Hi. My name is Jamie Roney and I am a nurse specialist at Covenant Health System in Lubbock, Texas. We are going to talk today about the first principles of asepsis.

Now first, I want to talk about some common infectious agents. We called those microorganisms and what microorganisms are, are they are tiny organisms that can be disease causing that can only be seen with assistance of a microscope. Those can include bacteria and examples of bacteria are Streptococcus, which causes Strep throat and pneumonia and Escherichia coli or E. coli, which can cause urinary tract infection, tuberculosis, which causes lung disease, and methicillin-resistant Staphylococcus aureus or MRSA, which is a skin infection – those are all examples of the microorganisms of bacteria. There are also microorganisms known as viruses and some of the common viruses we think of are HIV or the acquired immune deficiency syndrome virus, and hepatitis A, B, C, which all cause liver disease. Remember hepatitis B is the vaccine that you got offered from your healthcare facility that is given in three shots. It has to be offered for free by law, so hopefully, you got protected against hepatitis B. Another virus is common cold or respiratory infections and influenza, which is another word for the flu virus and it causes fever, chills, and body aches. Then herpes zoster, which causes chickenpox and/or shingles are both caused by the herpes zoster virus that we see in hospitals. The newest, most in the news, is H1N1 or the swine flu is another virus, which is an example of a virus microorganism that we see in hospitals. Fungus or fungi are another classification of microorganism. Examples of that would be Tinea pedis or athletes’ foot, Candida albicans, or yeast infection that would be thrush, thrush in the mouth or esophagus and/or even yeast infections down in the vagina or the groin. Insects carry microorganisms and there are insects that we see in hospitals in our patients and sometimes our patients have lice and there can be body, head, or pubic lice that cause itching, scabies, which is under the skin and causes skin rash, and we also see antibiotic-resistant bacterial infection. One of the key ones that we see is methicillin-resistant Staphylococcus aureus or MRSA. We also see VRE a lot Vancomycin-resistant enterococcus. We also now are seeing resistant forms of C difficile or Clostridium difficile. So, we have a lot of antibiotic-resistant bacteria as well or microorganism. There are conditions necessary for an infectious agent growth and they have to have a food source, they have to have moisture, they have to have either oxygen or lack of oxygen. Most bacteria are what we call aerobic and they need oxygen to survive. There are a few that are anaerobic and some examples of anaerobic bacteria would be anthrax and tetanus. Both anthrax and tetanus do not like oxygen, but if you put them in a place without oxygen, they are going to thrive and grow. That is why when you step on nail and you get a tetanus infection or it leads to locked jaw. It is because there is a lack of oxygen deep in that wound that it grows. An infectious
agent would need warmth and needs darkness to survive. There are six parts to the chain of infection and those six parts include, there is a causative agent that must be present that means there has got to be bacteria, fungus, virus, or insects to be part of that chain of infection. You have to have a causative agent. The other thing that would be necessary in the six parts of the chain is a reservoir. A reservoir would be a resident, a healthcare worker, environment, or equipment that has that bacteria or microorganism on it. A portal of exit – there has got to be a way for that microorganism to leave that carrier or that reservoir and get on to somebody else and find another place to grow and thrive. Portal of exits include any excretions, wound drainage, urine, feces, blood, and saliva. There has to be a method of transmission – it has to have a way to get from one place to the other. So, airborne, droplet, contact, food and water, animals or insects can be a method of transmission. When you think of insects and think of malaria with mosquitoes or Lyme disease with ticks some of those things. So, sometimes insects are methods of transmission. You also need a portal of entry. Where is it going to enter the new host – non-intact skin, mucous membranes, respiratory tract, urinary tract, or reproductive tract can all be portals of entry. Last, but not least, you need a susceptible host. A susceptible host for an infection would be anybody, a patient, a healthcare worker, families, or visitors can all be considered susceptible host. With the chain of infection, all parts of that chain are linked. To stop the spread of infection, you have to break that chain. At any link, if you break it you are going to stop infection. Now, the body has four lines of defense against infection. The first line of defense is there is normal flora in all of our bodies. Not all bacteria cause infection, not all microorganisms cause infection, some are good, and normal flora is that bacteria that naturally live in the bowel, in the gut, on the skin, wherever it is that protects us from harm. So, that is one of the four lines of defense against infection. The largest organ in the body and probably the most important primary defense against infection is our skin. Any break or cut in the skin is a source portal of entry for microorganism to get in. Our mucous membranes also act as a line of defense against infection and mucous membranes are thick and then trap bacteria to keep it from being able to get down into the lungs as you inhale organisms from the air, hopefully, most of them get trapped before they reach the lungs and enter the body. Your immune system is the fourth line of defense against infection and that is your natural immunity and any acquired immunity that you have received from vaccines to protect you. Your immune system can help protect you against hepatitis B, H1N1 or the swine flu, influenza or the regular flu, tetanus, etc. So, anything that you can get a vaccine for, those immunizations are very, very important for healthcare providers.

