin called the "Morbidity and Mortality Weekly

Report", or MMWR. Now, the original reported cases involved five gay males described as suffering from Pneumocystic Carinii Pneumonia, or PCP, which is an extremely rare type of lung infection that develops only in the presence of immunosuppression. A subsequent article reported similar PCP outbreaks in gay men in New York and Los Angeles, where they also noted the additional presence of Kaposi's sarcoma, which is yet, again, a very rare type of skin cancer that's uncommon in the United States, along with the presence of Persistent Generalized Lymphadenopathy, or PGL, which is basically a persistent state of swollen lymph nodes. So this development of a variety of opportunistic infections in a group of previously healthy gay young men resulted in an increased demand for pentamidine, which is an approved antifungal for the treatment and for the prevention of PCP. And these two events caught the attention of more scientists who actually referred to this new disease as GRID, or Gay-Related Immunodeficiency. So by the summer of 1982, infections that were mimicking GRID were reported in individuals with hemophilia, which is a hereditary blood disease where the blood doesn't clot, and hemophiliacs often require numerous blood transfusions. And this actually became the game-changer because of the handful of hemophiliacs that were manifesting this GRID-type disease, it was crystal clear that this was now a virus and no longer associated with being gay, or a gay disease.

So the acronym AIDS, or Acquired Immunodeficiency Syndrome, was actually coined in July of 1982. Now, although it was suspected early on that AIDS was caused by a virus, it wasn't until 1983, that the virus was actually isolated by French researchers led by Luc Montagnier of the Pasteur Institute, who refer to it as Lymphadenopathy-Associated Virus, or LAV. Around the same time, Robert Gallo of the National Institutes of Health, or NIH, identified the same virus calling it Human T-cell Lymphotropic Virus. So this code a discovery of the same virus actually led to some political turf wars, and eventually by May of 1986, the International Committee of Viral Taxonomy named the virus Human Immunodeficiency Virus, or HIV. So now that you know some of those basics, let's look at some statistics. Now, according to the

Joint United Nations Program on HIV or AIDS, or UNAIDS, there were approximately 40 million individuals living with HIV as of the end of 2019, with the majority of cases, or 95% involving adults, and the remaining 5% involving children under the age of 15.

Since 2010, there have been on average about 2.3 million new infected cases of HIV every year. In the past year, that has declined to 1.7 million, which is actually, seems promising. However, this 1.7 million figure from 2019 is actually three times higher than what the UNAIDS target was for 2020. So there's still a lot of work to do. In terms of the United States, the CDC estimates that approximately 1.2 million people in the United States are currently living with HIV with about 40,000 newly infected every year. The most recent data projections indicate that about 14% of individuals are actually unaware of their status in the United States. So the put that in perspective, that basically amounts to one out of seven individuals is unaware of their HIV status in the United States. So now in terms of transmission and prevention, only certain fluids, including blood, semen, vaginal and rectal fluids, as well as breast milk from an infected mother, can actually transmit HIV. These fluids must come in contact with a mucous membrane or damaged tissue, or be directly injected into the bloodstream from a needle or a syringe, in order for transmission to possibly occur. The mucus membranes can be found basically inside the rectum, the vagina, the opening of the penis, and the mouth.

Now, HIV is mainly spread in one of two ways. Number one, by having unprotected sex with someone infected with HIV, or number two, by sharing needles, syringes, or other items used to PrEPare injection drugs with someone who is infected with HIV. Now, there are other ways that someone can be infected with HIV, although these types of transmissions are not as common. So for example, HIV can be passed from mother to child during pregnancy and birth, the virus can be transmitted during breastfeeding, in the past, HIV has been transmitted via blood transfusion, blood products, or organ and tissue transplants that have contaminated with HIV although the risk is extremely rare

since 1985, when appropriate screening procedures were actually implemented, it can be transmitted by being stuck with an HIV-contaminated needle, or sharp object, by being severely bitten by a person with HIV where actually there's tissue damage and extensive bleeding. So you can't just get HIV potentially from a bite, the bite has to be extreme and there has to be bleeding present. And then it can also be transmitted by contact between broken skin or mucus membranes with HIV-infected blood or bodily fluids.

So keep in mind that HIV is mainly spread by unprotected sex, as well as sharing needles or syringes. So at the end of 2018, which is the most recent year where there's actually information available, the majority of new HIV diagnoses were from unprotected sex, so 93% of the new HIV diagnosis in the United States were as a result of unprotected sex with the remaining 7% resulting from the sharing of needles and syringes. Of that 93%, the majority, or 69%, were among gay, bisexual, and other men having sex with men, and the 24% were among heterosexuals. Risk factors in terms of unprotected sex include having anal or vaginal sex without a condom, or without taking appropriate medications to prevent or treat HIV. Receptive anal sex is the riskiest type of sex for getting HIV, and it's possible for either partner, either the partner that's inserting the penis in the anus or the partner receiving the penis, to get HIV, but it is much riskier for an HIV-negative partner to be the receptive partner because the lining of the rectum is extremely thin and it can allow HIV to enter the body during anal sex. Vaginal sex also carries a risk for HIV, although it's less risky than receptive anal sex. Most women who get HIV, get it from vaginal sex, but men can also get HIV from vaginal sex.

In terms of the impact on racial and ethnic minorities, it's important to appreciate that HIV can affect anyone regardless of sexual orientation, race, ethnicity, gender, age, or geographic location. However, having said that, in the United States, there are some racial and ethnic groups that are more affected than others due to a range of social,

economical, and demographic factors like stigma, discrimination, income, education, and geographic regions. So in other words, some populations do bear a much heavier burden because they account for the larger numbers of HIV infections. So although the risk factors for HIV are the same for everyone, there are some groups that are more affected than others. According to the CDC, when you basically look at the new HIV diagnoses in the United States, based on the most up-to-date data available, the highest percentage was seen in black and African-American populations as indicated by the red portion of the pie graph. So 42% of new diagnoses in the United States included blacks and African-Americans, Hispanics and Latinos also accounted for a relatively high percentage of new HIV cases as indicated by the green portion of the pie chart at 27%, whereas Caucasians, or white individuals, in the United States accounted for 28%. And I think it's really important to put this information in context.

So to put this in a, I think, a better perspective, the gray bars basically represent the general population distribution of white, African-American, and Hispanic and Latinos in the United States. So you have 72% of the United States population is white, 13% is African-American, and 15% is Hispanic and Latino. In contrast, the red bars basically correspond to the percentage of new HIV diagnoses in the United States for those very same patient populations. So clearly, blacks and African-Americans account for a much higher proportion of new HIV diagnoses, and so while they only account for 13% of the U.S. population, they account for 42% of the new HIV-infected patient diagnoses. So in terms of prevention, HIV prevention basically involves eliminating or reducing behaviors associated with disease transmission.

So since the main ways that HIV is spread is through unprotected sex, the number of sex partners will affect HIV risk. Obviously the more partners, the more likely a partner may have HIV, so reducing the number of sexual partners is recommended. In addition, inconsistent, or consistent and correct condom use remains extremely effective in preventing HIV in addition to other sexually transmitted diseases. Latex condoms

basically provide the best protection against HIV, although there are polyurethane or polyisoprene, which is a synthetic rubber, which are also good options for individuals who have latex allergies. Prevention can also include taking what are referred to as Preexposure Prophylaxis medications, or PrEP, to basically prevent HIV infection in those instances whereby an HIV-negative individual is involved in an ongoing sexual relationship with an HIV-positive partner. Postexposure Prophylaxis, or P-E-P, or PEP, is also an option which basically this involves taking medication after having sex with somebody who is, or may be HIV-positive.

