Standard Precautions: The Nurse's Role

3 Contact Hours

Written by: Colleen Garcia, RN, BSN, CLC, CCE

To earn a certificate and contact hours, students must take test and pass with a score of 80% or greater.

Objectives:

1. Explain the transmission process of common diseases
2. Identify when and how to perform hand washing, the use of PPE, safe injection practices, Respiratory Hygiene/Cough Etiquette, and safe disposal of contaminated equipment and materials
3. Identify when and how to use Standard Precautions, Airborne Precautions, Contact Precautions, Droplet Precautions, and Neutropenic Precautions
4. Explain how to prevent the transmission of common diseases such as influenza
5. Explain how to prevent the occurrence of common diseases and conditions like hospital-acquired pneumonia

Introduction:

In any group of nurses, there is diversity. We nurses seem to thrive on this diversity among us; but the thing that draws us together is far stronger than our differences, it's our desire to serve others. Think about it, it is you, the nurse, who sits with the HIV+ patient talking and holding their hand, it's you who runs into the isolation room when the patient slips and falls, it is you who cares for your patients with everything you have. This compassion makes you the excellent nurse that you are, it also means that you get to come into contact with over 20 pathogens on any given patient at any time. For this reason, because you are on the front-line, that standard precautions are important enough to take this online course.

What are Standard Precautions

Standard precautions were first established in 1996 by the Centers for Disease Control (CDC) with a goal of preventing the spread of communicable diseases in hospitals and healthcare settings. They have since become one of the cornerstones of infection prevention.

The CDC recommends standard precautions be used by nursing and healthcare workers for the care of all patients at all times, regardless of their diagnosis or presumed infection status. While there are many components of standard precautions, those centered around nursing care include hand hygiene, use of personal protective equipment (PPE), and care and cleaning of the environment.

Definitions…

It's important to understand terminology when discussing Standard Precautions, so let's review a few terms:

- *A **pathogen** is a disease producing microorganism.*
- ***Transmission** is any mechanism by which a pathogen is spread by a source or reservoir to a host.*
- ***Reservoir** is any person, animal, plant, soil, substance, or any combination of these in which an infectious agent normally lives and multiplies. The infectious agent depends on the reservoir for survival, and the reservoir must provide a place where it can reproduce itself in such a manner that it can be transmitted to a susceptible host.*
- ***Susceptibility** is defined as the inability of a host to resist infection with a particular pathogen.*
- ***The common vehicle** is a contaminated material, product, or substance that serves as an intermediate means by which an infectious agent is transported to two or more susceptible hosts.*
- ***Colonization** is when an organism is present without host interference or interaction, like normal skin flora.*
- ***Host**: An organism in which another organism can live and potentially multiply.*
- ***Infection** is when there are invasion and multiplication by a microorganism. Infection may be local or systemic; it may begin as local and become systemic, and; there may be no apparent host response or clinical signs and symptoms caused by the infection and/or the host response.*
- ***Infectious disease** is when the infected host shows a decline in wellness due to an infection.*
- ***Incubation period** is the time between the beginning of an infection and recognition of symptoms.*
- ***Latency** is the time after primary infection during which the microorganism lives within the host without producing clinical evidence.*
- ***Virulence** is the degree of pathogenicity of a microorganism, i.e., how easily it can invade a host and the severity of the disease it can cause.*

Transmission

A chain of events is required for infection to occur. These events are a causative organism, a reservoir for the organism, a means to exit the reservoir, a mode of transmission, as susceptible

host, and a mode of entry into the host. Causative organisms may be bacteria, rickettsiae, viruses, protozoa, fungi, or parasites. The characteristics of causative organisms are as follows:

- Pathogenicity: The ability of a microorganism to cause disease.
- Virulence is the degree of pathogenicity of a microorganism, i.e., how easily it can invade a host and the severity of the disease it can cause.
- Invasiveness: The ability of a microorganism to enter into and move through tissue.
- Infectious dose: The number of organisms needed to initiate an infection.
- Organism specificity: Host preference of the infectious agent.
- Antigen variations: The ability of an infectious organism to change its surface proteins in order to escape host defenses.
- Toxigenicity: The capacity to produce toxins.
- Resistance: The ability to develop resistance to antimicrobial agents.

The organism and its reservoir are the sources of infection. The organism must have a means to exit the reservoir. In an infected host, the organisms exit through the respiratory tract, gastrointestinal tract, genitourinary tract, or drainage from a wound. A route of transmission is necessary to connect the source of infection to its new host. Routes of transmission are contact or airborne.

Transmission Types:

Contact transmission

Direct contact: person to person contact.

Indirect contact: Usually contact with a harmless inanimate object. The infected inanimate object is called a fomite. Fomites can survive on objects and surfaces for a long time and be a potential source of infection for weeks and months, e.g., fomites containing norovirus and Clostridium difficile.

