

2.02

Infection Control

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Study this!

Objective 2.02

Understand infection control procedures

Essential Questions

1. What are some principles of infection and infection control?
2. What methods are used to control the spread and growth of microorganisms?

I Principles of infection

A. The types of Infections

a. Infection

- i. Is the invasion of the body by microorganisms
- ii. These invading microorganisms are capable of the following:
 1. Using the host's resources to multiply
 2. Being able to interfere with the body's normal functions
 3. It is the 3rd leading cause of death in the U. S. and 1st Globally

b. Local Infections occur when only in a specific portion of the body is infected:

1. They cause localized pain
2. They cause localized redness
3. Heat at the site of infection
4. Localized swelling to the infected area
5. Pus coming from the infected site
6. And a foul smelling drainage from the infected site

c. Systemic infections affect the entire body

1. They produce fever
2. Generalized aches
3. Chills
4. Nausea
5. Vomiting
6. And weakness

d. Infections can also be classified according how they were acquired; this includes:

- i. Endogenous infections – (endo – inside; genous – type or kind) a type or kind of infection or disease that originates from in the body, such as diabetes
- ii. Exogenous – (exo – outside; genous – type or kind) a type or kind of infection or disease that originates from outside the body, such as TB
- iii. Nosocomial infections are acquired through two avenues, which include:
 1. Hospital acquired – from just being in the hospital

2. Transmitted by the healthcare worker, especially those who do not use Standard Precautions
3. It is best to move the patient toward discharge as quickly as possible
- iv. Opportunistic infections occur when the body's defenses are weakened; they look for the immunosuppressed patient/individual

B. Classes of Microorganisms

a. General information concerning microorganisms

i. Non-pathogenic

1. Those that are normal within our bodies
2. They do not produce disease
3. They are beneficial in certain areas; i.e. bacteria in the digestive tract, e-coli
- ii. Pathogenic – they are capable of causing infection and disease
- iii. A microorganism may be non-pathogenic in one body system, yet pathogenic in another (E. coli is present in the bowel and is beneficial yet may be deadly in the circulatory system)
- iv. They may be aerobic – require oxygen to live
- v. They may be anaerobic – do not require oxygen to live
- vi. They may be facultative – may live with or without oxygen

b. The main classification of microorganisms include the following:

i. Bacteria – often considered the causes for disease

1. Certain bacteria

- a. Are used to produce antibiotics and other products
- b. Live in the body without problems
- c. Live in the roots of certain plants, converting nitrogen into a usable form
- d. Help to break down dead organic matter

2. Classified by the shape and arrangement; such as the following:

a. Cocci – i.e. Streptococcal pharyngitis

- i. Round in shape
- ii. Diplococci – i.e. gonorrhoea, meningitis and pneumonia
- iii. Streptococci – i.e. a severe sore throat or rheumatic fever
- iv. Staphylococci – common pus producing infection; i.e. boils, UTI, wound infections and toxic shock

b. Bacilli

i. Rod shaped

1. Single
2. Pairs
3. Chains

ii. May have flagella

iii. May form spores and are difficult to treat

iv. Diseases include TB, tetanus, pertussis, botulism, diphtheria and typhoid

c. Spirilla – spiral or corkscrew shaped

i. Vibrio

ii. Spirochete

iii. Diseases include syphilis and cholera

3. Bacterial infections are treated with **antibiotics**

4. Some bacteria develop resistance to antibiotics; through indiscriminate use (not taking as prescribed); examples include:

a. Methicillin-resistant Staphylococcus (MRSA)

b. Multidrug-resistant Staphylococcus (MDSA)

ii. Protozoa

1. One celled, animal-like organisms found in decayed materials, animal or bird feces, insect bites and contaminated water
2. Contain a nucleus and other defined organelles
3. Diseases include malaria, amebic dysentery, trichomonas (a sexually transmitted disease), and African sleeping sickness (transmitted through the tsetse fly, is curable with medication, but fatal if left untreated)

iii. Fungi

1. These are organisms that usually enjoy a symbiotic, but sometimes parasitic relationship with their host
2. Provide numerous drugs and foods; industrial processing of certain drugs such as two anti-cholesterol statins, the antibiotic penicillin and cyclosporine A (immunosuppressant); as well as food, i.e. mushrooms
3. Provides the bubbles in bread, champagne, and beer
4. Cause a number plant and animal diseases: including aspergillosis in birds; mycotoxicosis in poultry; and moniliasis in crops (http://wiki.answers.com/Q/Type_of_fungal_diseases_in_animals)