Now, the second main way that HIV can be spread, or transmitted, is through the sharing of needles or syringes. So in terms of prevention, if an individual cannot stop taking injection drugs, which includes hormones as well as steroids, ways to reduce HIV infection do include the PrEP medications, it also involves using only new needles or syringes for each injection, and making sure that the needles are never shared, as well as using sterile water for drug preparation. Now, for HIV-positive mothers that are concerned about transmitting HIV to their newborn, the risk of transmission is greatly lowered when the mother obviously undergoes a C-section, and the mother is also taking PrEP medication during pregnancy, labor, and delivery, as well as avoiding breastfeeding. Since I mentioned it, I wanna just highlight Preexposure Prophylaxis, PrEP, medications. PrEP is when people at risk for HIV end up taking a medication daily in order to lower their chances of getting HIV. For example, there have been commercials that you see now on TV for Truvada, which is an FDA-approved PrEP to help a person who is HIV-negative from getting the virus from sex, or injection drug use. Studies have shown, if taken daily, PrEP can be highly effective for preventing HIV in terms of reducing HIV transmission, 99% of the time, as well as a 75% reduced rate for injection drug users. This is something that is typically a 28-day prescription, and it is effective, but it's not something that is 100% effective. So it's still important to basically use condoms as well as other preventative measures.

In terms of postexposure prophylaxis, this involves taking an antiretroviral medication after potential exposure in order to try and prevent from being infected with HIV. These should be only used in emergency situations, and they should be taken within 72 hours. However, the sooner the better, because every hour counts. Basically this is something that involves taking a medication one to two times a day for 28 days, and once again, it's effective, but not 100% effective in eliminating the risk of getting HIV. So now that we've gotten through an overview of HIV, we're at the second objective of the presentation, where we're gonna talk about the immune system and the HIV. I feel that it's important for us to understand how the immune system is supposed to work, because you'll have a better appreciation as to how HIV attacks the immune system, and it'll help you better understand disease classification, the course of the disease, and what have you.

So let's begin with how the immune system works. So human beings are continually challenged by different microorganisms that are found throughout the environment as different bacteria, viruses, parasites, what have you, vigorously pursue a resource for growth and reproduction. And unfortunately, the human body is the perfect incubator for these microorganisms. So it's the job of the immune system in order to defend and protect us from these types of microorganisms. So how does it actually accomplish this? Well, the immune system is comprised of two major subsystems, we have the natural immune system, and we have the adaptive immune system. The natural immune system provides us with the first line of defense against any type of microorganisms, and it's represented by a variety of physical barriers, cells, and other soluble factors, that are designed to react to all microorganisms in the same way each and every time, without any regard to the structural or chemical property of that microorganism.

So because the natural immune system responds in such a nondiscriminatory fashion, it provides us with what are referred to as nonspecific immune responses. Although

relatively effective, nonspecific immune responses generated by the immune system are not foolproof, so we really rely on the adaptive immune system in order to protect us from infection. Now, the adaptive immune system involves the recognition of antigen. Antigen simply refers to any substance or molecule that is recognized by the adaptive immune system as foreign, and when the adaptive immune system recognizes something that's not supposed to be there, it calls upon specific cells to do very specific things and provides us with what are referred to as specific immune responses.

So before we dissect some of these specific immune responses, let's go over some basic anatomy. The organs of the adaptive immune system are positioned throughout the body and they include the bone marrow, the thymus, the lymph nodes, and a whole bunch of other stuff. The bone marrow basically refers to the soft material that's found within the hollow shaft of bones, whereas the thymus is this small butterfly-shaped organ that's located slightly above the heart. Now, both the bone marrow and the thymus are locations where the specialized immune cells of the adaptive immune system develop and mature. And once these immune cells fully develop and mature, they do assemble in the lymph nodes, which are located in the neck, the armpit, the abdomen, and groin regions. While they immune cells of the adaptive immune system mainly congregate in the lymph nodes, they do continually mobilize throughout the body via two interconnected systems, and those two systems include the lymphatic system, as well as your bloodstream. Now, the lymphatic system is a network of vessels that channels lymph fluid to the lymph nodes, and as the lymph fluid is channeled to the lymph nodes, the lymph nodes basically filter through everything in order to detect the presence of antigen. From there, the lymph fluid is then directed to flow towards the chest where it empties into the bloodstream, and it's eventually reabsorbed by your tissues, and then it's redirected back to start the same cycle again, that you're basically seeing happening on the slide, so over and over again. So this design basically allows for an immune response that's generated at one part of your

body to be communicated throughout its entirety. It's really a beautiful, wonderful system.

The second one is your blood basically, and it's comprised of two distinct cell populations, we basically have red blood cells, which when you look under the microscope, they look red because they have hemoglobin, and then we have leukocytes, which don't have hemoglobin, and they're basically white blood cells. There is a unique category of white blood cells, or leukocytes, that are referred to as lymphocytes. So lymphocytes are white blood cells that are really, really important because they're responsible for executing and managing all the activities of the adaptive immune system. There are several different types of lymphocytes, but the two specific ones that I'm gonna call attention to are referred to as B-cell lymphocytes and T-cell lymphocytes. So let's start with the B-cell lymphocytes. The B-cell lymphocyte develops and fully matures within the bone marrow. So bone marrow starts with the letter B, so it's easy to remember that the B-cells come from the bone marrow. Now, the job of the B-cell is basically to identify or recognize antigen. Once the B-cell recognizes antigen, it is basically responsible for mass-producing antibody and releasing the antibody throughout the body's fluids so that the antibody can neutralize and kill the antigen.

So let's take a look at this. So here we have an antigen and we've got the big, bad B-cell that comes in. The job of the B-cell is to recognize the antigen. The B-cell won't do anything until it does receive an activation signal. Once it receives the activation signal, it starts mass-producing antibody, and then that antibody is released throughout the body's fluids so that it can attach itself to the antigen in order to neutralize and kill that antigen. Another term for bodily fluid is humor. So this entire process that you saw played out on this slide is what's referred to as humoral immunity. So the B-cell is responsible for humoral immunity. So let's now talk about the second cell, which is the T-cell, all T-cells basically initiate their development in the

bone marrow, but in order for them to become fully matured, they must pass through the thymus. The thymus starts with the letter T, this is probably why they're referred to as T-cells. There are several different types of T-cells, but the one category of T-cells that we're gonna talk about today is what's referred to as the CD4 T-cell. The job of the CD4 T-cell is to detect antigen as well, and once it does, it basically attaches itself and destroys the antigen.

So to give you a visual of this, here we have our antigen, we got the CD4 T-cell comes in and because of its unique outer envelope, it attaches itself to the antigen to neutralize and kill it. So this process where the CD4 T-cell does all the work is what's referred to as cell-mediated immunity. So if we're gonna put all this together, here we have our antigen, so we got the CD4 T-cell and the B-cell come in, the CD4 T-cell attaches itself to the antigen. Meanwhile, the B-cell just sits there and does nothing because it's supposed to receive an activation signal. The activation signal actually comes from the CD4 T-cell. So the CD4 T-cell tells the B-cell, "Hey, yo, you gotta start making antibody," so the B-cell basically starts mass-producing antibody and sends it throughout the body's fluids, and this is how the CD4 T-cell and the B-cell work together in order to neutralize and kill antigen, okay? So basically they work together in order to keep us safe from infection, by providing both cell-mediated and humoral immunity, okay?

So how does HIV attack the immune system? So, HIV is an antigen and the specific target of HIV is the CD4 T-cell. So individuals infected with HIV, they have plenty of B-cells, the B-cell comes in, recognizes the presence of HIV, but won't do anything until it receives an activation signal. Meanwhile, the CD4 T-cell comes in and recognizes HIV, and whether it's not able to attach to it, whether it's not strong enough to send a signal to the B-cell, what ends up happening is HIV starts attacking and killing more and more T-cells, and basically eliminating all cell-mediated and humoral immunity. So as a result, individuals who are HIV-positive are very susceptible to

opportunistic infections, which are caused by very commonplace microorganisms that don't cause disease in individuals with intact immune systems, but can certainly cause severe, even life-threatening illnesses, to individuals who are immunocompromised. And it's gonna basically occur more often and in more severe degrees in individuals with HIV.