Droplet contact: Large particles from coughing, sneezing, or talking.

Airborne transmission

Droplet nuclei: Residue of evaporated droplets that remain suspended in the air. Pathogens spread by airborne transmission include

- Mycobacterium
- Tuberculosis
- Varicella

Dust: Particles in the air containing the infectious agent.

Pathogens

Any agent causing disease.
Usually a living microorganism.
Capable of producing infection.
Poisons like Arsenic would be excluded.

VIRUSES

Multi-celled but can only reproduce inside a plant, animal, or person.

Hepatitis	SARS
Herpes, Mono	AIDS,HIV
Warts	Influenza
Chicken Pox	Cold Sores
Small Pox	Cold Germs
Bird Flu H5N1	Measles
Norovirus	Tetanus
Yellow Fever	Typhoid

Ebola Hemmorhagic Fever

BACTERIA

Tiny one-celled creatures
Can live inside or outside the body.

Tuberculosis	Pheumonia
Anthrax	Urinary Tract Infection
Staph	Peritonitis
E.Coli	Strep Throat
Typhoid	Stomach Ulcers
Salmonella	Tularemia
Morgellons ?	Lyme Disease

FUNGI

Multi-celled but plant-like similar to tree fungus.
Takes nutrition from a plant, tree, or animal.

Ringworm	Yeast Infection
Adv Pneumonia	Histoplasmosis
Candidiasis	Cryptococcosis

PROTOZOA

One-celled creatures.
Usually spread through water.

Malaria	Giardiasis
Chagas Disease	Cryptosporidiosis

PARASITES

Actual complex living organism.
Can live in intestinal tract or blood stream.

Round Worm	Tape Worm
Morgellons ?	Triginosis

PROTEIN

Multi-celled but can only reproduce inside a plant, animal, or person.

BSE Mad Cow Disease
vCJD Disease

Incomplete list gathered from various medical books.

The following table outlines the organism, the mode of transmission and incubation period for most common microorganisms and parasites.

Disease/Condition	Organism	Mode of Transmission	Incu
Acquired immunodeficiency syndrome (AIDS)	Human immunodeficiency virus	Sexual Percutaneous Prenatal Stage 1 HIV is passed from one person to another. The virus travels through the bloodstream to many different places in the body.	Media
Amebiasis	*Entamoeba histolytica*	Contaminated water Contact with raw vegetables	2-4 we longer
Chancroid	*Haemophilus ducreyi*	Sexual	4-7 da
Chickenpox	*Varicella zoster*	Airborne	10-21
Cholera	*Vibrio cholerae*	Ingestion of water contaminated with human waste	A few
Creutzfeldt-Jacob disease	Prion protein	Unknown in most cases	12 mo
Cryptococcosis	*Cryptococcus neoformans, Cryptococcus gatti*	Inhalation, tissue inoculation, gastrointestinal. No person-to-person spread[10]	Unkno
Cyptosporidiosis	*Cryptosporidium*species	Ingestion of contaminated water Direct contact with carrier	2-10 d of 7 da
Cytomegalovirus (CMV)	Cytomegalovirus	Transfusion Transplant Sexual Perinatal Breast milk Contact with mucous membranes, saliva, or urine	Highly Newbo after d
Diarrheal diseases	*Campylobacter*species	Ingestion of contaminated food or water	24-72
	Clostridium difficile	Fecal-oral Efficient transfer by healthcare professionals to patients	Variab related of anti

Disease/Condition	Organism	Mode of Transmission	Incu
	Salmonella species	Ingestion of contaminated food or drink	12-72
	Shigella species	Ingestion of contaminated food or drink Direct contact with carrier	1-2 da
	Yersinia species	Ingestion of contaminated food or drink Direct contact with carrier Blood transfusion (Rare)	4-7 da
Giardiasis	*Giardia lamblia*	Fecal-oral transmission Ingestion of contaminated water or food The risk of acquiring *Giardia* infection from your pet is small. However, there are some steps you can take to lower your risk.[18]	1-3 we
Gonorrhea	*Neisseria gonorrhoeae*	Sexual contact	1-14 d
Hand, foot, and mouth disease	Viruses of the Enterovirus genus	Direct contact with nose and throat secretions, and with feces of infected persons	Not kn vary w
Foodborne hepatitis	Hepatitis A Hepatitis E	Ingestion of contaminated food or drink contaminated with infected fecal material, Direct contact with carrier Raw or uncooked meat, contact with infected feces	A: 2-6 E: 2-6
Bloodborne hepatitis	Hepatitis B Hepatitis C Hepatitis D	Blood, seman, and other body fluids, and perinatally Blood, sexual contact, and perinatally Only occurs in people infected with hepatitis B. Percutaneous	B: 6 we month C: Acu weeks D: Unc
Herpangina	Coxsackie virus	Direct contact with nose and throat secretions and with feces of infected persons	4-14 d
Herpes simplex	Human herpes virus 1 and 2	Contact with mucous membrane secretions during sexual activity	2 days
Histoplasmosis	*Histoplasma capsulatum*	Inhalation of airborne spores	3-17 d
Hookworms	*Necator americanus* *Ancyclostoma deodenale*	Contact with soil contaminated with feces	21-35
Impetigo	*Staphylococcus aureus* (most common), *Streptococcus pyogenes*	Contact with carrier	4-10 d
Influenza	Influenza virus A, B, or C	Droplet spread	1- 4 da
Legionnaires' disease	*Legionellapneumonphila*	Airborne from water source	2-12 d longer