5. Fungal diseases are very difficult to treat; antifungal drugs must be taken for long periods and may cause liver damage
6. Disease include ringworm, athlete's foot, histoplasmosis, yeast vaginitis, and thrush

iv. Rickettsiae

1. Are rod-shaped, parasitic bacteria
2. They live in the tissues of ticks, fleas, and lice
3. They are transmitted to humans through the bites of the carrier
4. They invade the new host from within
5. Diseases include typhus fever (common in overcrowded areas, fever with red spots, that causes delirium, gangrenous sores and smell like rotting flesh, is very contagious, vaccine available) (<http://en.wikipedia.org/wiki/Typhus>) and Rocky Mountain spotted fever (difficult to dx, and is fatal if not treated promptly, transmitted through a vector [mosquito, tick, or mite]) ([http://en.wikipedia.org/wiki/Rocky Mountain spotted fever](http://en.wikipedia.org/wiki/Rocky_Mountain_spotted_fever))
6. Most are treated with antibiotics

v. Viruses

1. These are small, infectious agents
2. They require a host to survive
3. There are over 5,000 types
4. They can combine in multiple ways to produce a wide range of diseases
5. They produce an immune response in humans
6. They are treated with antiviral drugs
7. Diseases include SARS (Severe Acute Respiratory Syndrome), West Nile Virus, Monkey pox, Filoviruses [Ebola & Marburg], H5N1 [avian or bird flu], Hepatitis B, Hepatitis C, and AIDS [HIV]

vi. Helminthes

1. Is a parasitic worm-like organism
2. They live inside the host
3. They feed off their host
4. They disrupt nutrient absorption
5. They lead to weakness
6. They secrete toxins making the host susceptible to other diseases
7. Approximately 30 billion people globally are infected
8. Diseases include hookworm that live in the small intestines & can affect the heart and lungs; ascariasis that live in the small

intestines and cause obstruction; Trichinella Spiralis which causes trichinosis through eating raw meat or poorly cooked pork; enterobiasis commonly called pinworm affects young children, and others

C. Transmitting infection

a. Infections can be transmitted in a variety of ways, they include:

i. Direct contact

1. Person to person; i.e. shaking hands, exchanging bodily fluids, pink-eye, lice, etc
2. Animal to person; a bite from an infected animal, such as rabies
3. Mother to unborn child; infection is carried across the placenta to the fetus, especially if there is an exchange of blood during birth, as in AIDS/HIV; blindness d/t herpes simplex, contracted during the birthing process

ii. Indirect contact

1. This occurs when a pathogen is passed to an individual on some form of inanimate object
2. Examples of these infections include, but are not limited to the following:
 - a. Respiratory illness – person blows his/her nose, does not wash their hands, touches a door knob, and the victim touches the knob and picks up the illness or leaving dirty tissues on the counter and victim picks up the tissue
 - b. HIV – sharing of needles

iii. Airborne infection

1. The pathogens are carried through the air, they are lighter than air
2. They cling to the surroundings and are spread, you inhale them
3. Generally the infected individual is placed in a negative pressure room
4. Examples of these infections include, but are not limited to the following:
 - a. Tuberculosis – coughing up blood or phlegm, night sweats, fever, weight loss and tiredness; treat with antibiotic such as isoniazid or rifampin for six months, depending on severity

