

HEALTHCARE-ACQUIRED INFECTIONS
(PROGRAMS: 10322, 10422, 31322, 31422, 40422, 40522, 40622, AND 50322)

Presenter: Ryan J. Smith, DHSc, MBA, CNMT

The following manuscript is a word-for-word transcription of the course audio files. This is not intended to represent an edited publication document and may not contain critical information contained in graphics and other visual aids utilized by the course speaker. This document is provided solely as a supplemental resource for the video presentation.

COURSE OBJECTIVES

- * Describe the differences between hepatitis B, hepatitis C, and hepatitis A in terms of signs and symptoms, causes of transmission, likelihood of contraction, and any preventative treatments.
- * Recognize modes of transmission for HIV, as well as HIV symptoms.
- * Describe tuberculosis (TB) and its symptoms, how it is contracted, and the difference between latent TB infection vs. TB disease and their respective treatment.
- * Discuss transmission, risk factors, and treatment for methicillin-resistant Staphylococcus aureus (MRSA), scabies, C. difficile, vancomycin-resistant enterococci (VRE) and norovirus.

Hello everybody. Today we are going to talk about “Healthcare-Acquired Infections.” And before we get going on the details, I've got a handful of learning objectives to cover.

First, describe the difference between hepatitis B, hepatitis C, and hepatitis A in terms of signs, symptoms, causes of transmission, likelihood of contraction, and any preventative treatments. Next, describe the process involved with contraction of HIV, as well as symptoms. Describe TB (tuberculosis) and symptoms, how it's contracted, the difference between latent tuberculosis infection versus tuberculosis disease and their respective treatment. Describe MRSA (methicillin-resistant Staphylococcus aureus) and its transmission, treatment, and those at risk. Describe scabies and its transmission, treatment, and those at risk. Describe Clostridium difficile (C. diff) and its symptoms, spread, prevention, and treatment. Describe VRE (vancomycin-resistant enterococci), spread, prevention, and treatment. Describe norovirus, symptoms, spread, prevention, and treatment.

So we'll get started here with a brief discussion on bloodborne pathogens. Understand that bloodborne pathogens are a disease-causing microorganism that can be present in the human blood. So what we're concerned about here primarily is as a healthcare worker preventing situations in which you would be exposed through blood-to-blood contact, right? So

of course, using appropriate needle safety, not recapping your needles, using two hands, and using safer needle systems, if you have to recap your needles, using the appropriate recapping devices and/or techniques. And of course, just treating all patients as if they could be potentially infectious. This whole idea of standard precautions and so forth becomes very, very important.

The three highest risk categories include hepatitis B, hepatitis C, and HIV. Other less common types include varying versions of hepatitis such as A, D, and E. Hepatitis A is not considered a blood-borne pathogen because it's contracted via fecal to mouth. So you've probably heard of situations in which there had been hepatitis A outbreaks at various buffets, restaurants, and so forth, where perhaps there was some fecal contamination on the food products that were being served and that was not caught. Some products were not properly cleaned, stored, or otherwise and that led to the outbreak.

Handwashing. Handwashing becomes incredibly important in the practice of healthcare across-the-board and that's something that I had discussed in a previous lesson that was pertaining to infectious diseases and safety with respect to that. So there is a preventative vaccine that's available to reduce your risk.

Hepatitis D is rare in the United States, but it occurs among people that are infected with hepatitis B. So those who have hepatitis B are at a higher risk potentially for contracting hepatitis D. Unfortunately, there's no vaccine available. Hepatitis E is rare in the United States. It's spread fecal-to-mouth. Again, like hepatitis A, unfortunately there's no FDA-approved vaccine.

So let's talk about hepatitis B and we'll talk about B and C as they're the two most common for healthcare workers to concern yourself about. Symptoms include fatigue, nausea, vomiting, fever, headache, stomach, abdominal pain, splenomegaly (15-20% of the time, individuals may get an enlarged spleen because of this). It may progress into jaundice, liver cancer, or cirrhosis. And I'm sure you're familiar to some degree with the differences between those. Certainly just because a patient is jaundiced doesn't necessarily mean they have hepatitis B because there's other causes for that. We see children who are born, perhaps who are jaundiced, but there's other... as I said, there's other reasons for it. But if it's untreated, could certainly progress to that and it could be a problem given the patient's compromised health with the hepatitis, liver cancer, and cirrhosis, of course, are quite a bit... far more concerning.

The most common causes of transmission to the general population include sexual contact and IV drug use. So again, we're talking general population understand you're going to be working with patients who are part of the general population. So and we don't know their, I

guess, day-to-day behaviors. And we, then, of course, have to take the assumption that, whether or not you know this person or do not know this person, you don't know all the specific details of what they're doing and how they're living their life. So we have to assume that they could potentially be infectious. And if we have that mindset, and we take that approach, we are likely going to behave ourselves in a more cautious manner when it comes to providing care for others.