So since we're talking about opportunistic infections, basically, opportunistic infections are caused by a variety of different germs that are spread in a variety of different ways, including the air and body fluids, contaminated food and water, but contact transmission, particularly in this era of COVID-19, is something that I think it's important to focus on in terms of infection control for the provision of patient care, by any healthcare professional. And we're gonna touch a little bit more about this a little bit later, but I think it's important to understand that there are three types of contact transmission, we have direct, indirect, and droplet transmission. So direct transmission is when you actually touch, for example, a bodily fluid with your bare hand, that is a way to transmit disease. Indirect is when you are reusing an object that has been contaminated by blood or blood byproducts, or some other bodily fluid. And then finally we have droplet transmission, when you cough or sneeze in close proximity to somebody and basically spread disease in that way.

So when it comes to infection control, it's really important for us to control, as healthcare providers, to do a million different things. The first two, which is to control the mode as well as the route for disease transmission. So the first thing that a microorganism needs to potentially cause disease is a mode of transmission. And this basically means how does a microorganism get from point A to point B where point B is somewhere within the vicinity of the human body, okay? And this can happen in many different ways as indicated by the previous slide. It can happen by direct, indirect, as well as droplet transmission. From there, the second thing that a microorganism needs in order to potentially cause disease is a route of disease

transmission. Route of disease transmission refers to how does a microorganism gain entry into the body and basically your skin, dry chapped hands, as well as natural orifices, such as the nose, the eyes, the mouth, the ears, are very easy ways that microorganisms can gain entry into your body. After a microorganism gains entry into the body, there's like a thousand different things that need to happen in order for a potential disease state to occur. However, when we're talking about infection control and whether it's HIV or any other type of microorganism, our responsibility is to control our environment, and the first two orders of business are controlling the mode and the route of disease transmission in the environments that we work in.

So let's talk a little bit about disease classification, because I think this is important to understand. Since the primary target of HIV is the CD4 T-cell, it does make sense to categorize HIV patients as a function of absolute CD4 T-cell counts. So as our outline in the far-left column, Category One is basically designated for HIV-positive individuals who have CD4 T counts of 500 or more, and then you have a Category Two where their CD4 T-cell count is 200 to 499 cubic millimeters of blood, and then finally you have Category Three, which is less than 200. To put this in a better context, a healthy uninfected individual will have anywhere from 800 to a 1200 CD4 T-cell count per cubic millimeter of blood. So the fewer T-cells you have, the more severe the disease classification is. HIV/AIDS is also associated, as I mentioned, with a variety of different opportunistic infections and disease states. So HIV/AIDS is also categorized according to the presence of, or absence, of some disease manifestations. And we call those Category A, Category B, and Category C.

So Category A really is the asymptomatic category or somebody who has the PGL that I mentioned earlier in the beginning where the lymph nodes are a little bit swollen, but there's nothing significant going on. In contrast, you have Category C, which basically are potentially life-threatening, more severe AIDS-defining or AIDS-indicator disease states that are qualified by different bacterium or disease state like herpes simplex,

Kaposi's sarcoma, candida, what have you. And then you got this Category B, which is sort of in the middle, best way to describe it, it's neither A nor B. There are some things going on, not necessarily life-threatening, and can include anything from fever to persistent diarrhea, to shingles, what have you. So basically, to summarize, you can classify according to not only absolute CD4 T-cell count, but also according to clinical category. So on the first line that you see up here where you see the number ones, one refers to anybody who has a CD4 T-cell count of greater than 500, and then anybody who is asymptomatic is also assigned Category A.

So as a result, you end up getting nine different potential categories. So you have the A1s, the A2s, and the A3s, where A1 is an asymptomatic individual with a CD4 T-cell count of greater than 500, but they're asymptomatic, then you have A3, which is also an asymptomatic individual, but their CD4 T-cell count is less than 200. So then you got the B1s, and the C1s, and when you fill everything up, the most important takeaway is the following, anybody, regardless of their CD4 T-cell count, anybody who has an AIDS-indicator condition, as indicated by Category C, as well as anybody who has a CD4 T-cell count that falls below 200, basically meets the definition of AIDS. So someone falling into the A3, B3, C1, C2, or C3 category are considered AIDS, and then the remaining four categories are HIV-positive.

In terms of children, so this basically applies to anybody, to all adults, as well as anybody six years through 18 years, who are within the pediatric population, technically. For children or infants, toddlers, it gets a little bit more complicated for a couple of reasons. Number one, mothers who are HIV-positive have antibodies, so basically all infants that are born to HIV-positive mothers are gonna test positive for HIV antibodies at birth, and anywhere up to 15 to 18 months of age, despite the fact that only 15% of those infants will actually be truly infected. In addition, the normal CD4 T-cell counts in infants is actually higher than adults, and it differs between whether you're less than a year old, between the ages of one and five, or six years or

older. So basically what you see here is that the absolute CD4 T-cell counts in normal infants all the way up to the ages of six years of age, varies. So as a result, basically the classification for children is a little bit different, and basically they do classify children according to ABC, which is mild, moderate to severe symptoms, as well as an N group, which is no sign or symptoms, and then they also sub-categorize these children according to their absolute CD4 T-cell counts.

So with children under the age of six, the classification system is slightly different where you have 12 different categories, or anybody meeting the C category, or the Three category, is basically gonna be considered having AIDS. So, let's talk a little bit about the course of disease, the disease course itself. HIV does have an insidious nature in causing disease. The initial phase of the infection is visually undetectable. Several weeks after exposure, up to 70% of people experience flu-like symptoms that can range anywhere from fever, night sweats, weight loss, diarrhea, vomiting, what have you. Otherwise, from the initial infection to the actual onset of symptoms, the infected person may appear healthy. So this is what's referred to as the incubation period. And although it varies, the average incubation period, so from the time of initial infection to the onset of actual disease symptoms, it is on average, about 10 years. HIV and AIDS is associated with the continuum of both peripheral and central nervous system disease manifestations in a high percentage of patients, particularly later in the course of the disease. And some of these opportunistic infections that I recently mentioned, they do occur more often, and it's about 75%, compared to the non HIV-infected individuals, these opportunistic infections and other central nervous and peripheral nervous disease symptoms, occur at a rate of 75% higher than the normal population.

So there are actually three main stages of HIV infection, we have basically acute, chronic, and then we have AIDS, this is a different way to look at it. And acute HIV infection is the earliest stage of HIV infection, and it generally develops two to four

weeks post infection, and this is where you basically, an individual would experience the flu-like symptoms, fever, headache, rash, what have you. During this time, HIV can multiply very rapidly, and there's high levels found in the blood, so an individual is at increased risk of transmitting the disease. The middle stage is what's referred to, or the second stage is what's referred to as chronic. This is basically also referred to as the asymptomatic HIV stage, and during this stage, HIV does continue to multiply in the blood, but at very low levels. People with chronic HIV infection may not have any HIV-related symptoms. Without Antiretroviral Therapy, or ART, basically, chronic HIV infection, usually advances to AIDS within 10 years, but with antiretroviral therapy, basically, individuals can go on for several decades and be perfectly happy and healthy. And this is where it's really important for individuals to get the treatment that they need, because there've been some incredible advances made in medications to prolong the health and quality of life of individuals. When they are also taking antiretroviral therapy, they're essentially at no risk of transmission, the risk of transmitting the disease is significantly reduced with PEP medications, I'm sorry, not with PEP medications, but with antiretroviral medications.