- b. H1N1 – also called swine flu; fever, diarrhea, chills, sore throat, headache, body aches and fatigue; treatment – none typically for a healthy person, those at risk (pregnant women, AIDS/HIV, young children (<5) and those with chronic medical conditions, such as asthma and can be treated with meds such as oseltamivir and zanamavir; if not treated can result in pneumonia, respiratory arrest and exacerbation of other diseases
(<http://www.livestrong.com/article/79478-list-air-borne-diseases/>)
- c. Chicken pox – starts with a vesicular skin rash on the head and body, becomes very itchy; transmitted through coughing or sneezing, or through direct contact with the rash secretions ; a person is contagious at least two days prior to the rash appears and will remain such until all lesions have crusted over (at least six days)
(http://en.wikipedia.org/wiki/Chicken_pox)

iv. Vector-borne infections

1. In these diseases, an insect carries the pathogen from host to host and is transmitted through the bite of the insect
2. Some infections acquired this way include, but are not limited to the following:
 - a. Mosquitoes are the most important of the disease vectors, only the female can transmit the disease because they have the knife-like mouthparts, as there are over 3,000 species throughout the world; causing the following: Malaria, Yellow fever, Dengue Fever, West Nile virus, just to name a few
 - b. Ticks – live longer than mosquitoes, the hard ticks will feed only a few times during their lifespan, this limits the odds of getting a disease, but they are relatively efficient vectors. The soft ticks live longer and can feed longer. Diseases include tick-borne Encephalitis, Lyme Disease and Tick-born Relapsing Fever
(<http://mosquitozone.com/page8/assets/Vector%20Borne%20Disease%20Lo-Res.pdf>)
 - c. Fleas, though small, can bite and spread diseases mostly to cats and dogs, but can spread certain ones to humans as well; diseases include:
 - i. Cat-scratch fever, a bacterial disease, spread through young cats or kittens, most infections

occur at site of scratch, lymph nodes may become swollen in head, neck and upper limbs, the person may also have fever, headache, fatigue and poor appetite, there are rare complications, and can be prevented through flea control

(<http://www.cdc.gov/healthypets/diseases/catscratch.htm>)

- ii. Typhus – Rickettsia bacteria, spread by fleas, lice and rats; was common in prisons due-to filth; fever and red spots over arms, back, and chest, progressing to delirium, gangrenous sores, and the stink of rotting flesh; Azithromycin, most common drug of choice

<http://en.wikipedia.org/wiki/Typhus>

- iii. Plague is caused by Yersinia pestis transmitted through a flea bite; usually signs form swollen and very tender lymph nodes, that are painful (a swollen node is called a bubo, thereby the term bubonic plague) these appear in the groin, armpit or neck; symptoms also include fever, chills, headache, and extreme exhaustion; the person must be hospitalized and isolated and treated with antibiotics, asap, with Streptomycin being the drug of choice;

- iv. (<http://www.cdc.gov/ncidod/dvbid/plague/resources/plagueFactSheet.pdf>)

b. How do you get an infection? –

- i. Through the chain of infection, which includes the following:

1. Causative agent – the pathogen; kind of pathogen varies, i.e. bacteria, etc
2. Reservoir – where the pathogen lives, i.e. in a human, vector, or inanimate objects
3. Portal of exit – is the way that the pathogen escapes its reservoir, i.e. nose or bite
4. Mode of transmission – how the pathogen travels or is transmitted to the host or next host
5. Portal of entry – the way the pathogen is able to enter the new reservoir/host, i.e. a scrapped knee
6. Susceptible host – someone who can be affected by the pathogen and is likely to get sick from the transmission; the healthy are

usually able to fight off the attack, unless the attack is overwhelming to the system

II Methods used to control the spread of infection

A. Vaccinations

- a. The administration of a foreign antigen to produce immunity to a disease
- b. Most effective and least expensive method to prevent disease
- c. The injected pathogen may be live, weakened (attenuated), killed or inactivated
- d. Administered to stimulate the immune response (antigen antibody reaction)
- e. May be given after the disease exposure or after the disease was contracted
- f. Usually given by injection or orally