That being said, the most common cause of transmission to the healthcare worker is an accidental needle-stick. And I tell my students this all the time and it is one thing to be sitting in a classroom and be told, "Never recap your needles with two hands. Always use the one-hand scoop technique if you have to recap the needle or if you don't have to recap your needle at all and you can place your needle directly into a sharps container, do that." Or utilize the safer needle systems that have the self-sheathing needles or use a needle recapping device that is specific for that, that prevents you from having to recap with two hands.

The problem is everybody thinks, "It's not going to happen to me. I'm going to be careful. Of course, I know that if I stick myself with a needle, this could be very bad." I think everybody's intelligent enough to understand that. But the problem is everybody also tends to think that they are immune, perhaps, to anything bad happening to them because, "I am going to be careful." But you can't control what others around you are doing.

So the scenario I like to paint is, let's say you are going through this two-handed scoop method and you're eyeballing everything to align it properly using both hands. And then somebody walks behind you and inadvertently bumps up into you right as you're getting to recap. And so then you get a little bit Jarred and you end up sticking a contaminated needle with somebody else's blood on it directly into your hand? Right? And that kind of stuff can happen from time-to-time. And you know, these are the things that I want to make everybody aware of because yes, it can happen to you and we tend to allow ourselves to, I guess, view statistics (and I'm going to get into some statistics here in just a second), but we tend to view statistics as just that. Well, these are statistics. These are just statistics. And we paint this false sense of security in that, "Well, I don't know anybody that falls under this category. I don't know anybody who contracted hepatitis B or HIV or what have you through accidental needle-stick at work." And those are just numbers. Those are just data points. And we forget that those numbers were attached to a real live person with a name who became a statistic. The statistics had to come from somewhere. And if we stop thinking about these things as statistics and start thinking of these as actual individual people -- healthcare workers -- then I think that sheds a little bit of new light on how we might perceive and view some of these things.

TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER
HEALTH.EDU

So as far as the prevalence of hepatitis B among healthcare workers until 1995 before educational programs went into effect, approximately 10,000 healthcare workers were reported to contract hepatitis B virus annually. That's an incredibly large number particularly when we're talking about healthcare workers who, in theory, are trained, who should be aware, and who should be taking precautions. So up until that time, 10,000 a year. So the federal government stated that we need to take a little bit more proactive approach. The CDC made recommendations. And since 1995, because of this idea of standard precautions, which then was followed by new, newer, more safely-designed needles, that number was reduced to approximately 500, annually. Now, I think that even maybe a little bit high because we've continued to make progress over the years, but this was from the mid-90s until the early 2000s. And it was almost, I mean, there was an immediate drop-off. Even within that first year, there was an immediate drop-off. And as I said, we've continued to make some progress. Since the mid-1990s, the incidence of hepatitis B among healthcare workers has been lower, far lower than that of the general population. So that's a good thing. But again, not to paint a false sense of security in thinking that problem-solved. It's still going to take knowledge and willingness to follow the protocols and willingness to be safe and not make foolish decisions or and protect yourself.

The comparison in terms of the incidence of hepatitis B throughout the world, and the various countries. So in the United States and throughout most of Canada, we see a much lower risk. I guess you could say, we're a little bit more advanced when it comes to science and data and technology. And the overall knowledge base and the ability to utilize that knowledge. The resources are in place to utilize that knowledge for the betterment of all.

Some other interesting statistics here show reported number of acute hepatitis B cases in the United States from 2001 to 2016. So you can see that that has dropped. And again, a lot of that does have to do with our knowledge about it and education, not only for healthcare workers but to the general public and the next figure shows incidence of acute hepatitis B by age group. So typically the younger generations tend to be a little bit more at risk because, right, they're invincible. "Nothing is going to harm me..." particularly males. And just having a little bit more of an, I guess you could say, promiscuous, a carefree-type lifestyle.

And then here you can see that again, specifically, male versus female. And that kind of matches what I was saying before. And then on the last slide, incidence by race and ethnicity. And that's interesting and certainly it's not just... you're not necessarily more susceptible just because you're a particular race, but this really kind of correlates specifically to socioeconomic status and opportunities and, unfortunately, even though we're making advancements in our society towards equality, there is still institutional racism, there is still discrimination and those things impact minority groups in much higher numbers than what they do Caucasian, white,

Americans, right? And you can see those as people live in more impoverished conditions and minority groups typically have higher numbers of impoverished conditions, the degree to which they're impacted by that.

As far as recovery goes, there is a way to treat the hepatitis B through a vaccine and 85% typically recover within about a 6-8 week period. Unfortunately, you cannot work during that time. About 2.4% of the population who become exposed to hepatitis B do die. Where from a healthcare worker, this is very important here, one needle stick with a contaminated needle yields a 7-30% chance of contracting hepatitis B. So of course, just because you stick yourself with a needle that has somebody's blood on, it doesn't mean you're going to have hepatitis B. The virus has to be present in sufficient numbers within that blood sample in the needle. That being said, a 7-30% chance is pretty significant, right?