And then finally we have the third stage, which is AIDS. It's the final, most severe stage of HIV infection. Because HIV has severely damaged the immune system, it's really difficult for them to fight off opportunistic infections. This is for individuals where their CD4 T-cell count is less than 200 cubic millimeters per blood, so that the CD4 T-cells are not effective in providing any form of immunity. So they are susceptible to developing certain opportunistic infections. There's an extremely high viral load, and they're able to transmit the disease very easily. So those are the three basically stages of HIV infection disease states. In terms of, there's a couple of other comments that I would like to make, HIV can either directly or indirectly attack the system. So there's certain things that happen as a result of HIV actually damaging the cell tissue, releasing certain toxins, and changing a cell's metabolism, that results in various disease states.

But there are also some indirect effects that occur, not only as a result of the opportunistic infections, but also something referred to as ototoxicity.

So let's talk a little bit more about opportunistic infections. According to hiv.gov, some of the most common opportunistic infections in people that are living with HIV in the United States include Herpes Simplex Virus, or HSV-1 infection, which is a viral infection that can cause sores on the lips, as well as the mouth, there's salmonella infection, which is a bacterial infection that can affect the intestines, there's candida or thrush, which is a fungal infection of the mouth, the bronchi, the trachea, the lungs, the esophagus, as well as the vagina, and then there's toxoplasmosis, which is a parasitic infection that can affect the brain. If you want a more complete list, you can basically go to the CDC, they have a complete list of opportunistic infections that are common, including like the pneumonias, as well as cancer, invasive cervical cancer, Kaposi sarcoma, which I mentioned before can be life-threatening particularly when it affects the internal organs, as well as lymphoma are different types of cancers that individuals develop. Individuals with later stages of HIV or AIDS are also more susceptible to infections of the brain, including like encephalitis from cytomegalovirus or encephalopathy, or leukoencephalopathy, which includes a disease state of the brain, as well as the spinal cord.

In addition, several different parasites can cause a diarrheal disease where they have persistent diarrhea for months. Ototoxicity is also very common in patients with HIV. So in the absence of a vaccine, the medical management of HIV relies on a lot of pharmacological interventions that are FDA-approved and experimental. A lot of these patients will be taking medications for different opportunistic infections, and many of these medications have ototoxic side effects, meaning they affect the ears, and they can cause sensorineural hearing loss, they can cause tinnitus, which is ringing in the ear, and they can cause a lot of different balance and vestibular issues. And I bring this up from the perspective that according to the American Academy of Audiology, there

are about 15% of adults in the United States, or nearly 40 million, that report some trouble hearing. And the HIV-infected population has a higher incidence of hearing loss as a result of ototoxicity, as well as the direct effects of HIV on the auditory system. And I think what's important to understand is that hearing loss is associated with the simultaneous presence of some other chronic diseases or conditions, including cognitive decline, particularly in older adults, there are cardiovascular risk factors and diseases that are associated with greater hearing loss and a faster rate of hearing deterioration. Hearing loss occurs in as many as 80% of individuals who are treated with cisplatin for different kinds of cancer, and there's also an increased risk for depression in adults with hearing loss. So because the HIV-infected population is susceptible to hearing loss, it's important to be cognizant of some of these comorbidities, particularly the cognitive decline and depression.

So now that we've discussed disease course, the next thing to tackle is tests that are used to diagnose HIV. There are three types of HIV diagnostic tests, there's the antibody test, the antigen antibody test, and the nucleic acid or RNA test. Antibody tests detect antibody and not the virus itself, whereas the antigen and the nucleic acid, or RNA test, specifically detect HIV. So an initial HIV tests will either be an antibody or an antigen antibody test. In most cases, the Enzyme Immunoassay, or EIA, is the most common screening test used to look for antibodies to HIV. Another test is also called the rapid test. In either case, blood is collected and it's sent and analyzed, and it basically just takes anywhere from 10 to 20 minutes, if you're doing the rapid test, or up to two weeks, if you're doing the EIA test.

What do the actual results mean? If you get a negative result, or even a positive result, there's a couple of things that you need to keep in mind. A negative result may not always be accurate, and it basically depends on when you may have been exposed and when you took the screening test. So if a negative test comes back, it does take some time for a seroconversion to occur, so this is when your body begins to produce

antibodies to HIV and basically that can take anywhere from two weeks to six months. So basically, oftentimes if you have a negative test, you will be retesting in three months. If you're a healthcare practitioner that's concerned about occupational exposure, that might go to six months, just to make sure that the negative test continues to come out negative. In terms of a positive test, basically because you've received a screening test, a positive test will result in confirming the positive screening test with something that's a little bit more of substantial, oftentimes referred to as the Western Blot test. And if the Western Blot test comes back positive, that's when basically you are officially considered HIV-positive.

In terms of some testing and legal issues that I think that are important just to point out, the CDC does advocate that in all healthcare settings, screening for HIV infection should be performed routinely on all patients from starting at the age of 13, through 64 years of age. Healthcare providers are encouraged to initiate screening unless the prevalence of underdiagnosed HIV infection in the patient population that they serve is less than like 0.1%. It's important to understand that screening should be voluntary and undertaken only with the patient's knowledge and understanding that the HIV is planned. Patients should be involved, or should be informed, either orally or in writing that an HIV test is gonna be performed, unless they decline. So this is the whole opt-out screening. So basically the movement now is isn't to ask for permission, it's basically, well, it's not to ask for permission, it isn't to ask if it's something that they wanna do, it's more the healthcare practitioner saying, "We are testing you for HIV," and the patient basically has to opt out in order for that testing not to occur. So with such notification, consent for HIV screening should be incorporated as part of the patient's general informed consent for medical care on the same basis as any type of screening or diagnostic tests. So a separate consent form for HIV is not required or recommended. If the patient declines the HIV test, this decision is then documented in the medical records, and then basically anybody who's at a high risk is screened annually and prevention counseling should not be required with HIV diagnostic testing,

or as part of the screening. Same applies for pregnant women, basically all pregnant women in the United States should be screened for HIV, and basically it should be part of the routine panel. It is voluntary, so HIV screening after patient-notified testing, will be performed unless the patient declines, which is, they're opting out, and separate written consent is not required, and there should be repeat screening in the third trimester in certain jurisdictions, or in certain high-risk women. So that's basically just the general thing about testing to diagnose HIV.

And the last part is the antiretroviral drug treatment, just a few comments about that. Drugs prescribed to treat HIV and AIDS are referred to as antiretroviral drugs, because they are designed to interfere with some aspect as to how HIV causes the disease. To date, there are more than a dozen antiretroviral drugs that are approved by the FDA in order to treat HIV and AIDS, although most are probably prescribed in what's referred to as a cocktail where there's a combination of at least two of the antiretroviral drugs prescribed. When someone is prescribed two or more antiretroviral medications, this is what's referred to as antiretroviral therapy. And there are basically six general categories of antiretroviral drugs, because they're all designed to do somewhat different things, but some of the more common ones are referred to as integrase inhibitors, and those are basically designed to stop the action of the enzyme that HIV uses in order to actually infect the cell. There's also ones that are called reverse transcriptase inhibitors, where basically these drugs are designed to interrupt the HIV life cycle so that HIV cannot copy itself. So there's a lot of different medications out there, and as I mentioned before, many of which have made tremendous advances and have been effective in prolonging the lives of individuals infected with HIV, as long as they are on medication, and they're taking the medication as prescribed.

So now we get to the final part, which is basically a discussion on infection control because HIV was basically the catalyst of change when it came to infection control. So I would like to spend some time to discuss Standard Precautions. Given the COVID-19

pandemic, there are certain things that are relevant for us to discuss as well and to also give you some practical application takeaways in the different work environments. So let's begin with Standard Precautions. The discovery of HIV had a tremendous impact on how healthcare services were to be delivered, which basically created a domino effect of policies and procedures that were put in place. During the 1980s, and during the very early 1990s, there were a lot of different agencies, and governing bodies and expert panels, including the CDC, and OSHA, that were enacting different types of Universal Precautions, Body Substance Isolation, Standard Precautions, and it can get a little bit confusing.