B. Aseptic control

a. Antisepsis

- i. Is effective in preventing or inhibiting the growth of a pathogenic organisms, but not spores or viruses
- ii. It is safe to be used on the skin, i.e. alcohol, peroxide, PhisoHex and Betadine

b. Disinfection

- i. This destroys the pathogenic organisms that are already present
- ii. It is not effective against spores or viruses
- iii. These are chemicals
- iv. They may not be used on the skin
- v. Examples include; bleach, Lysol, and other household and medical types

c. Sterilization

- i. This kills all microorganisms, including spores and viruses
- ii. The different methods include
 1. Autoclave
 - a. Steam under pressure
 - b. Gas
 2. Radiation through the use of electron beams, x-rays, gamma rays or subatomic particles; generally used for disposable medical equipment, devices, or large packages and pallet loads of medical devices.
 3. Chemicals, i.e. bleach is effective when used in the proper ratio
- iii. This cannot be used on the skin (dah!)

- C. Precautions are those things healthcare providers use to protect, not only the patient, but themselves and their employers
- a. Standard precautions
 - i. These are to be used on all patients
 - ii. They are a set of guidelines/rules created by the CDC to be used at all times when providing patient care by all employees
 - iii. All body fluids must be considered potentially infectious and as well as all patients
 - b. The Standard Precaution guidelines for handwashing, as recommended by the CDC, include the following:
 - i. Most common mode of transmission of pathogens
 1. Infections acquired in the health care settings
 2. Spread of antimicrobial resistant
 - ii. Evidence of Relationship between hand hygiene & health care associated infections
 1. Substantial evidence that hand hygiene reduces the incidence of infections
 2. Historical study; Semmelweis
 3. More recent studies: rates lower when antiseptic handwashing was performed
 - iii. Indications for hand hygiene
 1. When the hands are visibly dirty, contaminated, or soiled, wash with non-antimicrobial or antimicrobial soap and water
 2. If hands are not visibly soiled, use an alcohol-based handrub for routinely decontaminating hands
 3. Specific Indications for hand hygiene
 - a. Before:
 - i. Patient contact
 - ii. Donning gloves when inserting a CVC
 - iii. Inserting urinary catheters, peripheral vascular catheters, or other invasive devices that don't require surgery
 - b. After:
 - i. Contact with a patient's skin
 - ii. Contact with body fluids or excretions, non-intact skin, or wound dressings
 - iii. Removing gloves

iv. Recommended hand hygiene technique

1. Handrubs

- a. Apply to palm of one hand, rub hands together covering all surfaces until dry
- b. Volume: based on manufacturer

2. Handwashing

- a. Wet hands with water, apply soap, rub hands together for at least 15 seconds (changes 1/1/2013 20 secs)
- b. Rinse and dry with disposable towel
- c. Use towel to turn off faucet

v. Fingernails and artificial nails

1. Natural nail tips should be kept short; no longer than the end of the finger tip
2. Artificial nails should not be worn

(Guideline for Hand Hygiene in Health-care Settings. *MMWR* 2002; vol. 51, no. RR-16.)

c. The following are Standard Precaution guidelines for the selection of PPE (Personal Protective Equipment) in the health care setting (all the following material was taken from the HSII power point for objective 2.02, CDC PPE for HS II, PPE Use in Healthcare Setting)

- i. PPE are specialized clothing or equipment that is worn by an employee for their protection against infectious materials (OSHA)

ii. Regulations and recommendations for PPE

1. OSHA issues workplace health and safety regulations, regarding PPE, the employer must do the following:
 - a. Provide appropriate PPE for employees
 - b. Ensure that PPE is disposed or reusable PPE is cleaned, laundered, repaired and stored after use
2. OSHA also specifies circumstances for which PPE is indicated
3. CDC recommends when, what and how to use PPE

iii. The types of PPE used in the health care settings include

1. Gloves – when in contact with anything that may be possibly contaminated or an invasive procedure; to protect the hands
2. Gowns – when a procedure may cause splashing or spraying of a contaminated product or blood; to protect skin and/or clothing
3. Mask and eye protection – same as above; i.e. irrigation of a wound, suctioning of a patient or dental procedures; to

protect mouth/nose; i.e. respirators protect respiratory tract from airborne infectious agents