Now, signs and symptoms of infection include appetite loss, pain, diarrhea, drainage, fatigue, fever, nausea and vomiting, rash, redness, or swelling and tenderness. Those are signs and symptoms of infection.

Now, we are going to talk a little bit about asepsis versus sterile technique. When we use the word asepsis, medical asepsis, or clean technique include free from microorganisms carrying disease. How do we do that? We wash our hands, we also disinfect and by disinfecting – it is a process of destroying pathogens utilizing soap and water or disinfectants that we can spray or wipe down objects with. Now, surgical asepsis or sterile technique is the use of sterilized equipment. So, this is where all microorganisms have been destroyed. You use barriers to prevent transmission of infectious agents with sterile technique, we think of anything invasive,
especially surgical procedures putting in IV catheters, anything that goes into the body we should be using sterile technique.

**THE ROLE OF CDC AND OSHA:** CDC is the Center for Disease Control and Prevention and they are located in Atlanta, Georgia and under the Department of Health and Human Services, which is the Federal Government - the CDC falls under them. They make non-regulatory recommendations for disease control. They introduced the standard precautions and transmission-based precautions in 1996, which they have continued to make changes to since. OSHA is the Occupational Safety and Health Administration and they publish and endorse rules to help keep workers safe including infection control. OSHA is run by the State. It requires written documentation and follow up on exposures and accidents. Now, standard precautions protect us and patients. One thing standard precautions help with are the prevention of what we call nosocomial infections. Nosocomial infections are hospital-acquired infection – that means the patient did not come in with that infection, but they left with that infection. So, somehow, we gave it to them. Standard precautions are used for the care of all patients regardless of diagnosis or presumed disease status. It is designed to reduce the risk of transmission of microorganisms from moist body fluids like blood, like all body fluid secretions, excretions, except for sweat. Non-intact skin is protected with universal precaution and/or mucous membranes are protected with the use of standard or universal precautions. Standard precautions protect from contamination, the process by which an object, person or area becomes unclean. The methods of prevention include hand washing. You should wash your hands at the beginning and end of every shift, anytime you go between the patients, after using the bathroom, before handling food, after removing gloves, after covering your mouth and/or your nose when coughing or sneezing, when providing tooth brushing, or drinking glasses, or towels or wash cloths, prior to handling raw fruit and vegetables, before serving them to the patient. You may also substitute alcohol and foams and gels during procedures involving multiple patient contacts. Instead of hand washing, you can use those alcohol-based foams for cleaning your hand. Sharps disposals are also covered understand standard precautions. Remember, needles are never bent, broken, or recapped by hand. They should always be disposed off in the appropriate sharps containers along with any other sharp that we may use, which includes the razors that a nursing assistant may use to shave the patient with. Personal protective equipment what we refer to as PPE is part of standard precaution. The government requires all facilities to provide you with personal protective equipment – it should be available. Gloves are required with contact with blood, body fluids, dressings, tissues, or contaminated surfaces or contact with non-intact skin or mucous membranes. Remove those gloves when your contact is complete and then wash her hands. Remember, you should wash before and after the patient contact. If your gloves are punctured, broken, or torn, remember to remove them and remember we always change our gloves between patients. We never ever reuse our gloves. Now, there are times for double gloving maybe required when necessary according to your policy and sometimes we double glove when somebody is on isolation. So, our inner glove is clean, we have a contaminated outer glove and sometimes I double glove if I got a big mess to clean up because my gloves are so soiled that I need to be able to pull off a pair of gloves and still be able to dig into whatever soiling is there. Just remember that is required and/or necessary according to your policy, you need to double glove. Gowns and aprons are used as moisture resistant gowns, when the possibility of soiling of blood or body fluids is there. If you think anything might splash on you, you should use a non-porous or moisture-resisting gown and remove it when the procedure is complete and prior to
leaving the room. Face shields protection is available as well. You can wear a mask to protect you from droplet organisms being spread or goggles to protect your eyes from droplets or sprays or splashes with facials to protect your eyes, nose, and mouth.