Disease/Condition	Organism	Mode of Transmission	Incu
Listeriosis	*Listeria monocytogenes*	Perinatal Sexual	Unclea days
Lyme disease	*Borrelia burgdorferi*	Tick bite Relative sizes of several ticks at different life stages. In general, adult ticks are approximately the size of a sesame seed and nymphal ticks are approximately the size of a poppy seed.[34]	3-30 d
Lymphogranuloma venereum	*Chlamydia trachomatis*	Sexual	3-30 d
Malaria	P*lasmodium vivax* *Plasmodium malariae* *Plasmodium falciparum* *Plasmodium ovale*	Bite from genus *Anopheles* mosquito	7-30 d
Measles	Measles virus	Droplet spread and Airborne	7-14 d
Meningococcal meningitis or bacteremia	*Neisseria meningitidis*	Contact with pharyngeal secretions, perhaps airborne	1-14 d
Mononucleosis	Epstein Barr virus	Usually by contact with oral and pharyngeal secretions, also by blood and semen during sexual contact, and contact with infected blood or organs.[41]	4-6 we
Mycobacterial diseases (non-tuberculosis) Mycobacterium species	*Mycobacterium avium* *Mycobacterium kansaii* *Mycobacterium fortuitum* *Mycobacterium gordonae* Other *Mycobacterium*species	Variable: probably contact with soil, water, or other environmental sources. Not transmissible person-to-person	Variab
Mycoplasma pulmonary tract infections	*Mycoplasma pneumonia*	Droplet inhalation	1-4 we
Pediculosis	*Pediculus humanus capitus* (head louse) *Pediculus humanus corporis* (body louse)	Direct contact	Approx weeks
	Phthirus pubis (crab louse)	Sexual	Approx weeks
Pinworm	*Enterobius vermicularis*	Direct contact with egg-contaminated articles - Usually fecal-oral	1-2 mo
Pneumocystis pneumonia	*Pneumocystis jiroveci*	Inhalation	4-8 we

Disease/Condition	Organism	Mode of Transmission	Incu
Pneumococcal pneumonia	*Streptococcus pneumoniae*	Droplet spread	Probab
Rabies	Rabies virus	Direct contact of virus-laden saliva of a rabid animal into a bite or scratch. Transmission by aerosol and organ transplantation has been reported.	weeks
Respiratory syncytial disease	Respiratory syncytial virus	Self-inoculation by touching mouth or nose after contact with infectious respiratory secretions	2/8 da
Ringworm	*Microsporum*species *Trychophton*species *Epidermophyton floccosum*	Direct and indirect contact with lesions	4-14 d
Rocky Mountain Spotted fever	*Rickettsia rickettsii*	Tick bite	2-14 d
Rotavirus gastroenteritis	Rota virus	Fecal, oral	About
Rubella	*Rubella* virus	Droplet spread Direct contact	12-23
Scabies	*Sarcoptes scabiei*	Direct skin	1-4 da previo weeks exposu
Staphylococci	*Staphylococcus aureus* Coagulase-negative: *S. epidermdidis* *S. haemolyticus*	Direct contact with draining lesions Auto-infection from colonized nares	Variab
Streptococci	*Streptococcus pyogenes* groups A with about 80 serologically distinct types	Large respiratory droplets Direct contact with secretions Ingestion of contaminated food	Variab for gro pharyn
Syphilis	*Treponema pallidum*	Sexual	2-4 we
Tetanus	Clostridium tetani	Entry through broken skin	1 day t month days[62]
Trichinosis	*Trichinella spiralis*	Ingestion of insufficiently cooked food, especially pork and beef	1-2 da
Tuberculosis	*Mycobacterium tuberculosis*	Airborne	2-10 w immun weeks sympt

Disease/Condition	Organism	Mode of Transmission	Incu
Typhoid fever	*Salmonella typhi*	Ingestion of contaminated food or water	Usuall range month

For these organism and parasites to be the most effective to host infection, there must be a susceptibility to the infection. The factors include:

- Number of organisms to watch host is exposed and the duration of exposure
- Age, genetic constitution of host, and general physical, mental, and emotional health and nutritional status of the host
- Status of hematopoietic systems: efficacy of reticuloendothelial system
- Absent or abnormal immunoglobulins
- The number of T lymphocytes and their ability to function

Pregnant healthcare professionals are not known to be at a greater risk of contracting bloodborne infections; however, during pregnancy, the infant is at risk of perinatal transmission.
The organism must have a portal of entry into the host for infection to occur. Portals of entry are:

- Mucous membranes
- Non-intact skin
- Respiratory tract
- Gastrointestinal tract
- Mechanism of introduction (Percutaneous injury or invasive devices).