So I wanna give you a little bit of a historical overview of infection control in terms of CDC's response to HIV. So in 1983, when HIV was first isolated, but it wasn't named, the CDC did publish some guidelines about calling for some blood and body fluid precautions that required the use of some personal active equipment like gloves, masks, disinfecting surfaces, as a part of just basic infection control. But in 1985, in direct response to HIV, the CDC did expand the blood and bodily fluid precautions and specifically provided healthcare practitioners with guidelines on what they need to be doing and wearing when they are providing patient care services to individuals infected with HIV and how to handle other blood and bodily fluids to prevent HIV transmission. Well, about two years later, the CDC basically recommended that all blood and bodily fluid precautions be applied to all patients regardless of their HIV status, which resulted in what was referred to as Universal Precautions. There was something else that was called Body Substance Isolation, which was very similar to Universal Precautions, but it just up-ticked a little bit more where beyond just blood and bodily fluids, other substances from the body that were soft substances were to be treated as if they were potentially infectious.

At the end of the day, by 1996, all of this was integrated together to be referred to as what we currently know as Standard Precautions. And Standard Precautions represent

the best of Universal Precautions and bodily substance isolation. And they represent the minimum precautions applicable to all patients in any type of setting. They've been around since 1996, and they outline things such as personal protective equipment, hand hygiene, cleaning and disinfecting, safe injection practices, cough etiquette, what have you. So when it comes to infection control, regardless of your work environment, even with the Standard Precautions that are available, infection control is all about the conscious management of your own clinical environment for the very specific purposes of minimizing or eliminating the potential spread of disease.

So it takes some forethought and some time to think through what it is that you're doing in order to potentially eliminate or minimize the spread of disease, whether it's spreading it to your patients, to your staff, or to yourself. So, because it requires a conscious management, and because we're in this COVID pandemic, there are some key COVID-19 precautions that are important to talk about, particularly when we're discussing patients who are HIV-positive, as well as other immunocompromised patients. So a little bit about the coronavirus disease, in February of 2020 of this year, the World Health Organization announced the official name of the disease, coronavirus disease, as COVID-19, whereas the CO stands for Corona, the VI is for Virus, and the D is for Disease, and this disease is caused by a coronavirus called the SARS-CoV-2, and it's a respiratory virus that is transmitted from person to person through respiratory droplets when an individual with COVID-19 is in close proximity to other individuals, and then that person who's infected ends up coughing or sneezing, or talking loudly. This is why the CDC has advised the public to practice social distancing by maintaining a distance of at least six feet, which is about two arm lengths from one another. You also might be able to get it by touching a surface or object that has virus on it, and then, immediately touching your mouth, nose, or eyes, which is why the CDC has advised the public to wash their hands often and to do so after coughing, and sneezing, and prior to touching their own eyes and mouth.

However, it's really important to appreciate the fact that at this time, that the main mode of transmission, per the CDC, is as a result of these respiratory droplets that get expelled into the air when somebody coughs or sneezes in very close proximity to individuals. According to the CDC, nearly half of people in the United States who are diagnosed with HIV are aged 50 or more, or older, and while there is still a lot more to learn about COVID-19 based on the limited data, the CDC does believe that people with HIV who are on effective HIV treatment have the same risk for COVID-19 as people who do not have HIV. Having said that, older adults and individuals with any type of immunocompromise or underlying medical conditions, may be at increased risk for severe illness. So because there is no current vaccine available to prevent COVID-19, it does make sense to review Standard Precautions, but really focus on the ones that the CDC has been emphasizing, not only to healthcare practitioners, but to the public in general, as a result of COVID-19. So basically, the CDC has been focusing on personal barriers, specifically masks, as well as hand hygiene, as well as disinfecting.

So let's talk a little bit about masks. When I talk to my audiologists, as well as other healthcare providers, I do tell them that you, your staff, students, and patients, should basically be wearing a mask, some form of mask, regardless of what type of procedure you're being involved in, because what makes COVID-19 unique is how quickly and easily the virus spreads, which is evident by this pandemic of 2020. And that has direct implications on infection control policies and procedures, at least in the interim, if not for the long haul. So because COVID-19 is basically transmitted from person to person via respiratory droplets when somebody coughs or sneezes, or what have you, it's extremely critical for providers, healthcare professionals, to wear masks and to have their staff wear masks, and to require their patients basically to wear masks.
Now, there's several different kinds of masks that are available, and I like to clarify some of these things. A basic medical mask is the three-ply mask that you see here, and what you see is intended for healthcare practitioners and providers. You also have

what are called K-N95, or 95 masks. These are specifically designated for aerosol-generating procedures that are occurring in the hospital, or you see other individuals occupationally wear them where there's a lot of dust being generated in the air, and it's really important to be wearing a mask that is better at minimizing some of the smaller particles coming in. So masks are something that should be worn.

Hand sanitizers are extremely important. Hand hygiene is the single most important thing that anybody can do to help minimize the spread of disease, and according to the CDC, in healthcare facilities, whether it's a hospital or a clinic, if you are providing any kind of services to patients, as a provider, the preferred method of hand hygiene involves the use of alcohol-based hand sanitizers. And you wanna make sure that the product that you're using either has an active ingredient of 60% ethanol, or 70% isopropanol, so it's important to read instructions. Hand hygiene for providers and healthcare practitioners should happen often, it should happen before a patient appointment, during the patient appointment is needed, immediately after glove removal, if you choose to use glove, after a patient appointment, after coughing, sneezing, or blowing your nose, before eating, or before touching your face, so hand hygiene must occur often.

The third thing that the CDC has focused on has been disinfection, or disinfecting. And to disinfect something means to kill germs. And what's important in a healthcare or clinical setting, per the CDC, as well as the EPA, it's important to use an EPA-registered product, and if you're in a clinical patient care setting, you wanna make sure that that product is hospital-grade. Hospital-grade EPA-registered disinfectants have a very broad spectrum of kill for those microorganisms that are commonly found in those types of settings. And it's sometimes difficult to keep up with anything that's EPA-registered or hospital-grade, so at Oaktree Products, we do have a list of qualified disinfectants that we sell that have been deemed effective for COVID-19. I do wanna clarify a couple things, the EPA, early on in May of 2020, came out with something

that's called List N. This was their list of disinfectants that the EPA recognized as qualified effective against COVID-19. There currently is no test available to determine whether or not a disinfectant can actually kill COVID-19. The EPA basically based it on product performance in killing other types of coronaviruses.

So the CDC in May clarified saying, "Look, if you are a healthcare professional, or working with patients in a clinic or a setting where patient care and services is provided, as long as you're using a disinfectant that is hospital-grade and EPA-registered, you're fine." And just note, many of these hospital-grade disinfectants, you're not gonna be able to find over the counter, those are household disinfectants. So for providers, the key is EPA-registered and hospital-grade. And if you go to the Oaktree Products website, there is a COVID-19 resource section, and basically what we have listed is any disinfectant that is considered qualified against COVID-19, because that seems to be something that providers are looking to supply their clinics with at this point. In terms of what do you need to disinfect and how, touch surfaces need to be disinfected. So these are all horizontal services that people can come in contact with, mainly within the patient care rooms, including tables or countertops, door knobs, as well as anything else that multiple people can touch. Those kinds of touch surfaces should be disinfected often and immediately after patient appointments. Splash surfaces are the same thing where any surface where somebody can potentially cough or sneeze on, those need to be cleaned, and then disinfected. In terms of how to disinfect, it's extremely important to actually read the instructions of the product that you're using.

