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INFECTION PREVENTION (INCLUDING HIV), STANDARD PRECAUTION, BIO WASTE MANAGEMENT.

INFECTION PREVENTION

Introduction:

- Infection is one of the leading causes of preventable death in hospitals every year. The centre of Disease Control and Prevention estimated that there are approximately 2 million preventable infections in hospital every year, leading to 90,000 unnecessary deaths.

- Regardless of the work area, preventing the transmission of organism is concern of all nurses. One way in which nurse accomplishes this goal is by asepsis. A large number of micro-organism live and multiply on every surface.

- Infection control addresses factors related to the spread of infections within the healthcare setting (whether patient-to-patient, from patients to staff and from staff to patients, or among-staff), including prevention (via hand hygiene/hand washing, cleaning/disinfection/sterilization, vaccination, surveillance), monitoring/investigation of demonstrated or suspected spread of infection within a particular health-care setting (surveillance and outbreak investigation), and management (interruption of outbreaks).

Definition of infection:

- The invasion of bodily tissue by pathogenic microorganisms that proliferate, resulting in tissue injury that can progress to disease.

- (The invasion and multiplication of microorganisms such as bacteria, viruses, and parasites those are not normally present within the body. An infection may cause no symptoms and be subclinical, or it may cause symptoms and be clinically apparent. An infection may remain localized, or it may spread through the blood or lymphatic vessels to become systemic (body wide). Microorganisms that live naturally in the body are not considered infections. For example, bacteria that normally live within the mouth and intestine are not infections.)

Infection prevention:

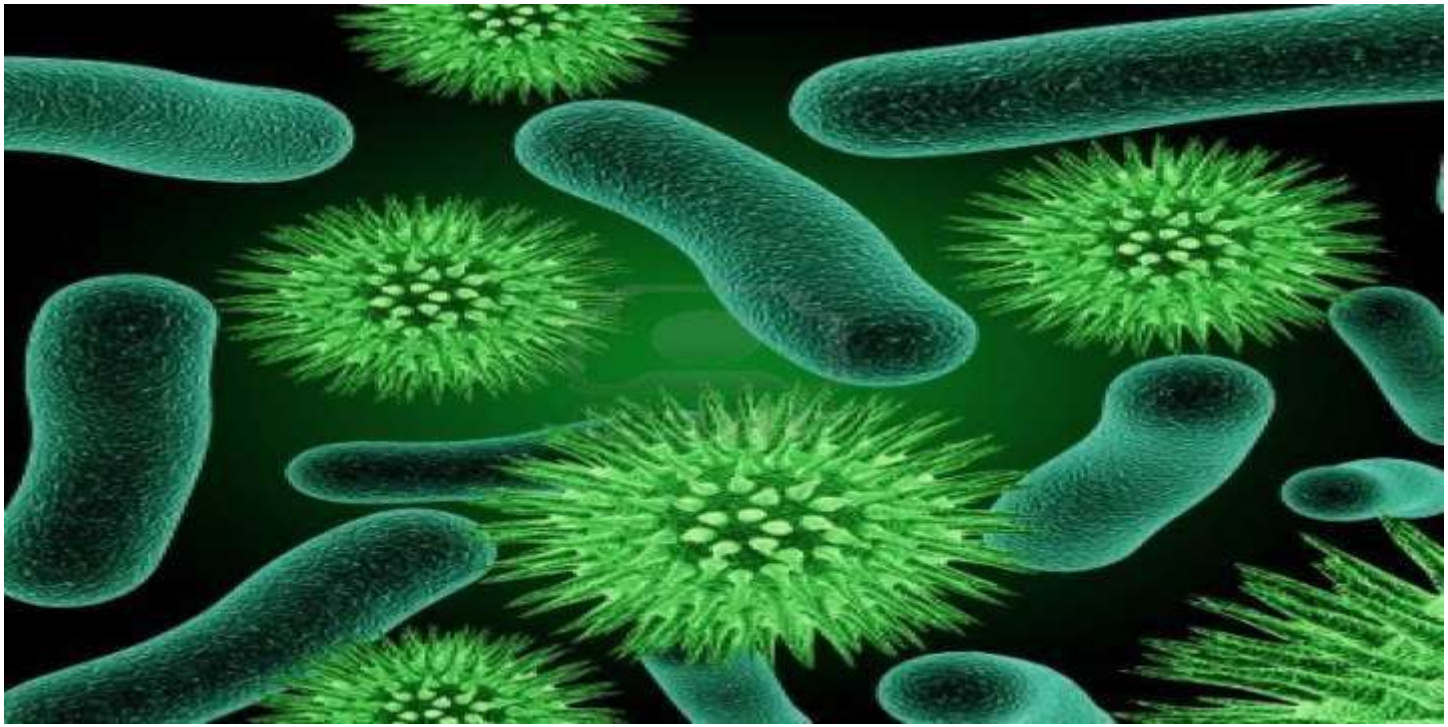
- Infection prevention refers to policies and procedures used to minimize the risk of spreading infections, especially in hospitals and human or animal health care facilities.