4. Goggles – protect eyes
 5. Face shield – protect face, mouth, nose, and eyes
- iv. Factors that influence PPE selection
1. Type of exposure anticipated
 - a. Splash/spray (large/small) versus touch
 - b. Category of isolation precautions
 2. Durability and appropriateness for the task, i.e. if a gown or apron is needed, if it needs to be fluid resistant, fluid proof, or neither
 3. Fit of the piece of equipment; is large or small need, it is up to the employer to ensure that all PPE are available in sizes appropriate for the workforce that must be protected
- v. The different types of PPE to be used when selections are made
1. Gloves are the most common type of PPE used in the healthcare setting.
 - a. There are several factors that are considered when selecting the right glove for a specified purpose
 - i. Is it for patient care or environmental services or other
 - ii. Which type of material needs to be used: vinyl, latex or Nitrile or other
 - iii. Do you need sterile or non-sterile
 - iv. Do you need one or two pairs
 - v. Do you need single use of reusable
 - b. Don's and don'ts for glove use
 - i. Change gloves
 1. During use if torn and when heavily soiled(even during use on the same patient)
 2. Always change between patient's
 - ii. Discard in appropriate receptacle
 - iii. Never wash or reuse disposable gloves
 2. Gowns or Aprons - There are three factors that influence the selection of a gown or apron
 - a. The purpose of the use

- i. A gown is preferred for isolation usage when the arms will be contaminated; they should also cover the torso and fit comfortably over the body and snug at the wrist
 - ii. Aprons can be used where limited contamination is anticipated
 - b. The material needed for the task
 - i. Natural or man-made – isolation gowns are either made of cotton or a spun synthetic material
 - ii. This dictates whether it can be laundered and reused or is disposable
 - iii. Cotton and synthetic gowns will vary in the degree of fluid resistance; if penetration is likely, than a fluid resistant gown should be used
 - c. The last factor is the concern for the patient, whether a clean or sterile gown is appropriate
 - i. Clean gowns are used for isolation patients
 - ii. Sterile gowns are necessary when performing invasive procedures; i.e. when inserting a central line, protects both the patient and the employee
- 3. Face protection
 - a. Comes in combination types to protect all or parts of the face from infectious materials
 - b. They type is determined by the isolation precautions needed for the patient and/or the nature of the patient contact
 - c. The mask protects the nose and mouth
 - i. Should fully cover both to prevent fluid penetration
 - ii. Has a flexible nose piece that is pinched to secure at nose
 - iii. Is secured to head with string ties or elastic if preferred

- d. Goggles provide a barrier protection for the eyes
 - i. Prescription lenses do not provide optimal protection and should not be used as a substitute for goggles
 - ii. They should fit snugly over and around the eyes or prescription lenses
 - iii. They also have antifog features that help maintain clarity of vision
- e. Face shields are use to protect the face, nose, mouth, and eyes
 - i. They are used when skin protection is needed in addition to the above; for example when irrigating a wound or suctioning copious secretions
 - ii. It should cover the forehead, extend below the chin, and wrap around the side of the face

4. Respiratory Protection

- a. It is used to protect the healthcare worker from inhalation of hazardous materials or infectious; i.e. Mycobacterium tuberculosis or TB
- b. Respirators filter the air before it is inhaled
- c. Types of respiratory protection include:
 - i. Particulate respirators
 - a. Are the most commonly used; i.e. the N95 (might be used to TB patient), N99, or N100
 - b. These contain a sub-micron filter that is capable of excluding particles that are less than 5 microns in diameter
 - ii. Half or full-face elastomeric respirators, depend upon the situation and fit of the equipment
 - iii. Powered air purifying respirators (PAPR); i.e. if a bronchoscopy is being performed on a patient or if doing research on a highly infectious material