The first thing you need to do is clean the area that you wanna disinfect. Cleaning is an important precursor to disinfecting, and cleaning can be simple as taking a paper towel and wiping that surface, or it could be using soap and water, depending on what it is you're disinfecting, and then you need to apply the product, and you need to leave the product on that surface and leave it wet for a specific amount of time, which is referred

to as dwell time. So when you read the instructions on a disinfectant, it will tell you, "This has to remain on a surface for one minute, or two minutes, or three minutes, to kill X, Y, and Z." So again, it's important to read the instructions of your EPA-registered hospital-grade disinfectants, and make sure that that product is wet on the specific surfaces that you need to disinfect. So now we get to the part where I do wanna talk about practical application in work environments, because there's a lot of information out there, and I think it's important to touch upon some of these as good takeaways. In this, I know that this isn't a presentation on COVID-19, but anytime that there's a new disease that gets introduced, there's lots of things that we need to think about, not only in terms of managing our own clinical environment, but considerations of our patients based on the patient populations that we serve.

So because of this era of the need to social distance in order to get the COVID-19 pandemic under control, and because many of our patients may be immunocompromised and susceptible, some practical things to consider. And I know that it depends on a lot of state licensure laws and what have you, but if you are able to, consider and plan for some sort of telemedicine appointments, as you can. There's been a lot of interim flexibility provided in terms of what certain providers can bill for and what certain formats are acceptable for telemedicine, and that's something that's important to explore. Know how to contact the health department within your state and stay connected with your health department. Your state's health department, there's a directory that you can look up if you're not sure how to contact the specific health department within your state. They are a very good source to rely on in terms of the newest information on COVID-19 as well as some of the newest information, in terms of interim flexibilities related to infection control. They are a good source of information, and it's important to stay in touch with them, as well as any other organizational or local public health authority, so that you are most prepared when it comes to opening up your clinic and keeping it open. And then finally, there's assess and restock infection control supplies now, and on a regular basis. And this sounds very simple, but

there have been some challenges because there have been product shortages that as a result of COVID-19, which has made it very difficult to find things like hand degermer, or masks, or gloves, what have you. So it's really important to know some of the things that you can do in the event that you experience some product shortages.

So I do wanna talk a little bit more about masks. The CDC and the FDA have basically identified the use of respirators. So the N95, or KN95 masks are also referred to as respirators. And what the CDC and FDA did, in response to basically a shortage of masks, they have identified some respirators that can come from other countries that are acceptable for use in the United States, at least in the interim. So right here on the right-hand side, you have the N95 mask, and then on the left hand-side, you have the KN95 mask. The difference between these two masks is the one that you see on the right, or the N95 mask, is produced in the United States, and it meets NIOSH requirements. The KN95 masks that you see on the left is actually produced in China. And out of concern of some counterfeit masks that are coming in from different parts of the country, per the CDC and the FDA, a KN95 mask, which is made in China, as long as it contains the label GB2626-2006, or dash 2009, that indicates that that mask has basically met the same standards as the U.S. standards appropriate for the N95 mask. So if you are in need of an N95 mask and you are unable to source it, and the availability of a KN95 mask comes into play, it's really important to make sure that the KN95 mask meets the performance criteria of the GB2626-2006, or dash 2009. And again, these are Chinese standards, but according to the CDC and the FDA, as long as it meets the GB2626 standard, they are consistent with U.S. standards, and in the interim, you're able to use them as if they were N95 masks.

Because of the shortages of masks, there's also been some interesting interim flexibility when it comes to the reusability, reusing masks. Most masks are basically designed as disposable, so it's one time, one time use only, you use it with one patient, after you're done, you basically throw it away. But the CDC and the FDA have granted

what's called extended use as well as extended limited reuse, and it's really important to understand what these things mean. So extended use, as well as limited reuse, in both situations, you are able to wear the same disposable mask with multiple patients. The difference is with extended use, you put on the mask and you keep it on, okay, and once you take it off, you dispose of it. With extended reuse, you put on the mask and you take it off, but then you put it back on the same mask with a different patient and take it off, up to a certain number of times. So with extended use, you wear it for an extended period of time throughout the day, across several different patients, but once you remove it, you have to dispose of it. Whereas limited reuse is you can put it on and then take it off in between patients, and continue to put it on and take it off between patients until it's time for you to dispose of it. So per the CDC and the FDA, if the mask that you are wearing ties in the back, or if it's an N95 or a KN95 mask, it is appropriate for extended use only. So in those situations, you would put the mask on, leave it on, and then once you take it off, whether it's halfway through the day, or at the end of the day, you have to dispose of it. Extended reuse is appropriate for any kind of cloth mask or even a ClearMask that has either ear or head loops. So in other words, when you look at this slide, extended use is intended for the respirator masks or any mask that's designed to tie in the back, and then the extended or limited reuse is intended for anything that has an ear loop or anything that has a loop that basically loops in the back of your head, that you don't have to tie.

Since we're talking about masks, I think it's really important to take a moment to understand that the use of masks, particularly the cloth ones, everything where you can't see the face, it does have a detrimental effect on speech understanding, even in individuals who have normal hearing. So when you think about speech sounds, speech sounds are comprised of different frequencies, that range from low, to mid, to high. So for example, all the vowels, the A, E, I, O, U, those are very low-frequency sounds, versus a lot of the consonants are mid-to-high-frequency sounds. The consonants, the P, the G, the sh, the K, those are extremely critical in providing us with speech

understanding. We need those consonants in order to understand speech, we need the vowels in order to hear speech. So the vowels, which are low-frequency, are really loud, A, E, I, O, U, and then the consonants are high-to-mid frequencies that are pretty soft, like the P, K, T, sh. So while the vowels give us a lot of the loudness of speech so that we can hear, it's the consonants that are responsible for providing us with the ability to understand speech. And the reason that I bring this up is what you see in this shaded area is the most critical area, or the most critical frequencies that we need to hear in order to understand speech.

But unfortunately, when you put a mask on, masks are considered low-pass filters, and what that means in English is, it lets you hear the low frequencies easily, but it starts making it difficult for you to hear the higher frequencies. And this actually creates a communication dilemma, where when you try to talk to somebody, not only who has normal hearing, but somebody who has hearing loss, which is something commonly found in individuals who are HIV-positive and AIDS, you start having difficulty communicating with your patients. So here are some important tips to keep in mind, when you are wearing a mask, it's important to speak slowly, it's really important to reduce any kind of ambient noise, background noise, and to make sure that you're actually have the patient's attention so that they are listening. If they are a hearing-aid wearer, you wanna confirm that they're actually wearing the hearing aid, and if they have them with them, ask 'em to put them in. If they don't have a hearing aid, or if they're having difficulty hearing, you might wanna consider having a portable hearing amplifier available. This is basically something that, it comes with a microphone with headphones, and you talk into the microphone, and the patient wears the headphones, and it's much easier for them to be able to hear if they're having difficulty while you're wearing a mask. If the patient doesn't understand something, be sure to rephrase the remarks. Please do not shout, overemphasize, or repeat the same thing over and over again, thinking that perhaps they're gonna be able to hear it. And it's really important

that everybody take turns listening and take turns talking. It's really difficult to talk over each other and hear in particular, when somebody is wearing masks.

Now, having said that, I think the other thing that's important to understand is there are some things that are currently available that can help facilitate communication by allowing the patient to visually see your entire face. So, for example, face shields are available, and per the CDC, when masks are not available, face shields are an appropriate alternative, and perfectly acceptable to be worn, and effective in minimizing the spread of COVID-19, as long as the face shield extends below the chin and on either side of the face. When you're wearing the face shield, there's no need to have to wear a cloth-covering mask, unless you're performing some sort of aerosol-generating procedure. So if you're in a situation where you have to see patients, or counsel patients, and masks are required, a face shield may be a suitable alternative for you to be able to wear so that the patient can actually take full advantage of seeing your face, seeing your lips, seeing the expressions, which will certainly help facilitate communication. In addition, there have been several masks that have been specifically designed with clear panels in order to facilitate communication, that are available as well.