Infectious diseases:

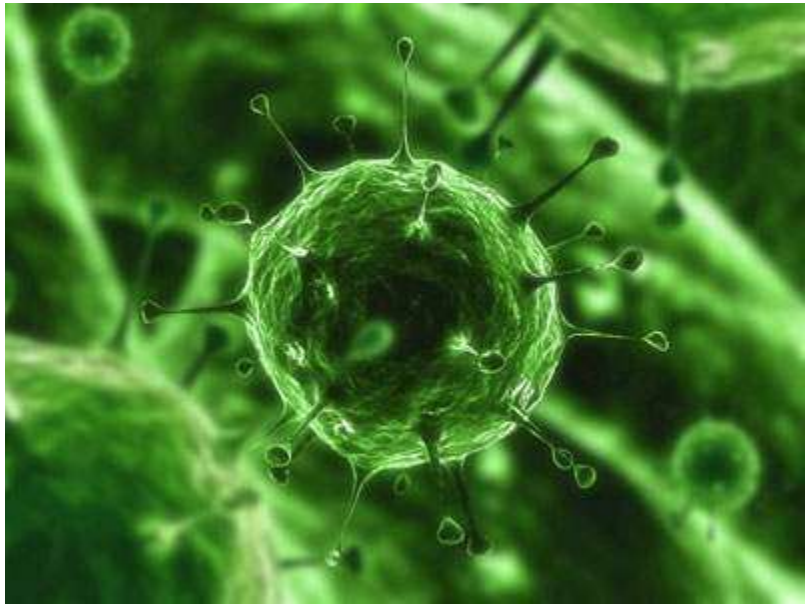
- Infectious diseases kill more people worldwide than any other single cause. Infectious diseases are caused by germs. Germs are tiny living things that are found everywhere - in air, soil and water. Person can get infected by touching, eating, drinking or breathing something that contains a germ.

- Germs can also spread through animal and insect bites, kissing and sexual contact. Vaccines, proper hand washing and medicines can help prevent infections.
- There are four main kinds of germs:

- Bacteria



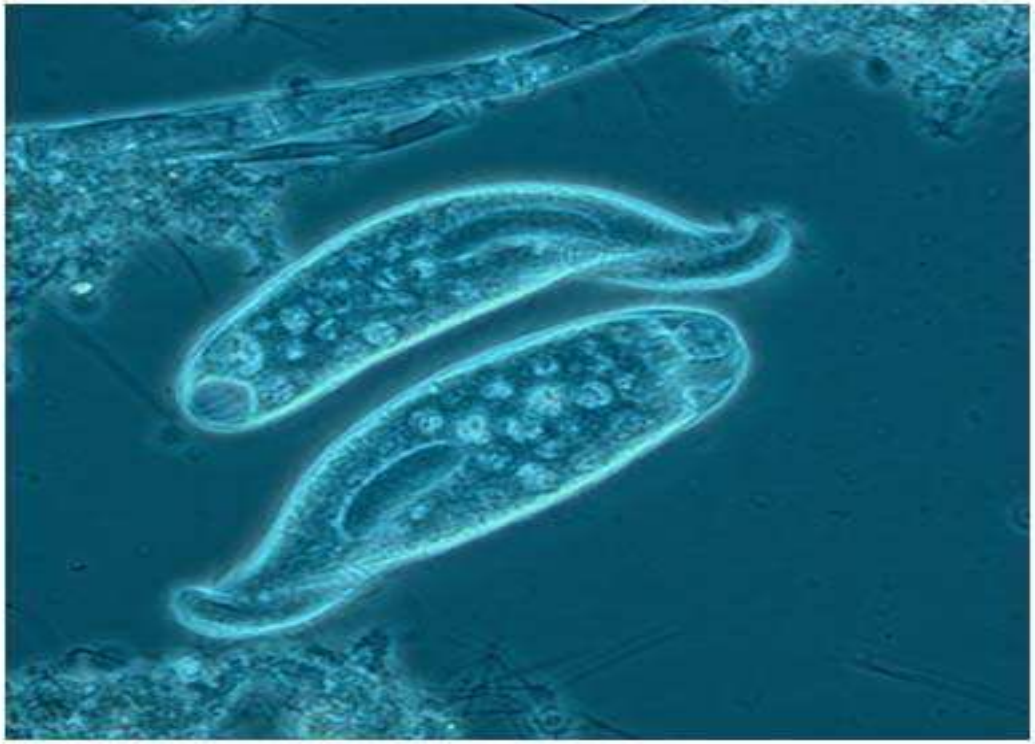
- Viruses



- Fungi


The fly agaric (Amanita muscaria), a poisonous, though not deadly, species, Denmark

- Protozoa



Types of infection:

- **Primary infection:**

  Initial infection with an organism to host constitutes primary infection.

- **Secondary infection:**

  When in a host whose resistance is lowered by pre-existing infection, a new organism may set up a new infection.

- **Local infection:**

  Infection that is limited to a defined area or single organ with symptoms that resemble inflammation (redness, tenderness and swelling.)

- **Systemic infection:**

  Infection that spreads to whole body resulting in a septicemia.

- **Acute infection:**

  It appears suddenly or lasts for a short time. E.g. URI

- **Chronic infection:**

  May occur slowly over a long period and may last months to years.

- **Iatrogenic infection:**

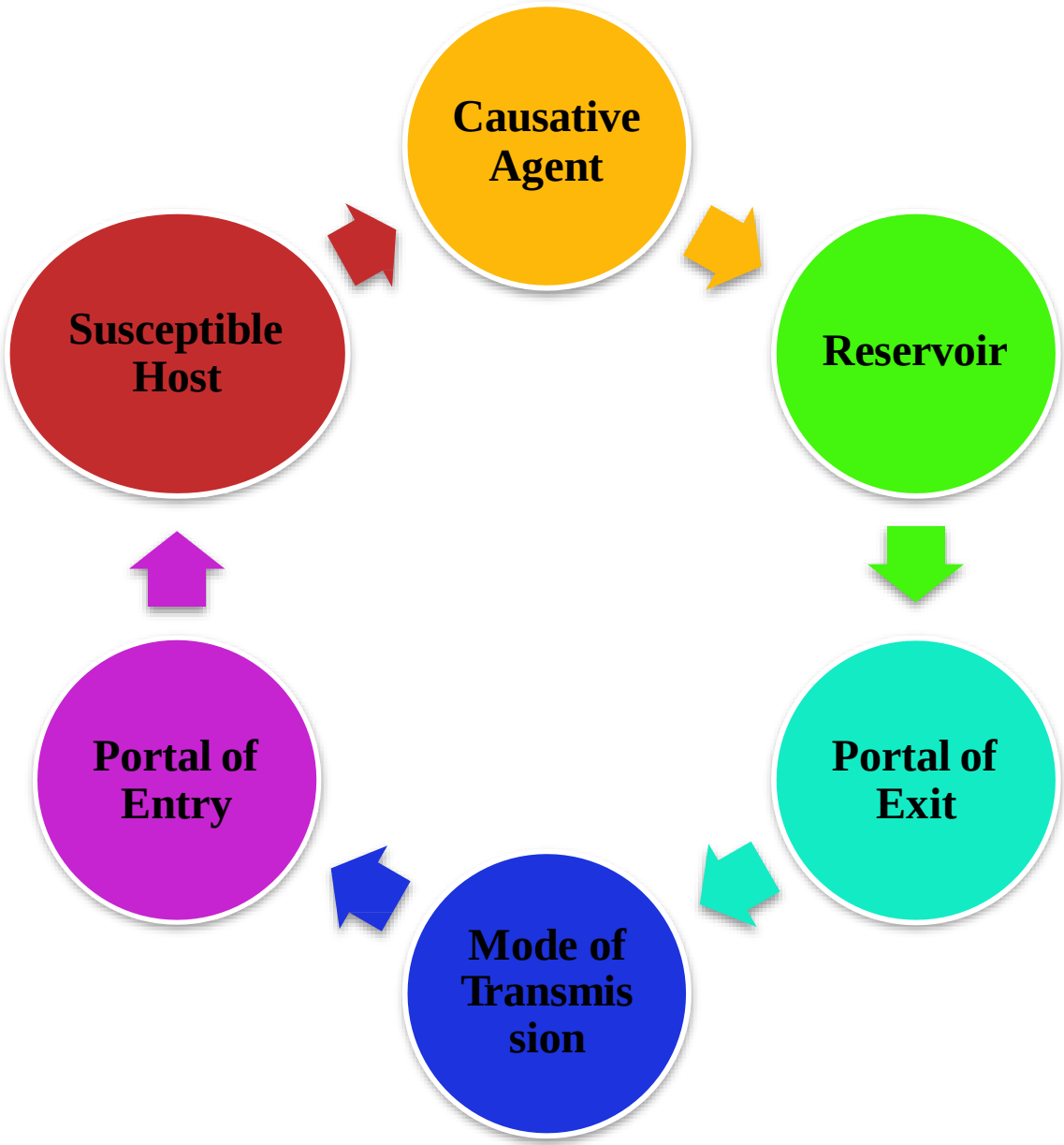
  Infection resulting due to therapeutic and diagnostic procedures.