- iv. Adjust to fit – you don't want to be touching the mask during the procedure, so make sure it is secure
 - c. How to don a particulate respirator
 - i. Select a fit tested respirator, i.e. N95, 99 or 100
 - ii. If you must wear a elastomeric or powered air purifying respirator, or PAPR, you will need instruction locally to properly use these devices
 - iii. Place over the nose, mouth and chin
 - iv. Fit flexible nose piece over the nose bridge
 - v. Secure on head with elastic, top of head and neck
 - vi. Adjust to fit
 - vii. Perform a fit check: as you were instructed and some manufacturer's may differ slightly from this presentation
 1. Inhale – respirator should collapse
 2. Exhale – check for leakage around the face
 - d. How to don eye and face protection
 - i. Position goggles over your eyes and secure to the head using the ear pieces or headband
 - ii. Position face shield over the face and secure on brow with headband
 - iii. Adjust to fit comfortably – goggles should feel snug but not tight
 - e. How to don gloves
 - i. This will be the last item to be donned
 - ii. Select the correct type of glove for the task at hand and the size that best fits you
 - iii. Insert each hand into the appropriate glove and adjust to comfort and dexterity.
 - iv. Extend the gloves over the isolation gown cuffs, if worn, it provides a continuous barrier to protect your skin
3. How to safely use PPE (safe work practices to avoid contaminating yourself)
 - a. Keep your gloved hands away from your face

- d. Elements of a respiratory protection program
 - i. Your employer is required that you are medically evaluated, prior to using a respirator, to determine that it is safe for you to wear a respirator
 - ii. Fit testing is required annually on all employees to maintain safe use of the product
 - iii. All employees must be trained on respiratory safety and equipment usage prior to using the equipment as well
 - iv. You are responsible for making sure you fit check your equipment prior to each use to make sure it has a proper seal, once trained
- vi. PPE use in the healthcare settings: How to safely don, use, and remove PPE (as dictated by the Standard Precaution guidelines)
 - 1. Key points about PPE
 - a. Don before contact with patient, generally before entering the room
 - b. Use carefully – don't spread contamination
 - c. Remove and discard carefully, either at the doorway or immediately outside patient room; remove the respirator outside the room
 - d. Immediately use good hand hygiene
 - 2. The following steps are the sequence for donning PPE, and should always be performed in this sequence
 - a. How to don a gown
 - i. Select the appropriate type and size
 - ii. Opening is in the back
 - iii. Secure the gown at the neck first then the waist
 - iv. If the gown is too small, use two gowns
 - 1. Gown #1 ties in the front
 - 2. Gown #2 ties in the back
 - b. How to don a mask
 - i. Place over the nose, mouth and chin
 - ii. Fit flexible nose piece over nose bridge
 - iii. Secure on head with ties (top first, then neck) or elastic over the ears

- b. Avoid touching or adjusting other PPR
 - c. Remove gloves if they become torn; perform hand hygiene before donning new gloves
 - d. Limit surfaces and items touched
- vii. PPE use in healthcare settings: How to safely remove PPE – to protect you, your colleagues, and patients from exposure to contaminated materials
1. Contaminated and Clean areas of PPE
 - a. Contaminated area
 - i. Outside front – front of goggles, mask, respirator and face shield, even if not visible soiled; and outside of the gloves
 - ii. These are areas that have or are likely to have been in contact with body sites, materials or environmental surfaces where infectious organisms may reside
 - b. Clean area
 - i. Inside of the gloves and gown, outside back of the gown including the ties, and ties, elastic or ear pieces of mask, goggles and face shield on head at the back
 - ii. These are areas that are not likely to have been in contact with the infectious organisms
 2. The following sequence for removing PPE must be strictly adhered to in order to limit the opportunities for self-contamination
 - a. Where to remove PPE
 - i. The location will depend upon the amount and type of PPE worn and the category of patient isolation; i.e. if gloves are only worn, you can safely remove them in the patient room
 - ii. If a gown or full PPE is worn, it should be removed in the doorway, before leaving the patient room or in anteroom
 - iii. Respirators should always be removed outside the patient room, after the door is closed **Why?**
 - iv. Hand hygiene should always be performed after all PPE is removed, as soon as possible