Antibiotic-Resistant Organism

One cannot discuss micro-organism and parasites without also discussing Antibiotic-resistant organisms that have become an increasingly serious problem in today's world. All microorganism that can cause disease are also capable of developing resistance to antibiotics, let's look at some of the most common ones.

Carbapenem-resistant Enterobacteriaceae

Enterobacteriaceae are gram-negative bacilli that are commonly found in the gastrointestinal tract. Common species of this family that cause infection include:

- Enterobacter
- Escherichia coli
- Klebsiella

Carbapenem-resistant Enterobacteriaceae (CRE) are resistant to treatment with carbapenem family of antibiotics, which include:

- Doripenem
- Ertapenem
- Imipenem
- Meropenem

These antibiotics have traditionally been used to treat pathogens that are resistant to broad-spectrum antimicrobials. The CRE is spread through contact with infected surfaces (e.g. hands or contaminated medical equipment), and infections with CRE are particularly dangerous as they can spread rapidly, and the mortality rate can exceed 40%. Antibiotics that are effective against multi-drug resistant gram-negative bacilli are still being developed, and much research is needed.

CRE infections do not usually occur in healthy individuals; they are more likely to occur in hospitalized patients who have a compromised immune syatem, patients who are mechanically ventilated, or those who have received multiple antibiotics.

The incidence of CRE infections is increasing. Control and prevention of CRE should be focused on the following seven factors:

1. Identifying colonized patients
2. Screening by taking stool, rectal, and perirectal cultures as well as wound cultures when appropriate
3. Strict adherence to handwashing protocol
4. Environmental cleaning
5. Patient and staff cohorting
6. Staff education
7. Using contact precautions

Drug Resistant Staphylococcus Aureus

Staphylococcus aureus is transmitted primarily via the hands of healthcare professionals as well as with contaminated equipment and surfaces. Transmission is very efficient, and S aureus colonizes the skin and nares easily. Once colonized, the person faces likelihood of infection when invasive procedures are performed.

Methicillin and oxacillin-resistant S aureus (MRSA, ORSA) are common causes of nosocomial infections in hospitals and extended care facilities. Methicillin-and oxacillin-resistant colonization are rarely recognized and MRSA colonization is quite common, so every patient must be assumed to have been exposed to and/or colonized with MRSA/ORSA. In addition, MRSA often contaminates medical equipment such as stethoscopes and environmental surfaces like computer keyboards. Methicillin- and oxacillin-resistant S aureus can produce toxins and invade body tissues. The only effective antibiotic for treating these infections is vancomycin. The Centers for Disease Control and Prevention (CDC) recommends strict adherence to Standard Precautions, correct and appropriate use of personal protective equipment (PPE), appropriate handling of medical devices and laundry, and Contact Precautions should be used if the facility has decided that MRSA is of special clinical or epidemiological significance.

Vancomycin intermediate S aureus (VISA) and vancomycin-resistant S aureus (VRSA) are classified by a lab test. The results of the test is called minimum inhibitory concentration (MIC),

which is the measure of the minimum amount of antimicrobial agent that inhibits bacterial growth in a test tube. Staph bacteria are classified as VISA if the MIC for Vancomycin is 4-8μg/ml, and classified as VRSA if the vancomycin MIC is >16μg/ml. These infections must be reported to the CDC and the state department of health. Patients who are infected with VISA or VRSA should:

- be in a single room
- Contact Precautions and Standard Precautions
- staff education is recommended
- minimize the number of staff caring for the patient
- flag the chart to alert staff of the situation.

Vancomycin-Resistant Enterococcus (VRE)

Enterococcus is a gram-positive bacterium that is normal flora of the gastrointestinal tract and female genital tract. It is a relatively weak pathogen, but it is capable of producing significant infections if the patient is infected with vancomycin-resistant enterococcus (VRE), treatment options for these infections are limited. People at risk for VRE infections include patients previously treated with vancomycin, patients in intensive care, patients who are immunocompromised, patients who have abdominal or chest surgery, and patients with in-dwelling IV or urinary catheters. Vancomycin-resistant enterococcus is transmitted primarily via the hands of healthcare professionals and by direct contact with contaminated equipment and surfaces. There have been many approaches used to control VRE in healthcare settings, and the methods used should be tailored to the clinical setting, the specific patient/patients involved, and the epidemiological characteristics of the situation. Contact precautions and standard precautions should be used to prevent transmission of VRE.