- **Nosocomial infection:**

  Also known as **Hospital-acquired infection** (**HAI**) — is an infection that is contracted from the environment or staff of a healthcare facility. It can be spread in the hospital environment, nursing home environment, rehabilitation facility, clinic, or other clinical settings. Infection is spread to the susceptible patient in the clinical setting by a number of means. Health care staff can spread infection, in addition to contaminated equipment, bed linens, or air droplets. The infection can originate from the outside environment, another infected patient, staff that may be infected, or in some cases, the source of the infection cannot be determined.

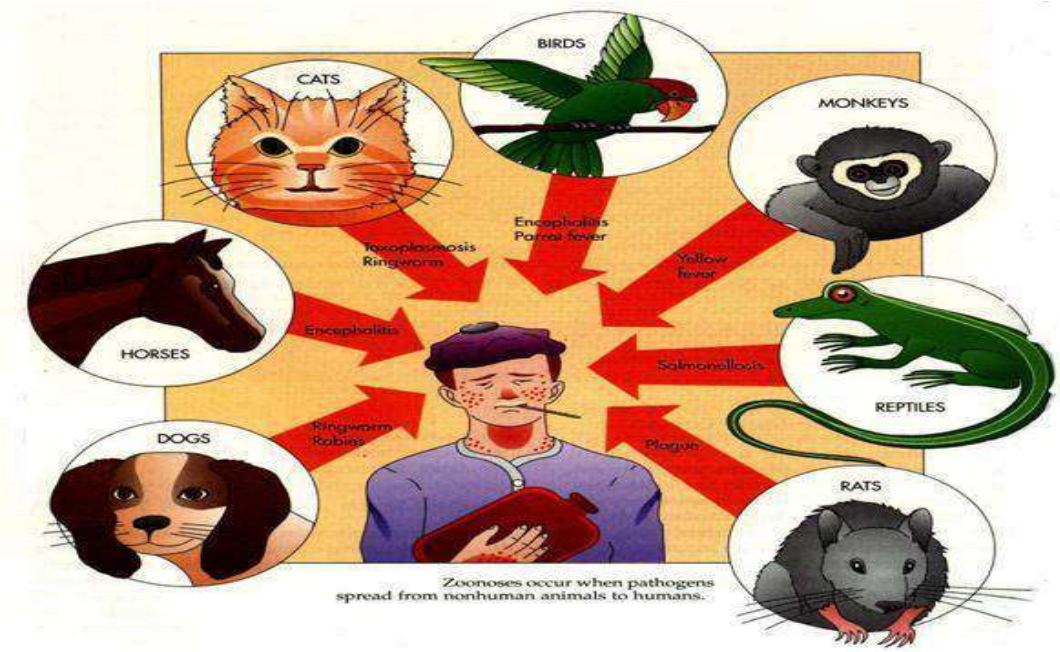
Chain of infection:

- The presence of a pathogen does not mean that an infection will begin. In order for infectious disease to spread, several necessary steps must occur. These steps are known as “chain of infection”. An infection will develop only if chain remains intact. These links are;