- b. How to remove the gloves
 - i. First step
 1. Grasp outside edge near the wrist
 2. Peel away from the hand, turning the glove inside-out, the contaminated side is now on the inside
 3. Hold in opposite gloved hand
 - ii. Second step
 1. Slide the ungloved finger under the wrist of the remaining glove
 2. Peel off from inside, creating a bag for both gloves
 3. Discard in the appropriate waste container
- c. Remove the goggles or face shield
 - i. Grasp the “clean” ear or head pieces with the ungloved hands
 - ii. Lift them away from the face
 - iii. If they are reusable, place them in the designated receptacle for reprocessing or disposal if indicated
- d. Removing the isolation gown
 - i. Unfasten the back ties and then the neck ties with the ungloved hands
 - ii. Peel the gown away from the neck and shoulder by doing the following
 1. Slip the fingers of one hand under the cuff on the opposite arm
 2. Pull the hand up into the sleeve and grasp the gown from the inside
 3. Reach across to the other arm and push the sleeve off the opposite arm
 4. Fold the gown towards the inside, so that the contaminated side will be away from you
 5. Continue to fold and roll the gown into a ball/bundle (this will allow the “clean” or inside of the gown to be visible)

6. Discard the gown into the appropriate waste or linen container
 - e. Removing a mask
 - i. Remember that the front of the mask is contaminated and should not be touched
 - ii. Remove the mask by only touching the ties or the elastic bands
 - iii. Remove the mask in the following order:
 1. Untie the bottom ties and then the top tie or band
 2. Lift the mask/respirator away from the face
 3. Discard the mask in the appropriate waste container
 - f. Removing a particulate respirator
 - i. The bottom elastic band should be lifted over the head first
 - ii. Then lift off the top elastic band, done slowly to prevent the respirator from snapping off the face
 - iii. Discard the respirator in the appropriate container
 - g. Hand hygiene (hand washing)
 - i. Perform hand hygiene immediately after removing the PPE
 - ii. If the hands become visibly contaminated during PPE removal, wash hands before continuing to remove PPE
 - iii. Wash hands with soap and water or use an alcohol-based hand rub
 - iv. Your employer is responsible for ensuring that hand hygiene facilities are available at the point needed, i.e. a sink or alcohol-based hand rub
3. PPE Use in The Healthcare Settings: When to use PPE
- a. Those decisions regarding when and which type of PPE must be worn are governed by the CDC, Standard Precautions and Expanded Isolation Precautions

- b. Standard Precautions identify the following:
- i. Assumes blood and body fluid of ANY patient could be infectious
 - ii. They recommend that PPE and other infection control practices be used to prevent transmission in any healthcare setting
 - iii. Decisions about when PPE are used is determined by the type of clinical interaction with the patient
 - iv. The following are the recommendations for PPE usage
 1. Gloves – are to be used when touching blood, body fluids, secretions, excretions, contaminated items; for touching mucus membranes and non-intact skin
 2. Gowns – are to be used during procedures and patient care activities when contact of clothing/exposed skin with blood/body fluids, secretions, or excretions are anticipated
 3. Aprons are used at times to cover scrubs, as in hemodialysis centers when inserting a needle into a fistula
 4. Mask and goggles or face shields – are to be used during patient care activities likely to generate splashes or sprays of blood, body fluids, secretions, or excretions

4. What type of PPE would YOU wear? Journal entry, please!

- a. Giving a bed bath?
- b. Suctioning oral secretions?
- c. Transporting a patient in a wheelchair?
- d. Responding to an emergency where blood is spurting?
- e. Drawing blood from a vein?
- f. Cleaning a Patient with diarrhea?
- g. Irrigating a wound?
- h. Taking vital signs?