Multidrug-Resistant Tuberculosis (MDR-TB)

Tuberculosis (TB) is caused the Mycobacterium tuberculosis bacteria, and it is one of the oldest recognized infectious diseases. Multidrug-resistant tuberculosis is resistant to the following drugs:

- Isoniazid
- Rifampin
- Fluoroquinolones
- And at one of the three second-line injectable drugs used to treat TB.

The incidence of MDR-TB has increased in recent years due to poor compliance with prescribed drug regimens, inappropriate/incorrect prescribing, patient risk factors, and characteristics of specific TB strains. Infection control measures should include separation of the infected patient/patients, using Standard Precautions, Respiratory Hygiene/Cough Etiquette, minimal hospitalization time proper ventilation, and staff use of particulate respirators. Airborne Precautions are required.

Drug-Resistant Streptococcus pneumonia

Streptococcus pneumoniae is a pathogen that is commonly found in the upper respiratory tract. Infections with this pathogen are a common cause of pneumonia, meningitis, sepsis, bacteremia, and otitis media and a leading cause of morbidity and mortality. The elderly and the very young are the most susceptible. Transmission is from infected respiratory droplets, and it can be spread by coughing, sneezing, close contact, or contact with infected droplets, Penicillin-resistant and multidrug-resistant strains of this pathogen have begun to emerge and are widespread in some communities. A vaccine for the most common serotype of S pneumonia is available but underutilized. Contact Precautions, Droplet Precautions, and Respiratory hygiene/Cough Etiquette should be used when caring for patients who are infected with this pathogen.

Drug-Resistant Acinetobacter

Acinetobacter is a bacterium that is usually found in the soil and water, and on the skin of healthy people. People who are susceptible to infections with drug-resistant Acinetobacter are usually immunocompromised and/or have chronic lung disease or diabetes. Outbreaks of pneumonia, urinary tract infections, wound infections and blood infections from Acinetobacter occur in areas of healthcare facilities where very sick patients are cared for like intensive care units. People on ventilators, patients who have prolonged hospitalization, patients who have had an invasive procedure (e.g. insertion of a central line catheter) and patients who have open wounds are at greater risks. The morbidity and mortality rates associated with drug-resistant Acinetobacter infections are very high, and outbreaks of these infections in healthcare facilities are very difficult to control. Contact transmission is the primary wat that Acinetobacter is spread, so Contact Precautions and Standard Precautions with special attention to hand washing resistant Acinetobacter may need to be isolated, or their placement in the facility should be carefully considered.

Preventing the Exposure to Infectious Pathogens

Controls are incorporated into the healthcare work setting to avoid or reduce exposure to potentially infectious materials. Healthcare associated transmission is the transmission of microorganisms that are likely to occur in a healthcare setting, and it can be reduced by using engineered controls, safe injection practices, and safe work practices. Engineering controls are equipment, devices, or instruments that remove or isolate a hazard. Safe injection practices are equipment and practices that allow the performance of injections in an optimally safe manner for patients, healthcare providers, and others that reduce exposure to injury and/or infection. Work practice controls change practices and procedures to reduce or eliminate risks.

Standard Precautions

And finally, we get to the reason why you are going through this course. Standard Precautions are strategies for protecting healthcare professionals from occupational transmission of organisms; Standard Precautions also prevents patient-to-patient transmission and staff-to-patient transmission. Standard Precautions assume that all pre-existing patient infections cannot by identified. The primary underpinning of Standard Precautions is that all body fluids are secretions should be considered potentially infectious, and barrier precautions should be used routinely to protect from all sources of potential infection. Standard Precautions apply to nonintact skin and mucous membranes, blood, and all body fluids, secretions, and excretions, except for sweat (In certain circumstances even sweat can be considered infectious). In some cases, e.g., with certain pathogens such as HIV, some body fluids such as vomit are only considered to be a risk for disease transmission if they contain visible blood. Additional precautions are based on highly transmissible or epidemiologically important pathogen. Transmission based precautions (isolation) are Airborne, Droplet, and Contact Precautions.

Standard Precautions has six different elements:

- Hand washing
- Use of Personal protective equipment
- Safe and proper disposal of contaminated material and equipment
- Safe injection practices
- Respiratory Hygiene/Cough Etiquette
- Use of mask for procedures like insertions of catheters or injections into spinal or epidural spaces via lumbar puncture.

The new elements of Standard Precautions that have been added since they were formulated were designed to focus on patient protection. These elements are Respiratory Hygiene/Cough Etiquette, safe injection practices, and use of masks for insertion of catheters or spinal or epidural spaces via lumbar puncture.