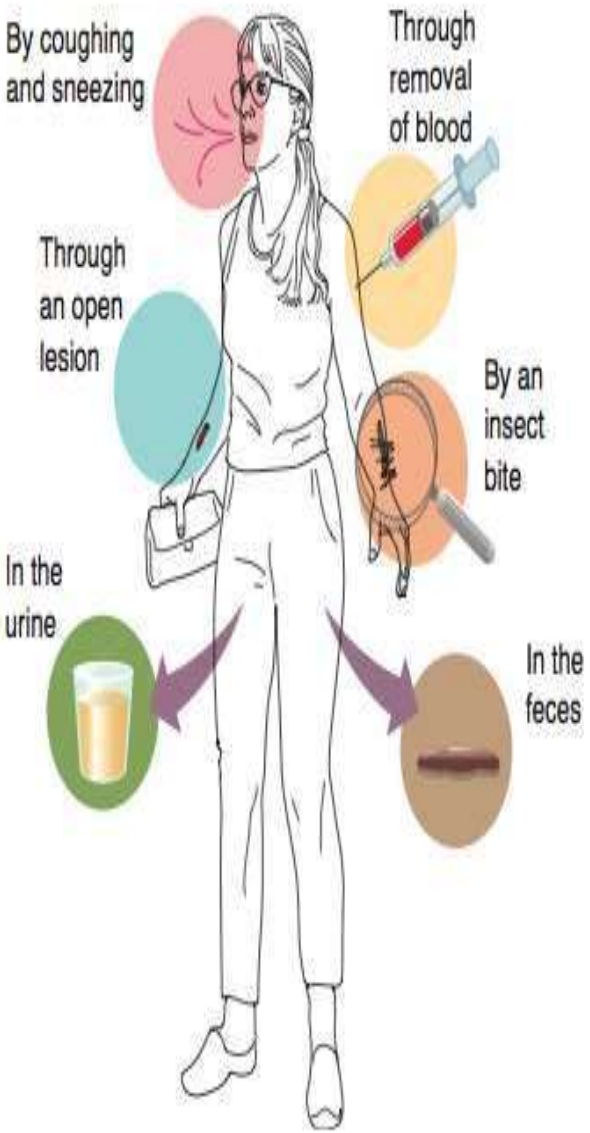

Causative Agent
Reservoir
Portal of Exit
Mode of Transmis sion
Portal of Entry
Susceptible Host

- **Causative Agent** - the microorganism (for example bacteria, virus or fungi).

- **Reservoir** (source) - a host which allows the microorganism to live, and possibly grow, and multiply. Humans, animals and the environment can all be reservoirs for microorganisms.



- **Portal of Exit** - a path for the microorganism to escape from the host. The blood, respiratory tract, skin and mucous membranes, genitourinary tract, gastrointestinal tract, and transplacental route from mother to her unborn infant are some examples.



- **Mode of Transmission** - since microorganisms cannot travel on their own; they require a vehicle to carry them to other people and places.

  Infectious diseases and even certain contagious diseases spread through the following agencies. Their ways of spreading is also given along with these agencies.

- Air-borne transmission
- Contact transmission-direct and indirect
- Vehicle transmission (Water, milk, food etc.)
- Vector-transmission
- Tran placental transmission

- **Portal of Entry** - a path for the microorganism to get into a new host, similar to the portal of exit.

- **Susceptible Host** - a person susceptible to the microorganism

Who is at risk of infection?

- **Staff:** service provide are at significant risk for infection because they are exposed to potentially infectious blood and other body fluids on daily basis.

- **Clients:** they are at risk of post procedural infection when, e.g. service providers do not wash hands between client and procedure, when they do not adequately prepare client for procedure and when used instruments and other items are not cleaned and processed correctly.
- **Community:** it is also at risk of infection, particularly from inappropriate disposal of medical waste.

Breaking chain of infection:

- As health professional, we cannot provide health care services without some exposure to potentially infectious materials, but we can prevent transmission in many cases. The only way to prevent infection is to break the chain of infection. The nurse must follow certain principle and procedures to prevent infection and control its spread.

Breaking the chain 1 of infection:

1. Rapid and accurate identification of organism:

- Routinely send blood cultures, urine culture, skin swabs, throat swabs, tracheal aspirate culture.
- Send endotracheal tube tip, urinary catheter tip and central line tip for culture after removal.

2. Control or elimination of infectious agents including:

- Proper cleaning by the water and mechanical action with or without detergents.

- Disinfection.
- Sterilization of contaminated objects.