So how do you protect yourself, then? As a healthcare worker, most, if not all, healthcare facilities today are going to require having the hepatitis B preventative vaccine. And there's a preventative vaccine so that you can build antibodies, but then there is a treatment of sorts that if you were to become exposed afterwards then that treatment can be used. But as far as a preventative vaccine goes, it's very important to make sure that you follow the recommended schedule. This is an intramuscular injection and it's given in the shoulder where you get three primary shots and the first shot is going to be what we call zero time. And it's going to basically start the clock for when you receive the second and the third shot. So once you've received the first shot, your second shot is going to be given four weeks later and your third shot is going to be given six months after the initial. And that's very important to remember that it's after the initial, not six months after the second shot because this schedule is recommended in order to produce sufficient antibodies and in order to get those antibodies, you do have to follow the appropriate schedule and get that flood of the vaccine at the appropriate intervals in order to be most successful.

A surface antibody tests can be done about six to eight weeks after the three-shot series, and this is going to test to see if you have a sufficient antibodies to see that has this taken within your system? Unfortunately, not everybody will produce sufficient antibodies just for a number of reasons. Perhaps they didn't follow the three-shot series the way they should have, but in other cases, just for their genetic makeup, they didn't respond in a manner that was otherwise expected.

Historically, there has been use of a booster that was given and it was fairly effective, but it's not guaranteed. So the CDC now recommends that if you test negative for antibodies, you actually repeat the three-shot series from scratch as opposed to just getting one additional booster, so to speak. [My apologies, everyone. I forgot to turn off my email and that's probably the additional dinging you're hearing in the background].

TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER
HEALTH.EDU

As far as this booster, if it is still being used, it's recommended. Let me back up here for a second. Let's say you test positive for antibodies. You should be effectively immune now. And it should last a lifetime. But occasionally, again, everybody's different. Sometimes those immunities start to drop. And in situations like that, perhaps a booster could potentially be warranted.

Symptoms include tenderness, redness, and swelling at the injection site, fever, headache, nausea -- that's pretty common. Usually there aren't too many who experience a significant type health effect from this.

Availability of the hepatitis B vaccine to employees. You know, with this, the hospital needs to make it available to you. All right. And well, let me rephrase. The hospital is going to require that you have this done. Okay. Now, they may make it available to you at there, you know, if they're hiring you in, perhaps they're going to say, "Yeah, we'll go ahead and pay for this" but that's not always the case, so you may have to pay for it on your own, but at any rate, it's something that if you are working directly with patients and you are potentially... your job is one that is at higher risk for exposure to patients' blood or other bodily fluids in which hepatitis B could be present, then you need to make sure that you have that done prior to employment. The employer, rather, does have the right to make it a requirement and say that, "If you don't have it done, then we will not formally hire you."

So what are your options then? It seems, you know, given the explanation I just made, that the only option would be to receive the three-shot series. Now, it certainly is the best option, but some people might have an allergic reaction due to sensitivities to the vaccine. It is yeast. The last thing that we want to have happen is as somebody be exposed potentially to, you know, that and obtain an anaphylactic reaction. So for people who are overly sensitive to this, it may be contraindicated. That being said, does that mean that "Well, shoot, because I have the sensitivity that I am no longer a viable employee?" Hospitals may allow you to sign a waiver and provided that you do sign that waiver, you're saying, "I'm taking all responsibility if I were to become exposed to hepatitis B, that I will not sue the hospital, so that could be a potential option for that.

Next, is hepatitis C (HCV). About 75-85% of people exposed to hepatitis C virus develop chronic hepatitis C, which is a life-long infection that will damage the liver. There's nearly twice as many cases of hepatitis C than there are hepatitis B and HIV combined. It is the leading, leading reason for liver transplants in the United States. And unlike hepatitis B, there's, unfortunately, no preventative vaccine.

That being said, there are treatments. So hepatitis C virus treatment utilizes antiviral medication which may take six months to one year to complete. And most people who are

treated will experience a variety of side effects. So we're not going to get into all the various types of treatments that are out there and what those side effects are because the side effects are going to vary depending upon the different types of treatments. But, you know, I guess the biggest thing that I want you to know is that the best way that you can protect yourself is through knowledge and following appropriate protocol since there is no preventative vaccine, you don't have that protection upfront. And, yes, you can be treated after the fact but really the best form of treatment is prevention and if you can prevent getting it by simply treating all patients as if they are potentially infectious so that you do not let your guard down and you do not do anything foolish when it comes to handling needles, then you're going to be much better off.

I'm sure we all know about HIV and the concern there because HIV is the virus that, of course, will lead to AIDS and this affects the lymphocytes and the white blood cells, specifically the T4 lymphocytes and the presence of this virus renders the cells less effective in preventing disease. So, unfortunately, what ends up happening is the virus will begin to shut down your immune system. And after, you know, it's a progressive-type condition where certainly it's going to take some time to render your immune system to the point where it's no longer effective, but it will eventually lead to this. And at that point in time, you have full-blown AIDS and something, as, you know, I guess I wouldn't say harmless, but what many people perceive to be something that may not be their cause of death, such as the common cold, right, can end up being what?