There's something called the communicator mask, it is a disposable mask, and it does have a little cutout panel, which was designed to allow somebody to see lips. Although I will say we have been having difficulty sourcing this communicator mask 'cause it's been in pretty high demand, but it is called the communicator mask, and it is something that is available. There is also something that's called the ClearMask, and instead of ear loops, it actually has head loops, and it is also packaged as disposable. However, the CDC and the FDA have issued some interim flexibility in terms of extended reuse of disposable masks, such as the ClearMask. What makes this ClearMask unique, and extremely effective, is that that clear panel is actually comprised of an anti-fogging material. So with the communicator mask, if you breathe

heavy, it can fog up that little window, but on this ClearMask, it basically is designed in such a way where it is anti-fog. I have also worn it, and the way that it's rests on your head, it does leave a little bit of airspace that makes it more comfortable and easier to breathe in, if you are actually the wearer. There is also something called the Smile Mask. This is a reusable cloth mask that has the ear loops as well, and has a bigger window than the Communicator Mask window. But these are things for you to consider, particularly if you are providing services to patients who rely on being able to hear and see what you need to tell them during this pandemic situation.

In terms of hand sanitizers, unfortunately, there have been some supply disruptions in hand sanitizers, and these have been very difficult to come by. And even though the CDC recommends no rinse hand degermers or alcohol-based degermers, as the preferred method of hand hygiene, for healthcare practitioners, it's also important to recognize that in the absence of these things, plain soap and water is also recognized by the CDC as a perfectly acceptable way to perform hand hygiene in the healthcare facility. And you don't have to worry so much about whether the soap is anti-microbial or not, but plain soap, liquid soap, not bar soap, in any clinical or healthcare facility, is a perfectly acceptable option for hand hygiene when the non-alcohol-based degermers are not available. And then finally, a couple of things about disinfectants, again, there's been a supply disruption in EPA-registered hospital-grade disinfectants, particularly those that come in a canister. Probably the most popular form factor is the use of wipes that come in a canister, and since March, they have been very difficult to source, and once you do get 'em, it's only in limited numbers and vendors are very inconsistent, or manufacturers are very inconsistent in terms of supplying these right now, and it's probably gonna last for the rest of the year.

So what's important to understand is disinfectants do come in many forms. There are things that are individually wrapped, there are things that come in spray bottles, there are things that come in gallon containers that you, once you receive it, you can pour it

in a spray bottle. So if you are looking for and cannot find your favorite disinfectant, or your favorite form of disinfectant, please know that there are disinfectants available in other forms that are EPA-registered hospital-grade, and it's really critical for you to have these products on hand in order for your clinics to open and to remain open. So that was all intended for the healthcare practitioner. I do wanna talk a little bit about COVID-19 and HIV patients, and things for you to know, and perhaps to let your patients know, that are important. So it's really important for those infected, who are HIV-positive whether they are asymptomatic, or what have you, to avoid close contact with individuals, both inside of the home and outside of the home.

So inside of the home, it's avoid contact with people who are sick, if possible, maintaining six feet between the person who is sick, as well as the other household members. In terms of outside of the home, put six feet of distance between yourself and people who do not live in your household, remembering that some people without symptoms may be able to spread COVID-19 very easily. Six feet is about two arms length from other people, so that's important to reiterate to patients. In terms of masks, HIV-positive patients should cover their mouth and cover their nose. The mask is meant to protect other people in case you are infected, understanding, once again, that asymptomatic people can transmit the virus. Per the CDC, everyone should wear a mask in a public setting and when around individuals who do not live in your household, especially when social distancing is difficult to maintain. For the general public, masks meant for healthcare workers should not be worn because like the surgical masks, and the N95 respirator masks are undergoing critical shortages and they should be reserved for healthcare workers and for first responders. The important thing to reiterate to patients as well is that a mask is not a substitute for social distancing. So it's really important to stay safe by masking up.

In terms of hand hygiene, it's important to wash hands and to wash hands often. For the general public and for your HIV-positive patients, washing hands with soap and

water for at least 20 seconds, is really important. If soap and water are not readily available, using a hand sanitizer that contains 60% or 70% of the active ingredients that I mentioned earlier, is acceptable too. So understand hand hygiene for the general public, soap and water is recommended, hand hygiene for the healthcare practitioner, it's the alcohol-based products, hand degermers, that are the preferred method of hand hygiene. So anyway, use soap and water for at least 20 seconds. It's really important to do so after being in a public place, after blowing your own nose, coughing or sneezing, before eating, before prepping food, before touching your face, after using the restroom, after you handle your mask, after changing a diaper, after you touch your mask, after for caring for someone who is sick, and after touching any type of animal, including your pets. So this may seem like a very long list, but at the end of the day, washing hands is one of the single most important things anyone can do in order to help minimize the spread of disease.

So hands should be washed, and they should be washed often, for 20 seconds. One of the things that you can consider is the CDC has some really nice resources available for free posters and brochures about their Clean Hands Count Campaign. These are things that you can order at no charge, there're big posters, little posters, as well as brochures, something that you can provide your patients, put in your office. This is something that we really should be promoting as well. In addition, it's very important for people to know that they need to cover their coughs and sneezes. Always cover the mouth and nose with tissue when you cough or sneeze, or use the inside of your elbow. If you're using a tissue, you need to throw the tissue out immediately in the trash, and then you immediately need to commence with hand hygiene, with soap and water for at least 20 seconds, if you're the general public. If soap and water are not available, you can clean your hands with hand sanitizers that contains at least 60% of the alcohols that I had listed, or the 70% isopropyl.

Now, in terms of cleaning and disinfecting, it's really important for our patients to clean and disinfect frequently touched surfaces daily. So this basically includes tables, door knobs, light switches, countertops, desks, phones, keyboards, what have you. If surfaces are really dirty, clean them first with some sort of detergent, or soap and water, prior to disinfection, then use a household EPA-registered disinfectant that could be readily found anywhere over the counter. So again, when you are working in your work environment, it's important to have an EPA-registered, hospital-grade disinfectant, for the general public and our patients when they are at home, it's important for them to have a EPA-registered household disinfectant. There're different spectrums of kill, and household disinfectants are appropriate for the household, hospital for patient care settings.

In addition, it's really important for HIV-positive patients to be alert for any types of symptoms, particularly related to COVID-19. They need to watch for a fever, cough, shortness of breath, or any other symptoms such as unexplained fatigue, new muscle or body aches that are unexplained, headache, new loss of taste, or smell, new nausea, vomiting, or diarrhea. This isn't a comprehensive list of possible symptoms, but it's really important to refer to the CDC for updates as more information is learned about COVID-19. But for HIV-positive patients, if symptoms develop, it's really important for them to not only keep track of the symptoms, but actually to contact their healthcare provider. And if they develop anything like trouble breathing, persistent chest pain, or pressure, new confusion, bluish lips, or face, this constitutes basically an emergency, and they need to either call 911, or call ahead to the local emergency facility, notifying the operator that they are seeking care for somebody who has, or may have COVID-19.