❑ High level of disinfectants:

- Activated glutaraldehyde (cidex 2%)
- Sodium hypochloride 1%
- Carbolic solution 5%
- Bleaching powder 1%

❑ Low level of disinfectant:

- Methylated spirit 70%
- Betadine solution 10%
- Savlone 1%

Breaking the chain 2 of infection:

- Measures to control or eliminate of reservoir of infection.
- **Employee health:**
- Immunization of health personnel's e.g. hepatitis B vaccine
- Regular checkup for early detection of any communicable disease
- Restriction from work of patient contact when infected with communicable disease.

Environmental disease:

- Cleaning with hospital approved clear disinfectant, e.g. phenol
- Through cleaning of bed and bedside equipments before admitting new patient.
- Separate mops should be used for cleaning of unit. (Twice a day).
- Damp dusting should be done.
- Drains should be patent.

Handling of linen:

- Keep bed sheets dry and clean.
- Change sheets every day.
- Do not shake blankets and linen.
- Do not throw them on floor.
- Soiled linen counting should be done in separate place.

Pest control:

- Measures to be taken to avoid their entry into unit. E.g. proper cleaning, sealing and draining.
- Patient's diet should be kept in covered containers.
- Keep fly trappers on each bedside of patient.
- Pesticide spray should be used weekly.

- **Visitors control:**
- Traffic should be restricted except for doctor, nurse and supportive staff.
- Allow only one attendant (3-4 hours).
- Keep the doors and windows closed.
- Mobile phones should not be allowed inside the area.
- Machines (X-rays, echo machines, ultrasound machine) from outside should be cleaned with spirit before their use.

Breaking the chain 3 of infection:

❑ Portal of exit:

- Practice aseptic precaution.
- Avoid talking directly into the client's mouth to prevent the droplet infection.
- Wearing of mask is compulsory if the nurse is infected or she is dealing with the patients who are infected.
- Careful handling of waste like urine, faeces, emesis and blood is important.
- Disposable gloves should be worn to prevent direct contact with wastes or infected materials.

Breaking the chain 4 of infection:

Mode of transmission:

- **Contact Precautions;**

- Single patient room.
- Staff to perform hand hygiene, put on gown/apron and gloves prior to entering patient room and when anticipating contact with the patient or their surroundings is.
- Remove gown/apron and gloves and perform hand hygiene after leaving room.
- Clean and disinfect non-disposable equipment and items when removed from patient room.

❑ Droplet Precautions;

- Single patient room.
- Staff to put on surgical mask when entering room and remove and dispose of mask after leaving room and perform hand hygiene.
- Instruct patient about respiratory hygiene and cough etiquette.
- Limit patient movement outside the room to medically-necessary purposes.
- Patient to put on a surgical mask when leaving room.

❑ Airborne Precautions;

- Single negatively pressured room.
- Door to remain closed.
- Staff to put on N95/P2 mask when entering patient room and remove and dispose of mask and perform hand hygiene after leaving room.
- Instruct patient about respiratory hygiene and cough etiquette.
- Patient to put on surgical mask when leaving room.

Breaking the chain 5 of infection:

- **Portal of entry:**
  - Maintain integrity of skin and mucous membrane.
  - Prepare position of tubing, etc. may prevent injuries and skin breakdown.
  - Turning and positioning of debilitated clients.

- Ensure the personal hygiene of client regularly.
- Proper disposal of contaminated syringe and needles.
- Proper handling of catheters and drainage set etc. care should be taken while collecting and handling specimen.

Breaking the chain 6 of infection:

❑ Protecting susceptible host:

- Protecting the normal defense mechanism by,
- Regular oral hygiene.
- Maintaining adequate intake.
- Encouraging deep breathing exercise.
- Encouraging proper immunization of children and adult client.

❑ Maintaining healing process:

- Promotion of intake of well-balanced diet containing essential protein, vitamins, fats and carbohydrates.
- Institution measures to improve appetite of patient.
- Helping the client to identify methods to relieve stress.

STANDARD SAFETY MEASURES OR STANDARD PRECAUTION OR PERSONAL PROTECTIVE EQUIPMENTS (PPE):

Introduction:

- **Universal precautions** refers to the practice, in medicine of avoiding contact with patients' bodily fluids, by means of the wearing of nonporous articles such as medical gloves, goggles, and face shields. The practice was introduced in 1985–88. In 1987, the practice of universal precautions was adjusted by a set of rules known as body substance isolation. In 1996, both practices were replaced by the latest approach known as standard precautions.

- Under universal precautions all patients were considered to be possible carriers of blood-borne pathogens.