All right, as far as transmission modes, it's contact with body fluids containing or specifically those infected cells, plasma, blood, semen, vaginal secretions, breast milk, and saliva. Modes of transmission include IV drug use, sexual transmission (those two pretty much right in line with what we discussed with hepatitis B), and unfortunately, sometimes children born HIV-positive and get it through the birth canal because mom has HIV.

Contracted through accidental needle injections, blood transfusions, mucous membrane exposure, and so forth. Blood transfusions have become much safer over the years. If you were old enough to remember in the 1980s there was a young boy, Ryan White, who became a huge news story. He was a hemophiliac, had a bleeding disorder, where his blood couldn't clot and so in order to treat that, he received blood transfusions. And this was before we really knew when HIV and AIDS was. I mean, it was out there but it wasn't... there just wasn't a whole lot of information. It was thought to be a disease that only affected a particular population based off of lifestyle and behavioral decisions. And they didn't have the testing for it in blood. So this young man (I believe he was only middle school age at the time) contracted HIV. And he ended up dying from it a few years later and he became a strong advocate for HIV awareness. At any rate, my point in this is that things are much safer right now. It's almost

unheard of for somebody to contract HIV through a blood transfusion, provided it was given was given at a hospital, an established medical facility here in the United States, that tests for these types of things.

But accidental needle injections, again, are the biggest concern for the healthcare worker. Transmission from an accidental needle-stick yields a one in 200 chance of contraction. So we're looking at 0.5% chance, which is very small and, again, I think sometimes people might think of that and say, "Well, I have 0.5% chance of getting this. So... and that's assuming that the HIV is even present in the needle that stuck me. So, you know, why do I need to be as cautious?" Well, and I think the simple answer to that is if you get HIV, you'll die, period. And while there are medications that can minimize the symptoms of the disease and extend your life by boosting your immune system. There's nothing that will cure it, and most of us, unfortunately, don't have the resources that Magic Johnson has. Famous athlete who, again, made national news and in the early nineties when he made it known that he had HIV. And this is what 25, 30 years later roughly and he's still kicking strong. But he's a world-famous athlete with unlimited resources and can afford the incredibly expensive treatments, where the average worker won't be able to. So and still he's going to succumb to the disease unless a lifesaving treatment is developed over the next few years, which of course is unlikely and if that were to happen to any one of us, we wouldn't have nearly as good of a chance in most cases.

It is more difficult and less frequent to contract with respect to hepatitis B because the number of virions in the blood and it's just a little bit hard to pick up that way.

Inactivation can occur through heat and commonly used disinfecting agents including peroxides and alcohols. So this becomes very, very important with respect to making sure that you are sanitizing your work areas and cleaning properly. Using good housekeeping techniques was something that I talked about in prior section with respect to protecting yourself against infectious diseases.

Symptoms include night sweats, lesions on the skin, rapid weight loss, swollen glands, and thrush. So as you're working with patients, you are going to want to be aware of what the risks are so that, you know, if you see these symptoms within your patients that could be an indication. Now, again, symptoms alone, a single symptom alone could be any number of things. But if you start seeing thrush, including swollen glands and the patient's telling you, "I've lost 50 pounds in the last month and I can't sleep at night because of these night sweats" and you get the idea. So again, we want to treat everybody as if they are potentially infectious, but we still want to be aware. We still want to be aware of what the risks are. And being knowledgeable of who might be a patient who is actually suffering from this.

On the other hand, not everybody with HIV may even show any symptoms for several years. So again, I feel like I, maybe I'm speaking out of both sides of my mouth here, but, you know, that is where standard precautions comes into play.

So those are our bloodborne pathogens. So there certainly are other health conditions that are out and about in the hospital that you need to be aware of that are not contracted through the blood. They are contracted through other various means. Airborne illnesses, for example, which are spread via coughing, sneezing, and speaking and you can see this here that I think very clearly makes that point as far as how easily these things can be spread if we're not appropriately covering our mouth and in today's world of COVID-19, wearing a mask and things of that nature. So you've been told ever since you were a young child, make sure you cover your mouth when you cough and when you sneeze. And this really kind of shows why that is very important.

Different types of airborne illnesses include tuberculosis (TB), influenza (or the flu), COVID-19, chickenpox (which is varicella), measles, smallpox, anthrax. We're not going to talk about all of these things. I am going to talk about the first couple, specifically, but for your own awareness there they are.

Tuberculosis, first and foremost is a disease caused by the bacterium *Mycobacterium tuberculosis*. It attacks the lungs, but it can progress to other areas of the body such as the spine, kidneys, and brain. If it's not properly treated, it can be fatal. And it was once the leading cause of death in the United States. We tend to think back oftentimes to the Wild West days. You know, I'm sure you've probably heard of Doc Holliday. He had a bad case of tuberculosis. He was coughing up blood regularly. That's what he died from, but we don't see this a lot today. It certainly hasn't been eradicated, but the number of cases has dramatically decreased. But from time-to-time, there is a patient who does develop tuberculosis, and then the proper precautions need to be taken in order to prevent spread throughout the hospital to the healthcare workers, and all of the patients and so forth.