So there was a lot of information that we covered in these two hours, and I just wanna summarize the three basic general things that we talked about today as follows. So, it's important to know HIV and AIDS, while used interchangeably, they do not mean the

same thing. HIV is a retrovirus that causes AIDS, and just because you are HIV-positive doesn't mean you have AIDS. AIDS is more of an endstage disease, and individuals who have AIDS indicator conditions, or those who have CD4 T-cell counts that are less than 200, those patients are considered to have AIDS, whereas other individuals fall into the HIV-positive status. It's also important to recognize that there are ethnic and racial disproportions in terms of new HIV cases. Blacks and African-Americans account for 42% of new HIV cases, despite the fact that they only comprise 13% of the U.S. population, Latinos and Hispanics also, they account for 27% of new cases despite the fact that they make up about 15% of the U.S. population at this time. So certain ethnic groups do bear a greater burden due to a variety of reasons, and it's important to recognize that. In terms of how HIV attacks the immune system, the target of HIV is the CD4 T-cell. The CD4 T-cell is that white blood cell that lymphocyte that is critical in providing us with cell-mediated and humoral immunity. This is what allows our body to fight off infections. And when any of those aspects are compromised, patients become extremely susceptible to microorganisms that are readily found throughout the environment, and this is where they are susceptible to opportunistic infections that can be life-threatening.

And this is where it becomes extremely important for us as healthcare practitioners, to make sure we have the correct infection control policies and procedures in place. Infection control is not about protecting ourselves or our patients from getting HIV, it's not about that, it's actually about keeping ourselves, our staff, and our patients safe from every type of microorganism that, given the perfect storm, can cause disease states in individuals. So it's really important to appreciate with HIV-positive patients, even if they're asymptomatic, know they are susceptible to opportunistic infections that occur as a result of commonplace microorganisms, and we need to be cognizant of that. As healthcare providers, we have always been expected to adhere to Standard Precautions, which are the minimum precautions that are applicable to any patient in any type of clinical setting. A lot of these things, it involves personal protective

equipment, hand hygiene, disinfecting, sterilizing, cough etiquette, appropriate injection procedures, et cetera. But in this midst of COVID-19 the key precautions that the CDC has focused on because of how COVID-19 is spread, is masking up and social distancing, as well as hand hygiene and disinfecting.

So there's plenty of infection control resources that are available. The CDC is a really good resource, there's a great resource at Oaktree Products because that's part of what we're all about, is educating our customers, our audiologists, ENTs, what have you, about the infection control protocols as well as offering product so that they can make informed decisions in terms of what's the best product. So it was lovely spending two hours with you. I know that there's many questions that might come up, so please, the easiest way to get in touch with me is via my email, which is au@oaktreeproducts.com. I have references that will be available as well. And the other resource that I wanted to comment on is in terms of cultural competence. So for additional information regarding standards and indicators for cultural competence, please review the NASW resource, "Standards and Indicators for Cultural Competence in Social Work Practice". So at this time, this is the perfect place for questions, if anybody has any.

- [Katrinna] So Doctor Bankaitis, you've shared a lot of very important information with us today, but I do have a couple of questions for you. First, can you tell us the difference between disinfecting and sterilizing? Can you speak to that?

- [Bankaitis] Yeah, that's a great question that comes up a lot, and I'm glad you asked it. Disinfecting is a process that involves killing germs, okay, so, when you kill germs, that's called disinfecting. In contrast, sterilizing is a process in which 100% of germs are killed, including their endospores. As a result, different products are available to disinfect versus sterilize. So currently, there's different ways that you can sterilize things, and in terms of product, in terms of chemicals, the EPA only recognizes

chemicals that have the active ingredients of at least a 2.5% glutaraldehyde, or something that has 7.5% hydrogen peroxide. So when you're talking about, "I wanna sterilize something," you are basically killing everything on it, and you that's intended for any critical instrument that you intend to reuse between patients, whereas disinfecting, you're simply killing germs, and depending on what product you use, will determine what kinds of germs it will kill.

- [Katrinna] Thank you for clarifying that. My second question for you, is alcohol, as in like rubbing alcohol, considered a disinfectant?

- [Bankaitis] It's technically, it is a disinfectant, however, it's not considered an appropriate disinfectant in a clinical setting because it's not really registered with the EPA as a disinfectant. So yes, does it kill germs, yes, what germs does it kill, it's not clear. So for those of you working in any type of setting where patient care services are being provided, it's important, as indicated by the CDC, that you use a hospital-grade EPA-registered disinfectant, because those have been tested by the EPA, and it has been confirmed that they kill X, Y, and Z, and the hospital-grade is key because those are types of settings where certain microorganisms are gonna be found because that's a place where there's multiple patients, multiple objects, and sick people, and it's an environment that requires a hospital-grade disinfectant, which means it's got a broader spectrum of kill. So again, what you use in your home, okay, is considered a household, and you don't need the heavy-duty disinfectants that are appropriate for hospitals. But when you are working in an environment that is a clinic where you see multiple patients, there's no place for rubbing alcohol as a disinfectant and there's no place for any kind of homemade anything in those types of settings, they require EPA-registered hospital-grade disinfectants for you to be in compliance with infection control requirements.

- [Katrinna] Thank you so much for that answer. That makes perfect sense, and thank you for clarifying that. Juliet, where are we on time? Are we good?

- Okay.

- So Doctor Bankaitis, you talked a lot about the differences between reusable and disposable PPE, in particular, the mask. Could you please talk about that a little bit more, just to clarify, what do you mean, like what can we actually reuse, and then what is it that once we wear it, we need to throw it away?

- [Bankaitis] Yes, I can totally clarify, because this can be confusing. So prior to COVID-19, any type of mask that was packaged for a hospital or clinical setting, has always been labeled as disposable, and what that means is one time, one time use only. So the three-ply masks, or even the KN95 masks that were used in hospital settings, once you put the mask on and you saw a patient, once you were done with that patient, because it was labeled disposable, you were required to throw that mask away. As a result of the pandemic, COVID-19, what started happening was there was a serious shortage of a lot of infection control products, in particular masks, it was difficult to source, it was difficult for hospitals to get. So in the spring of 2020, the CDC and the FDA, 'cause the FDA is responsible for approving these products, issued some interim flexibility, and that's key, it's interim flexibility, which means it's temporary. And then the flexibility means, "Hey, you can take a mask that is packaged and labeled as disposable, and because of the shortages, you can actually use that disposable mask either in an extended way, or use, and reuse, and reuse, and reuse it up to a certain point because A, there aren't enough masks available, and B, wearing a mask is critical at this point, okay?" So for example, the N95 masks, or the KN95 masks that somebody would purchase, they will still say disposable on them, but you can actually put that mask on and wear it for an extended period of time as long as you don't perform an aerosol procedure. Meaning I can put that on an eight o'clock, I can see

four different patients through 11 o'clock, and as long as I don't take it off, I can continue wearing that same mask. Once I take that off, because it's a KN95 mask, or if it's a mask that ties in the back of my head, once I take it off, I have to throw that away. But there's the interim flexibility for that mask, I can use it across several different patients, the same mask, okay? For those ear-loop masks, or ones that loop in the back, you can use and reuse. So this is limited reuse, where I can have a patient at eight o'clock, and even though it's labeled disposable, I can put that mask on, see my patient, when I'm done, I can take that mask off, put it in a proper place, whether it's a paper bag, or what have you, when I'm ready to see the second patient, I can reuse that very same mask, okay, and I can do that up to five times, per the CDC, and then I can throw it away. We can continue to do this until the CDC basically says, "Okay, interim flexibility is over," but this is where it's really important to stay in touch with the public health officials of not only your state, but of your organizations, because there are some flexibilities that are issued in order to make sure that we're wearing and doing what we need to do to minimize the potential spread of disease in an era when sometimes it's difficult to get the things that we need to get and use in order to minimize the spread of disease.

- [Katrinna] Perfect. Thank you for that explanation, that helped clear up the understanding of what is meant by a disposable and reusable PPE. So thank you so much for that. Thank you so much, Dr. Bankaitis, for sharing your knowledge and expertise with us on HIV/AIDS and the transmission and infection control considerations. You have provided valuable knowledge related to how HIV is transmitted, the differentiation between HIV infection from AIDS based on accepted disease classification systems. And you've provided us with various methods for increasing infection control. Again, thank you. And thank you for joining us at continued.com.