- Pathogens fall into two broad categories, blood borne (carried in the body fluids) and airborne.
- Standard precaution contains following things;
- Hand washing
- Gloving
- Gowning
- Mask/ protective eye wear/ cap
- Shoe cover

Definition:

- Standard precaution is defined as, “a set of precautionary measures including good hand hygiene practices and use of protective barriers during routine patient care carried out by health care workers (HCW)”.

Hand washing:

- Hand washing or hand hygiene is the act of cleaning one's hands with or without the use of water or another liquid, or with the use of soap for the purpose of removing soil, dirt, and/or microorganisms.

Your 5 Moments for Hand Hygiene

Steps of hand washing:

Step-1

Rub palms together

Step-2

Rub the back of both hands

Step-3

Interface fingers and rub the hands together.

Step-4

Interlock fingers and rub the back of fingers of both hands

Step-5

Rub thumb in a rotating manner followed by the area between index finger & thumb.

Step-6

Rub fingertips on palm for both hands

Step-7

Rub both wrists in a rotating manner rinse and dry thoroughly.

Masks:

- When mask is correctly applied, it will fit snugly and securely over the nose and mouth.
- To protect staff from inhalation of infectious aerosols or droplets, smoke or plume or other airborne hazards.
- To prevent the spread of micro-organisms from the nasopharynx of staff of the patient to others who are susceptible.

❑Types of masks:

- **Surgical Mask:** Used in wards, departments or operating theatres.

- **N95 Particulate Mask:** Used when caring for patients with diagnosed or suspected airborne infectious diseases.

Gloving:

- Gloves must be available and accessible in a range of sizes in all patient care areas.
- Wearing gloves reduces contamination of hands and minimizes the risk that a health care worker will become infected after contact with a patient's blood or body substance. Wearing gloves reduces the likelihood that staff will transmit micro-organisms for their hands to patients.

- **The type of glove used will depend on the task involved:**
  - **Non sterile gloves:** Non sterile nitrile gloves are suitable for most situations when contact with any blood or body substance, mucous membranes or non-intact skin is anticipated.
  - **Sterile gloves:** Sterile latex gloves shall be worn for surgical procedures where asepsis must be maintained. Staff involved with surgical procedures should double-glove for added protection

Eye/ Face Protection:

- Eye/face protection shall be worn in any situation when splash or splatter with blood or body substance to the mucous membrane of the mouth, nose and or eyes in likely.

Types of eye/face protection:

- Chin length plastic face shield

- Goggles Note

Types of protective clothing:

- **Plastic aprons:** In general, disposable plastic aprons are sufficient to provide protection from contamination
- **Fluid Resistant Gown:** Long sleeved, disposable fluid resistant gowns should be used for contact isolation or where there is an elevated risk of contamination

- **Managing injuries and exposure in health care personal:**

- In health care settings, injuries form needle or other sharp instruments are the number of one of the cause of the occupational exposure to blood born infections.

Sharps:

- The term sharp refers to any sharp instruments or object used in delivery of health care services, including hypodermic needles, suture needles, scalpel blades, sharp instruments, IV catheters and razor blades.

❑Prevention of injuries from sharps:

- Use the “handles-free” techniques when passing sharps during clinical procedures.
- Do not bend, break, or cut hypodermic needle before disposal.
- Do not recap the needles.
- Disposal of hypodermic needles and other sharps properly.

❑Safe-passing of sharp instruments:

- Uncapped or otherwise unprotected sharps should never be passed directly from one person to another. In the operating theater or procedure room, pass sharps instruments in such a way that the surgeon and assistant are never touching the item at the same time. This way of passing sharps is known as the “hands-free” techniques:

- The assistant places the instrument in a sterile kidney basin or in designated “safe zone” in sterile field.
- The service provider picks up the instrument, uses it, and returns it to the basin or safe.

❑Managing injuries and exposure:

- Studies have shown that cleaning a wound with an antiseptic or squeezing it does not reduce the risk of infection. If you are accidently exposed to blood or other body fluids, either by needle stick, an injury from another sharp object, and a splash of fluid:
- Wash the needle stick injury site or cut with soap and running water.
- Flush splashes to the nose, mouth or skin with water.
- Irrigate splashes to the eyes with water or saline.