So tuberculosis bacteria are put into the air when a person with tuberculosis disease of the lungs or the throat, coughs, sneezes, speaks, or sings. Now, that's important. "Tuberculosis disease" because there is a version of tuberculosis that is called "latent tuberculosis infection." And if they have latent tuberculosis infection, they are not contagious. It has to progress into tuberculosis disease and I'm going to talk about that briefly in the next slide. But people will contract this or can contract this when they breathe in those bacteria that are projected into the air and then they enter into the patient's lungs. Interestingly enough, tuberculosis cannot be spread by shaking somebody's hand, sharing food or drink, touching bed linens or toilet seat, sharing toothbrushes, kissing, and so on. So it's not so much about mouth-to-mouth contact as some of these things here indicate -- sharing food and drink, kissing,

toothbrushes, etc. or even touching surfaces that some of these bacteria may have landed on and then bringing your hands into your mouth. You can't get it that way. It actually has to be inhaled into the lungs. So this airborne concept here where it is projected and then it is breathed then, and then it is taken in by the lungs and then it will begin to take hold and spread.

So what's the difference between latent tuberculosis infection and tuberculosis disease? Well, latent tuberculosis infection is when the bacteria live in the body but without making you sick. So you're infected with it, but in this stage of the game, it hasn't progressed into full-blown disease. And during the latent stage, many people can actually fight this off before it becomes tuberculosis disease and it doesn't make you sick and it doesn't make anyone else sick. Okay? With latent tuberculosis infection, you are not infectious and you cannot spread it to others. However, if it's not treated and if your body doesn't take care of it, it can progress into tuberculosis disease and at that stage, it can make you sick and you do have the potential to spread it to others.

So tuberculosis disease, then, is when the bacteria become active in your body, when your immune system can't stop them from growing. They are actively multiplying in your body. You get sick and you spread it to others.

So symptoms include a bad cough that lasts three weeks or longer, pain in the chest, coughing up blood or sputum, weakness, fatigue, weight loss, no appetite, chills, fever, sweating at night.

Again, as a healthcare worker, these are some things you need to watch out for because if you kind of add all this up and determine, "I think this patient might have tuberculosis" perhaps you need to let somebody know and the hospital is probably going to put this patient in quarantine, or at least consider them contact isolation with all of the necessary precautions. And then of course, had you been working with that person, you may need to be checked for that as well.

As far as treatment goes back to latent tuberculosis infection, healthcare provider may want you to be treated to keep you from it turning into full-blown tuberculosis disease. Treatment reduces the risk that the infection will progress into the disease and it's essential to controlling and eliminating tuberculosis in the U.S. Decision for treatment will be based off of your chances of developing the disease.

Now, tuberculosis disease can also be treated, but it may take anywhere from six months on the low end to nine months on the high end. And there are approximately 10 drugs throughout the United States that had been approved by the FDA for treating it. Regimens for treating include an initial phase which lasts about two months, followed by a secondary phase

where you have a choice of various types of treatments lasting anywhere from four to seven months. So again, depending upon the treatment of choice, which will be determined by consultation with your physician, in terms of what would be best given your situation, it could last anywhere from six to nine months.

Next, then, is influenza. I'm sure we're all familiar with the flu and flu-like symptoms. As you can see here, symptoms include cough, fever, sore throat, nasal discharge, congestion, muscle/body aches, headaches, fever, vomiting, diarrhea, and so forth. I'm sure that everybody has experienced this at some point in their life. I think the main thing that I want to remind everybody of, and as a healthcare worker, you should know this but, unfortunately, I don't think everybody does and perhaps you should also inform your family members. When we think of the flu, oftentimes we tend to think of it as gastrointestinal flu, right? When we get sick and we pick up what we perceive to be the flu in the winter time or in the colder months of the year and we get this nausea, vomiting, diarrhea, fever and so forth, we refer to it as the flu. And I've heard a number of people say, when asked, "Are you going to get the flu vaccine?" "No, it doesn't do me any good because I got the flu last year and was sicker than a dog and why am I going to get this?" Or they think that because they received the vaccine that was what made them sick, which is just silly. There's no evidence that that could happen. But I think there's a misconception in terms of what the flu is and when we're talking influenza, we're talking about the respiratory flu. The respiratory flu, which is far more serious than the intestinal flu. The respiratory flu is what people die from.

Now, that being said, that you certainly, you could, perhaps if you, if you're already in poor health and you become severely dehydrated because of vomiting and diarrhea, you could pass away from the intestinal flu, but the vast majority of people recover from this. People are not as likely to recover from respiratory flu if that's what they get and that is what the flu vaccine is truly for. And since the two are completely unrelated, it is possible that you can get the intestinal flu after you've gotten your influenza vaccine, but you're far less likely to get the more dangerous variety -- respiratory flu -- provided you've been vaccinated. And that's what's really going to be saving lives. And that's what people need to understand so that they can make an informed decision when it comes to that.