Now there are some environmental controls. We need to use EPA registered disinfectants on solid surfaces including floors, furnishings, bathrooms, and utility rooms. Reusable equipment must be clean or disinfected before reuse. Mouthpieces for resuscitation are necessary and waste and soiled linen should be placed in plastic bags and disposed of according to policy. We must wipe up body fluid spills immediately and disinfect and do not eat, drink, or apply makeup, or handle contacts in any area where it may be contaminated. Label your biohazard for sharps and for blood and watch for lab specimen’s label and transport. There are certain transmission-based precautions that are taken. We use these for patients that are known or suspected to be infected with pathogens transmitted by the following methods: If somebody has a disease that is airborne or droplet or contact or even special contact, which is our C difficile, these patients are placed on isolation or transmission-based precautions that are guidelines set up for by the CDC. The isolation is needed to separate the patient to prevent the spread of microorganisms to not only healthcare providers, but to other patients and family members that are there visiting. So, remember that those isolation-based precautions should be followed, and not only by healthcare providers, us, but also by family members and by physicians. When you see a family member go in there and fail to put on the proper equipment and gown, it is a good time to educate them because what is happening is they may be getting that microorganism on their clothing then what they do is they go back down to the waiting room or to the hospital cafeteria or to the gift stop and they are spreading that infection. So, although they may already have been exposed to that bacteria or microorganism, it is important to explain to them that not everybody in the hospital has, and so you are not protecting them from their loved one, they are helping protect everybody else there that may not can fight infection as well.

Again, isolation precautions are used in addition to the standard precautions, so those transmission-based precautions are added to the standard precautions that already exist. The type of precaution is dependent on the type of organism and how they spread. Again, the Centers for Disease Control guidelines are to be used on all of these. There is a psychological effect of transmission-based precautions. They have done a study interestingly enough that if you are on isolation and/or you are a very important person or a VIP in a hospital, you receive less care and you have less visits into your room than the regular population of patients, and there is a psychological effect. You do not like to put on all of that equipment. It interferes with their basic needs of safety, less self-esteem and self-actualization. There are methods for existing patients, and to meet those needs, explain the reason for isolation to them, frequently check on those patients and their condition instead of letting them feel like they are being avoided. Provide patients with distractions, books, television, magazines, and things like that. Instruct families and visitors on isolation technique, and if they can stay as long as they want to, just help them understand why they are on isolation. Make sure that the equipment necessary is available to take care of them and that their call light is in reach and answer it promptly when they use it. Talk to the patient when in the room and giving care and make them feel welcome and safe. There are certain skills that need to be provided to those patients and that need to be done without spreading microorganisms. Distribution of ice and water is one of those skills. If the water
pitcher is in an isolation room, you should not take it out of that room to go fill it up and bring it back in. So, there are skills for distributing ice and water. Hand washing is very important.

Gloving, gowning and masking and washing hands again when doing gloving, gowning and masking, before and after - remember when you do put on a gown, you should always tie the top first and then the bottom. In a mask, same thing, you always tie the top first and then the bottom. So, the top is considered clean, the bottom is considered contaminated. When you remove a mask or gown, you remove them in the opposite order. You untie the bottom, then the top and you always start with the gown and then the mask. When you remove gloves, remember to remove them from the inside out and remember to do your care and remove those gloves and wash hands. Remove your mask bottom tie first then top, remove gown bottom tie first, then top, and again wash your hands.

I hope that this program was helpful in preventing the spread of microorganisms in our healthcare facility.

Thank you for spending your time with me and enjoying this program.

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