Let's look a little closer at a few of these Standard Precautions:

Respiratory Hygiene/Cough Etiquette

Respiratory Hygiene/Cough Etiquette is a strategy to reduce transmission of respiratory infections at the first point of entry into a healthcare setting. There are signs used to educate both patients and families about Respiratory Hygiene/Cough Etiquette protocol that are posted at entry areas. The instructions are simple ones and state that persons with cough, congestion, rhinorrhea, or increased respiratory secretions should do the following:

- Cover the mouth and nose when coughing or sneezing.
- Dispose of used tissues promptly.
- Use surgical mask if coughing and if tolerated.
- Wash hands after contact with respiratory secretions.
- Separate at least three feet from persons with respiratory infections in common areas when possible.

Although the effectiveness of Cough Etiquette techniques has been questioned, it is still considered to be a mandatory part of infection control and its use among the lay public can be increased by education.

Healthcare personnel should observe Droplet Precautions when caring for patients who have signs and symptoms of a respiratory infection and for whom Respiratory Hygiene/Cough Etiquette is needed. Healthcare personnel who have a respiratory infection are advised to avoid direct patient contact, especially contact with high-risk patients. If this is not possible, then a mask should be worn while providing patient care.

Safe Injection Practice

Needle stick and sharps injuries are a common occurrence in healthcare. The World Health Organization (WHO) “reports in the World Health Report 2002, that of the 35 million health-care workers, 2 million experience percutaneous exposure to infectious diseases each year. It further notes that 37.6% of Hepatitis B, 39% of Hepatitis C and 4.4% HIV/AIDS in Health-Care Workers around the world are due to needlestick injuries. The CDC estimates that 350,000 sharps injuries occur each year, and these injuries are a potential cause for transmission of, and infection with Hepatitis B virus (HBV), hepatitis C (HCV), human immunodeficiency virus (HIV), and more that 20 other pathogens. Infections with each of these pathogens are potentially life threatening but they are also preventable. Literature reviews and individual studies have shown that compared to other health care workers, nurses are especially at risk for needle stick injuries, but housekeepers, physicians, laboratory staff, and other people who work in healthcare suffer these injuries as well.

One serious bloodborne infection can cost more than a million dollars for medications, follow up laboratory testing, clinical evaluation, lost wages, and disability payments, as well as the human costs after an exposure are immeasurable. Employees who have been exposed to a dangerous pathogen such as HIV may experience anger, depression, fear, anxiety, difficulty with sexual relations, difficulty sleeping, problems concentrating, and doubts regarding their career choice. This emotional effect can be a long lasting and have devastating effects, even after a low-risk exposure that does not result in infection.

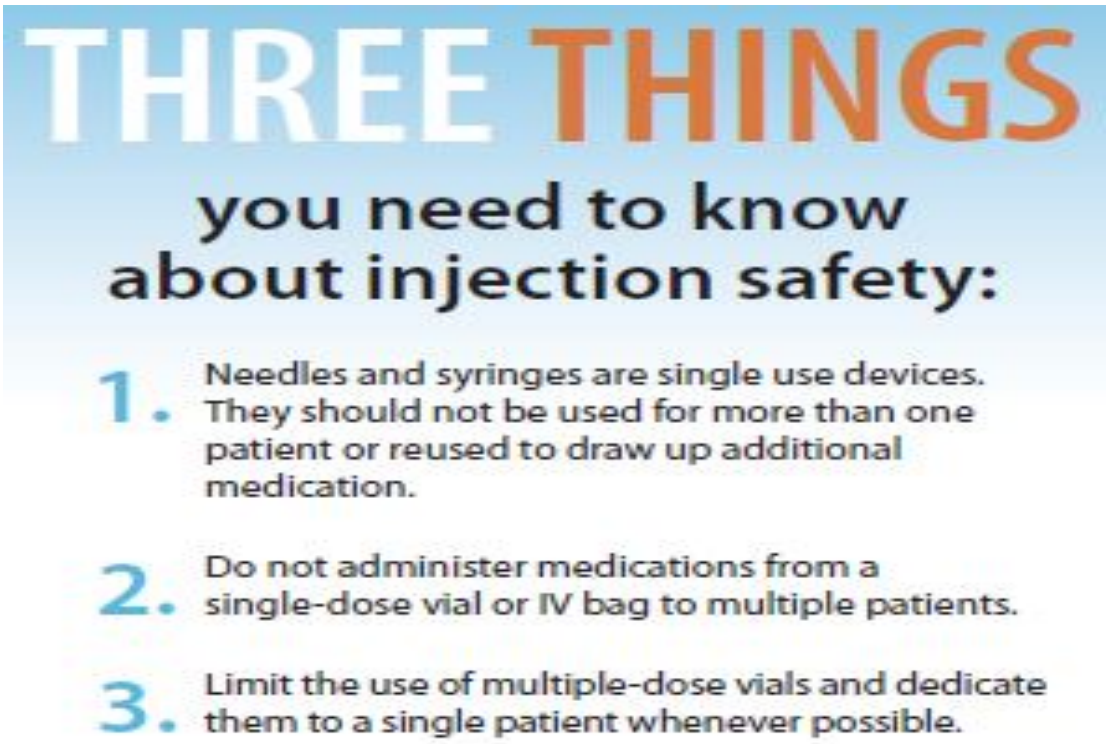
Percutaneous injuries can be avoided by eliminating the unnecessary use of needles, using devices with safety features, and promoting education and safe work place practices for handling needles and related systems. Since 1993, the use of engineered sharps devices has increased while the use of conventional sharps devices has decreased.