Now, as far as influenza transmission is concerned, it is droplet transmission. Droplets may exit the body by coughing, sneezing, talking, and they attach to dust particles in the air, but then floats around and get carried and then eventually fall on various surfaces which we touch and then gets on our hands, and then we put our hands in our mouth and this could lead into a lengthy discussion on the importance of handwashing and cleaning your work surfaces which, again, I talked about in the previous section on limiting your risk for infectious diseases -- handwashing, handwashing, handwashing.

TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER
HEALTH.EDU

The virus may live on an object for up to two days prior to entering the host. That's something to be aware of. And that should reinforce, again, the importance of handwashing and the importance of cleaning your surface, cleaning your work area with disinfecting agents. Don't just allow yourself to rely on housekeeping or environmental services to be the people who come clean your workspace. You -- the technologist, the healthcare worker -- you need to be responsible for cleaning your own work areas throughout the day on a regular basis because you are the one who is at risk of these things within your own workspace because you have your own patients that are coming and going throughout the day and housekeeping isn't going to be coming into your area to clean during the day. So make sure that you're doing your part.

And remember, how often are we shaking hands with people, touching common surfaces such as bathroom door knobs or door handles or handrails as we walk up and down stairs or elevator buttons? And think of all of the nastiness that is going to be present on those surfaces that we touch, including shaking hands with our patients when we meet them. And if we're not constantly washing our hands, it's not going to take much for us to potentially get exposed.

Of course, right now we're all dealing with COVID-19 coronavirus and as healthcare workers, I'm sure that you have you have heard many things about it and perhaps some of you may have even become exposed to this contract of it or know somebody who has. It absolutely is a deadly disease, but as we know it tends to affect people with compromised immune systems, who are older, who are already in poor health, who are obese individuals, blood pressure are not physically active. It effects them at a much higher rate and the risk is much higher for those individuals.

Most healthier, younger people do tend to fight this off and it affects them with symptoms similar to the common cold, if you will and it kind of a respiratory condition with a cough, congestion, shortness of breath, fatigue, muscle/body aches, headache, and the like. So, you know, it is important to make sure that you get checked, diagnosed accordingly so that if you do contract it you can quarantine and not spread this to others.

Thankfully, there is now a couple of vaccines that are out there that are very good at treating. Some are one injection, some are two injections, but it's just new and of course we all have heard on the news some of the frustrations with respect to getting it out quickly, distributing it, the I guess you could say, lack of coordination between from the federal government to the state government and being able to logistically get this out in an organized manner. And, and then of course, having all of the necessary healthcare individuals who are qualified to administer the drug. There's some issues with respect to that, but we are starting to see a little bit of a greater push for this and, hopefully, we will start seeing some progress before too long.

But emergency signs and symptoms include trouble breathing, persistent pain or chest pressure, confusion, inability to stay awake, and blushing or flushing of the lips and face. Again, it's highly infectious and contagious. Social distancing guidelines of six feet -- staying six feet apart, minimum, are recommended, along with the use of face masks which will cover the nose and mouth. Due to particles, the face mask shields are not effective at preventing the transmission. Certainly it's going to be, you know, I guess better than nothing at, you know, it's going to prevent somebody else from sneezing directly in your face, but the fact is it's the particles that can float around in the air that can seep through those empty spaces and you could breathe it in and still get sick.

In extreme cases, people who are most susceptible experience life-threatening conditions which may lead to the need for being put on a ventilator.

Due to this being a novel virus, federal agencies are struggling to get a handle on the behavior of the virus and changes that are occurring and we are experiencing different strands of the virus and there certainly have been some questions as to whether or not these vaccines will be effective in treating the various strands and strains. But again, some of these things change on a daily basis, but we're doing our best, of course, to get a handle on it. And it's still advised get a vaccine. We don't have the luxury right now early in the stage of being able to pick and choose which vaccine we want, so if it does become available, we simply need to get it whatever is offered and reduce your risk of exposure. It protects you and it protects others.

Our last section is going to focus on contact diseases. And the ones that we're going to focus on are those listed here? Methicillin-resistant *Staphylococcus aureus*, which is MRSA, scabies, clostridium difficile or C-difficile, vancomycin-resistant *enterococci* or VRE and norovirus.

So, we'll start with MRSA (methicillin-resistant *Staphylococcus aureus*). It's a skin infection that's become resistant to treatment of most antibiotics and can lead to a life-threatening infection and it most commonly impacts patients who have undergone invasive medical procedures who have weakened immune systems. The primary means of spread is hand-to-hand contact or hand-to-surface contact among healthcare workers. It looks like a pimple-like sore -- perhaps a spider bite that is swollen, it's painful, and it drains pus. This is a very minor illustration of this. It does get much more grotesque. But I think this is a good illustration of kind of the early onset.