- d. Other Standard Precaution guidelines
- i. Needle stick safety – whenever possible, safe needles or needleless devices must be used; they may never be bent or broken after use; they must be left uncapped, still attached to the syringe and placed in a leak proof puncture resistant sharps container
 - ii. Sharps containers must be labeled with a red biohazard symbol; any instrument used for invasive surgical procedures or other sharp objects must be placed in one of these; the container cannot be emptied or reused; Fed, state, & local regulations apply for disposal of these containers and must be followed
 - iii. Spills or splashes of blood, body fluids, secretions or excretions are to be wiped up immediately; gloves and disposable cleaning cloths must be used, and disposed of properly; different facilities may have a variety of policies for this, but all established laws must be met
 - iv. Resuscitation devices should be used, if possible, when providing mouth-to-mouth resuscitation
 - v. Waste and linen disposal is done according to the healthcare agency policies, developed in accordance to established laws; all infectious waste particles must be placed in red biohazard bags and disposed of properly as well; all infectious linens must also be place in the proper containers as well and be laundered according to specific guidelines
 - vi. Injuries that involve cuts, needle sticks, splashes or any other injuries must be reported to the immediately to the supervisor; all agency policies are to be followed and all agency are to have policies regarding any type of injuries; and care must be taken to make sure these are documented, treated and follow-up care provided, along with identifying ways to prevent the injury from happening again (Diversified Health Occupations, 7th Ed, Louise Simmers, 2009, DELMAR CENGAGE Learning, pps.364 – 370)
- e. Bloodborne Pathogen Standard
- i. This applies to all occupational exposure of blood or other potentially infectious material
 - ii. Blood exposure consist of human blood, blood components, and blood products
 - iii. Bloodborne pathogens include disease causing organisms in the blood, i.e. Hep. B, Hep. C, and HIV

- iv. When in an emergency and you cannot identify the body fluids or tell whether they contain blood, you must treat all body fluids as potentially infectious
- f. Tuberculosis Standard
 - i. OSHA Standard to reduce occupationally transmitted/acquired TB
 - ii. Requires FIT testing and training in the use of specific respiratory PPE, i.e. N95 or particulate respirator
 - iii. Healthcare workers must have annual a PPD skin test; this usually coincides with your birthday
- g. Extended Infection Control Precautions (Standard Precautions PLUS)
 - i. Transmission based precautions
 - 1. Additional precautions used with patients infected with pathogens that are spread via the following:
 - a. Airborne precautions
 - i. Patient pathogens are transmitted by airborne droplets
 - ii. Must be placed in a private room with the door closed
 - iii. The air must be discharged to the outdoors or filtered before recirculation (negative pressure)
 - iv. Must wear specific PPE's
 - 1. N95 mask
 - 2. P100 mask
 - 3. Fitted Mask or hood
 - b. Contact precautions
 - i. Patient spread the pathogens through direct or indirect contact
 - 1. Direct contact – person to person
 - 2. Indirect contact – person to inanimate object
 - ii. Specific PPEs are required; i.e. gloves, gowns, etc., depending on exposure and infectious agent
 - c. Droplet precautions
 - i. This is used when large-particle droplets are expelled during coughing, sneezing, talking or laughing

- ii. Specific PPEs include a mask worn if working within three feet of the infected patient
 2. All these precautions require that the patient be on the identified isolation, identified by the appropriate signage for the room
 - ii. Protective or reverse precautions
 1. This type of precaution is used when the patient must be protected from the environment
 2. It is used mainly for those individuals who are immunocompromised; those whose bodies defenses are weak
 3. Examples include: transplant patients, cancer patients, severely burned patients, or those whose immune systems have failed
- h. PPE Use in the Healthcare Settings: FINAL THOUGHTS!
 - i. PPE is available to protect you from exposure to infectious agents in the healthcare workplace
 - ii. Know what type of PPE is necessary for the duties you perform and know how to use it correctly

FOLLOWING STANDARD PRECAUTION GUIDELINES

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SAFER – HEALTHIER – PEOPLE