Vigorous efforts to prevent needle stick and sharps injuries have increased awareness of and use of safe injection practices, and improved equipment have helped to decrease the number of these injuries. The Needle Stick Prevention and Safety Act of 2000 was one such effort that mandated the use of engineered needle and sharps.

The following chart by the CDC reviews the nine steps for safe administration:

No.	Recommendation
1	Use aseptic technique when preparing and administering
2	Cleanse the access diaphragms of medication vials with into the vial
3	Never administer medications from the same syringe to changed or the injection is administered through an interv
4	Do not reuse a syringe to enter a medication vial or soluti
5	Do not administer medications from single-dose or single of intravenous solution to more than one patient
6	Do not use fluid infusion or administration sets (e.g., i patient
7	Dedicate multi-dose vials to a single patient whenever po for more than one patient, they should be restricted to a not enter the immediate patient treatment area (e.g., patient hemodialysis station)
8	Dispose off used syringes and needles at the point of use puncture-resistant and leak-proof
9	Adhere to "national" requirements for protection of h blood-borne pathogens

Content source: CDC. Guide to Infection Prevention for Outpatie
Safe Care. http://www.cdc.gov/HAI/pdfs/guidelines/standards-of-



Handwashing

Handwashing is the single most effect method for preventing patient-to-patient, patient-to-staff, and staff-to-patient transmission of microorganisms, and it is one of the foundations of infection control.

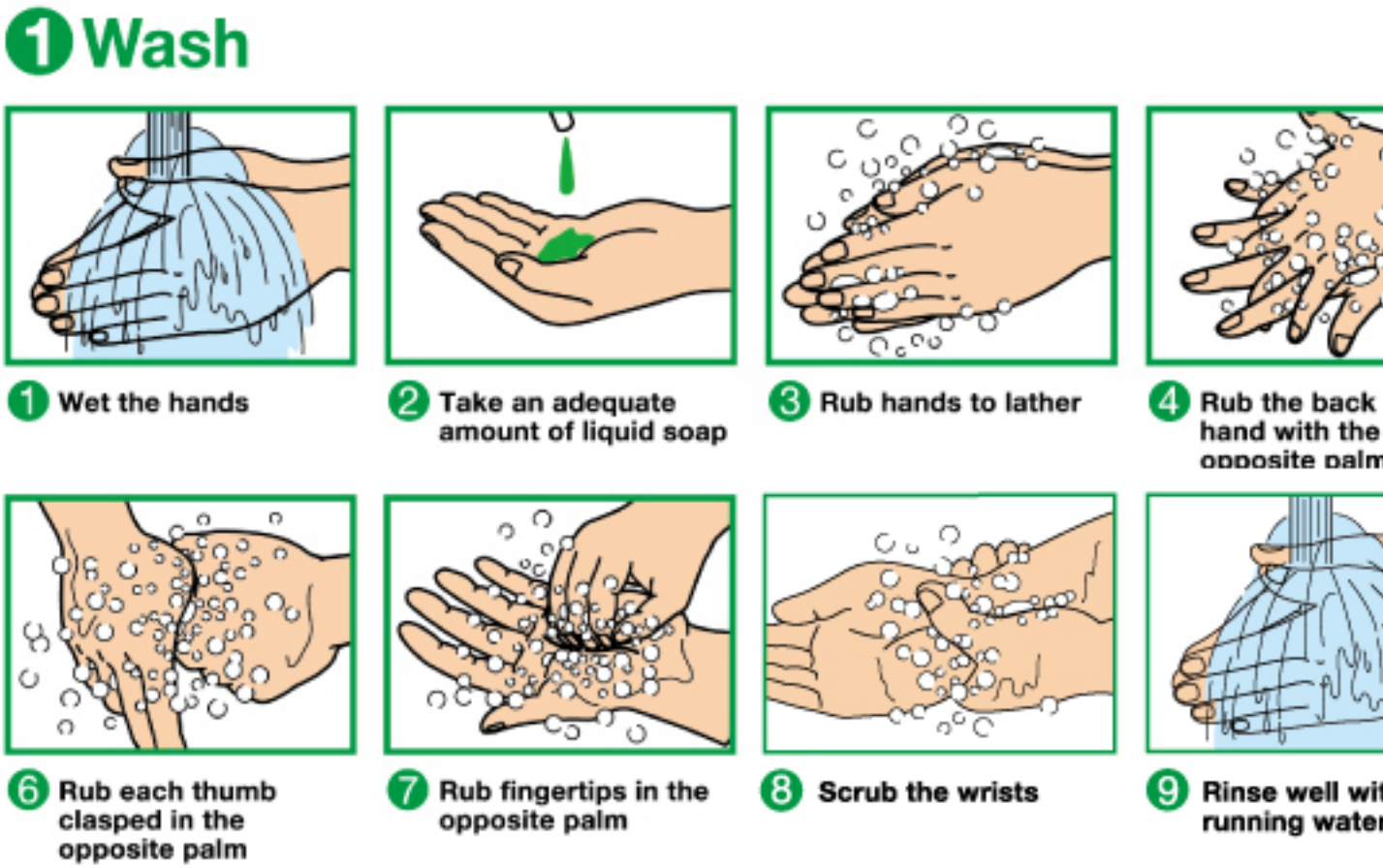
Hands should be washed, or alcohol-based rubs should be used:

- Before and after patient care
- Between patient contacts
- After gloves are removed
- After contact with blood, body fluids, secretions, mucous membranes, excretions, and contaminated equipment
- After contact with inanimate objects and medical equipment in the immediate vicinity of a patient
- After using the bathroom
- Before eating
- In certain situations, such as between tasks on the same patient to prevent cross contamination

Improved adherence to hand hygiene, (hand washing, use of alcohol-based hand rubs) have been shown to terminate outbreaks in healthcare facilities, to reduce transmission of antimicrobial resistant organisms such as MRSA and reduces overall infection rates.

However, despite the unequivocal evidence of the effectiveness of hand hygiene and mandatory hand hygiene education, healthcare professionals' compliance with hand hygiene protocols is often very low, at time <30%. There are many reasons why healthcare professionals are non-compliant with hand hygiene protocols, such as perceived lack of time, perceived inconvenience, high work load, and poor staffing. Interventions for improving compliance with hand hygiene protocol can increase compliance, and both the CDC and the WHO have published advice and guidelines for improving hand hygiene compliance. As part of these recommendations, the CDC is asking healthcare facilities to develop and implement a system for measuring improvements in adherence to hand hygiene recommendations. Some of the suggested performance indicators include periodic monitoring of hand hygiene adherence and providing feedback to personnel regarding their performance, monitoring the volume of alcohol-based hand rub used/1000 patient days, monitoring adherence to policies dealing with artificial nails, and focused assessment of the adequacy of healthcare personnel hand hygiene when outbreaks of infection occur.

The diagram below illustrates proper hand washing technique as per Saraya LTD, a leading hand hygiene company in Japan:



In addition to traditional handwashing with soap and water, the CDC recommends the use of alcohol-based cleansers by healthcare personnel who perform patient care because they address some of the obstacles that healthcare professionals face when taking care of patients and frequently washing their hands. Alcohol-based rubs have been shown to be very effective, in most cases as effective as soap and water. They significantly reduce the number of

microorganisms on skin, they are fast acting, and they cause less skin irritation than soap and water. When using an alcohol-based hand rubs, apply the product to the palm of one hand and rub your hands together, covering all surfaces of the hands and fingers until the hands are dry, approximately 20 seconds. It is possible for health care professionals can develop contact dermatitis due to alcohol-based hand rubs, but it is very uncommon. However, with increased use of these products by healthcare personal, it is likely that true allergic reactions to these products will occasionally by encountered. Alcohol-based hand rubs take less time to use than traditional soap and water methods, 20 seconds versus 40-80 seconds. In addition, hand rub dispensers can be mounted almost anywhere, unlike a sink and a water tap.

It's important to note that the use of proper hand hygiene does not eliminate the need for gloves. Gloves can significantly reduce hand contamination, prevent cross contamination, and protect patients and healthcare personnel from infection. It's the improper us of gloves that can greatly increase hand contamination. Gloves must be removed after patient contact and a new pair put on for each new patient contact, and they should be replaced if they are torn, damaged, or grossly soiled.

Healthcare personnel should avoid wearing artificial nails and keep natural nails less than one-quarter of an inch long if they care for patients at high-risk of acquiring infections, such as in the intensive care units or transplant units.

Handwashing with soap and water remains a sensible strategy for hand hygiene in non-healthcare settings and its use in these situations is recommended by the CDC and other experts.

Conclusion

As we started with this course, we will also end…with you. Healthcare professionals have an obligation to adhere to scientifically accepted standards for infection control and responsibility to monitor the infection control practices of subordinates. The correct incorporation of work practice controls and engineering controls help to avoid or reduce exposure to potentially infectious materials and hazards. Compliance with environmental infection control measures will decrease the risk of healthcare related infections among patients, especially the immunocompromised, and among healthcare professions.

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