It's generally treated by using empiric antimicrobial coverage. Occasionally antibiotics may be used that are guided by susceptibility profile of the organism. Now, again, this is one of those really scary-type things because as, you know, as people utilize antibiotics and, again, there's a lack of awareness as to what antibiotics are really good for. Antibiotics are for

bacterial infections, right? Not viruses. And people who don't understand that may not complete their antibiotics when a doctor prescribes them and they might save them in their medicine cabinets for some date later on. And then they get a cold, which is typically a virus and then they take one or two antibiotics thinking this is going to help and it doesn't. And in fact, it can be counterproductive because one, it's not the full dose, and two, it's not being used for the appropriate condition, virus versus bacteria. And so what that does though, a really big concern as you develop immunity or a resistance to these antibiotics. And then when you truly do need them for something later on, antibiotics are not going to be as effective. And I think a lot of... we're starting to see many, many more diseases that are out there that kind of fit that situation where, you know, it's just not going to be... some of these bacteria-related infections are not going to be effectively treated by antibiotics because of this resistance that we've built up for that.

So high-risk environments include hospitals, nursing homes, and other care facilities. Again, think if one person gets it and this is something we spread through physical contact, whether it's direct person-to-person or perhaps surfaces that are being touched and it, you know, it soaks into my padded-like surface through sweat and things of that nature. And then other people come in contact with those surfaces -- think, gyms and exercise equipment and mats and things of that nature. That becomes very, very problematic, right? So it is very important to make sure that not only in the healthcare setting, in long-term care facilities as well as athletic facilities that you are using disinfecting agents and wiping things down.

Same thing with day care facilities. There is a community-acquired MRSA that can affect otherwise healthy people and it's more virulent than what's found in hospitals. It's more easily spread that are common in daycare facilities on say, various commonly-used surface such as toys. And again, I mention gym facilities and so forth.

Next, is scabies which is an infestation of the skin through the human itch mite. If this doesn't give you the Willys, I'm not quite sure what will. It is a parasite and it's a microscopic mite that burrows into the skin and lays its eggs. Then the eggs hatch, and then you develop a very distinctive pimple-like rash. It's distinctive because of where it is found on the body. Some of the most common areas... Oftentimes, areas where there are folds, if you will, moist areas, bends of the arms, elbows, armpits, the buttocks region, and the wrists, in the webbing of fingers, a genital groin areas, waistline, as I said, kind of moist areas and areas that fold and bend and so forth.

Often this is spread via skin-to-skin contact. And it does tend to be very symmetrical. So if you have it, let's say, in the elbow area of the arms or the knee area, then you're probably going to see it on both sides. Advanced scabies may cause a rash already entire body and is associated with very high transmission rates.

TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER
HEALTH.EDU

Common outbreaks occur in nursing homes, extended care facilities, and prisons. And it is treated with a special prescription that is called a scabicide because these focus on killing the scabies mites and the eggs. So, you know, your traditional antibiotics, antiviral medications -- those are not going to work. It has to be this scabicide.

C-difficile (*Clostridium difficile*) is a bacterial healthcare-associated infection, nosocomial infection, right? One of those diseases we pick up simply by being in the hospital that we didn't have before we got there, that is at historically high levels. It's an infection that impacts the intestinal tract causing diarrhea, colitis, sepsis, and potentially death. So here, individuals get the watery diarrhea, high fever, loss of appetite, nausea, pretty extreme abdominal pain and discomfort.

The bacteria contain spores that are not easily removed. Now, here's again, coming back to this conversation regarding the handwashing. Appropriate handwashing is incredibly important here, where we're using running water and soap. And with handwashing, remember there is both a chemical and a physical component to this. The chemical component, of course, you know, the soap itself contains chemicals that will, when used for a good 30 to 60 seconds, will kill the various microbes on the surface of the hands, but the physical -- the scrubbing portion is also very important. And especially here when we're talking about spores because spores are not easily removed. And we need to make sure that we are scrubbing those spores so that they are physically removed from the hands, right? It's the friction that will remove them from the hands and then the running water will wash them away. Of course, the chemical component will kill much that is on the surface of the hands.

And so if you think about when it comes to this potentially being present in feces, and individuals go into the bathroom and not washing their hands, not to become overly graphic here, but as healthcare workers, we understand how this works and it's stuff that we hopefully can wrap our head around in a practical sense. And this should serve as a reminder, and I see this frequently that even though we are healthcare workers, not everybody practices appropriate handwashing techniques. So let this serve as a reminder if you fall into that category about, you know, how unprofessional that is and what we need to do, and how we need to be behaving and so forth and leading by example as healthcare workers, right? Persons who do become ill are those who are most likely already ill and being treated with antibiotics such as the elderly. The elderly are always a high-risk group.

It is a major concern in healthcare facilities. It causes diarrhea linked to 14,000 American deaths per year. And it's spread via feces, right? Through commode toilets and bedpans, sinks, showers, rectal thermometers, not using proper handwashing techniques and then touching surfaces and then hand-to-face, hand-to-mouth, hand-to-hand and so forth.

Wash your hands, wash your hands, wash your hands, keep your surfaces is clean. Use disinfecting agents and so forth.

As far as treatment goes, it requires a 10-day round course of antibiotics. Infection usually resolves within two to three days after completion of the antibiotic treatment. So it's going to be ten days of treatment followed by two to three days after for your body to build up immunity. Okay, so you're looking at almost two full weeks.

Next, is VRE (vancomycin-resistant *Enterococci*). *Enterococci* are bacteria that are normally present in a person's intestines or female genital tract without causing any disease. It is there and it usually doesn't progress into anything. However, some of these bacteria can lead to infection if the conditions are just so. Vancomycin is an antibiotic that's used to treat some drug-resistant infections caused by *Enterococci*, but unfortunately, this is a vancomycin-resistant *Enterococci*. So vancomycin is not going to be effective at treating this particular type. These *Enterococci* have become resistant to this drug and this is, again, one of those unfortunate situations that is due to inappropriate and overuse of antibiotics.

This was virtually unknown until 1989. It's now a major health problem in hospitals across the United States and other areas of the world, certainly. It usually causes infection of the urinary tract, intestinal tract, or bloodstream spread through physical contact. And those who are at increased risk include hospital patients, those in long-term care facilities, those being treated with antibiotics, those who have weak immune systems, those recovering from surgery, or those being treated with urinary or IV catheters.

It is spread via contact with infected urine, stool, or blood. Most important preventative steps include proper handwashing, keeping surfaces clean. And it's usually treated with antibiotics other than vancomycin.

And then lastly we have the norovirus, which is a contagious virus causing the stomach or the intestines to both become inflamed, leading to acute gastroenteritis. When we think of the... if I can kind of go back to when I was talking about the flu and I mentioned the difference between influenza (the respiratory flu) versus the gastrointestinal flu, the gastrointestinal flu is usually more along the lines of the norovirus. This is disease spread mainly through contaminated hands, body substances, or surfaces. Acute onset includes nausea, vomiting, diarrhea, abdominal cramps, headache, and low-grade fever. So there you go. What we've all experienced when we get what we refer to as the "intestinal flu."

These are some interesting statistics here with respect to outbreaks of diarrhea and vomiting: 61% of outbreaks of diarrhea and vomiting are spread by having direct contact such as shaking hands with an infected person or touching a contaminated surface, and then bringing your hands to your mouth. The norovirus is the number one cause of diarrhea or

TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER
HEALTH.EDU

vomiting outbreaks spread by direct contact with an infected person or touching a contaminated surface. And three out of four norovirus outbreaks occur in long-term care facilities like nursing homes and elderly residents are more likely to get very sick or potentially die from norovirus.

So again, wash your hands, clean your surfaces. Cover your mouth. Wash your hands after sneezing or coughing into your mouth. Use a tissue, throw the tissue away, immediately. Wash your hands afterwards, right? I tend to be repeating myself here, but for very good reason.

About 30% of those infected may not present any symptoms. The highest risk include young children and older adults. Again, either compromised immune system or immune system has not fully developed yet. It's highly contagious and can spread as an outbreak in healthcare facilities, hand-to-hand contact, feces and vomiting, water, food or surfaces that have been contaminated, and so forth. It is the most common cause of acute gastroenteritis in the United States. It's the most common cause of foodborne illness outbreaks in the United States. The immune system must fight it off. Unfortunately, there is no antiviral drug available, and antibiotics do not treat it. And statistics here are pretty stark and shocking. Approximately 19 to 21 million illnesses are reported per year, with up to 56,000-to-71,000 hospitalizations.

Death rates are relatively small in terms of total population, but even so, upwards of 600 to 800 deaths per year do occur because of this. So certainly something that we do not want to take lightly.

Again, not to beat a dead horse, but you know, I think a lot of this is common sense following protocols, washing our hands, wearing our gloves, cleaning our services, getting vaccinated when appropriate, pre-vaccinations, following up if we see symptoms that we think might be an indication of a particular condition, making sure that we get tested. And then, of course, following through on various treatment regimens. Stay home when you're sick, right? Don't expose others as healthcare workers. I think a lot of times we do tend to want to be at work, we've got a job to do, we're relied upon and so forth. But at the same time, it's a disservice to others if we show up to work sick and then spread what we have to other people, and then it's just going to compound the problem.

TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER
HEALTH.EDU

So I hope you enjoyed this session. I hope it was a good reminder for many of you. Perhaps you learned something new, and I appreciate you tuning in. I wish you all well. Be safe, everybody. Thank you.

Presenter: Ryan J. Smith, DHSc, MBA, CNMT

SLP: 011022 (Edited/revised)

This program is intended for the private use of Health.edu subscribers. Any rebroadcast or redistribution of this program without the express written permission of Health.edu is prohibited.

The clinical treatments described and recommended in this video are based on research and consultation with nursing, medical, and legal authorities. To the best of our knowledge, these procedures reflect currently accepted practice. Nevertheless, they cannot be considered absolute and universal recommendations. For individual applications, all recommendations must be considered in light of the patient's clinical condition. Health.edu and its presenters disclaim any responsibility for any adverse effects resulting from the suggested procedures, from any undetected errors, or from the viewer's misunderstanding of the information presented.

Health.edu recognizes that the use of this product/service does not imply or constitute endorsement of the product/service by the American Nurses Credentialing Center (ANCC) or of the Texas Nurses Association (TNA).

Transcription typed verbatim as recorded on video and not responsible for content or context of document with occasional corrections for pauses, etc. (HHT).