❑Post exposure prophylaxis:

- Post exposure prophylaxis with drugs or other therapy can reduce the risk of transmission of some blood borne pathogens.
- **For hepatitis B:** hepatitis B immune globulin and hepatitis B vaccine can reduce the risk of infection after exposure to blood or other body fluids containing the hepatitis B virus.
- **For hepatitis C:** there is no post exposure prophylaxis available for hepatitis C. Neither immune globulin nor antiviral drugs shown to reduce the risk of hepatitis C transmission.

❑Safe disposal of sharps:

- Do not recap, bend or break needle before disposal, and do not remove the needle from the syringe by hand.
- Dispose of needles and syringe immediately after use in a puncture resistant sharp disposal container.

❑Sharps disposal containers:

- Puncture resistant sharp disposal containers should be conveniently located in any area where sharp objects are frequently used (such as injection rooms, treatment room, operating theater, labor and laboratories.)

INFECTION PREVENTION OF HIV:

Introduction:

- Standard precaution (SP) is the core concept for the prevention of HIV transmission in all health care settings.
- SP encompasses precautions in the handling of blood, all body fluids, secretions and excretions; and avoidance of contamination of non-intact skin and mucous membrane.

The setting of infection control for the prevention of HIV can be;

- In-patient.
- out-patient clinics and Accident and Emergency Departments,
- Special settings like the dental clinics, surgical theatres.

The scope of infection control for HIV prevention is vast in health care settings. Apart from SP, there are the following dimensions:

- Environmental infection control practices.
- Occupational safety and health advice.
- Post exposure management of exposed HCW.

- “Prevention of Transmission of HIV in Health Care Settings” edited by the Scientific Committee of Advisory Council on AIDS in 1995.

Principles:

- In the context of infection control, HIV is treated as a blood borne pathogen. The recommended practices therefore apply to HIV as much as they apply to the control of other blood borne infections in health care settings.
- SP is the core practice recommended for HCW in all settings in relation to the prevention of blood borne infections including HIV and tuberculosis.

- Risk assessment is the most vital tool in the management of HCW after exposure to HIV. The provision of post exposure prophylaxis, including antiretroviral therapy, should follow thorough risk assessment and counseling tailored to the need of the injured.
- A surveillance system should be in place to monitor the potential risk of HIV transmission in health care settings. This would involve primarily the reporting of needle stick injury.
- Training and education of HCW on infection control practices.

Guidelines:

- Originally defined by CDC in 1985, applied only to blood and body fluids that have been implicated in the transmission of blood borne infections. Body fluids with an unknown risk of HIV transmission (amniotic, cerebrospinal, pericardial, peritoneal, pleural and synovial fluids) and body fluids that contaminated with blood. However, it did not apply to faeces, nasal secretions, sputum, sweat, urine or vomitus which were later included under the recommendations of Body Substance Isolation.

- Hand washing: Hands must be washed before and after patient contact. Hands must be washed immediately after touching blood, body fluids and removal of gloves. Plain soap and water are used for routine hand washing.

- Protective barriers: Disposable gloves must be worn when there is a direct contact or possibility of contact with blood, body fluids, mucous membrane and non-intact skin of all patients. Gloves should preferably be changed after patient contact and before administering care to another patient. Gloves must be changed whenever they are torn and when a needle-stick or other injury occurs and when they are visibly dirty with blood.

- Mask, eye protection or face shield, and gown must be worn as appropriate during procedures and patient care activity that may result in splashing of blood and body fluids.
- Sharps handling Precautions should be taken to prevent injuries.

- Patient-care equipment handling: Patient-care equipment soiled with blood, body fluids, secretions, and excretions should be handled in a manner that prevents skin and mucous membrane exposures.
- Reusable equipment should not be used for the care of another patient until it has been properly cleaned and reprocessed. Single-use items should be properly discarded.

- Used linen soiled with blood, body fluids, secretions, and excretions should be handled in a manner that prevents skin and mucous membrane exposure.
- Patient placement: Patient who contaminates the environment should be placed in a private room.
- The environment is a potential source of health-care-associated blood borne infections. Decontamination of the environment and equipment is an essential infection control practice in every setting. This fundamentally consists of disinfection, sterilization and handling of medical wastes.

- All contaminated equipment should be disinfected according to established disinfectant policy formulated by local hospitals (Queen Mary Hospital. Infection Control Manual, November 1999).
- Heating is an effective mean of disinfection. HIV is inactivated by moist heat at 60oC in 30 minutes. Chemical disinfectant like sodium hypochlorite (household bleach), 2% glutaraldehyde and ortho-phthalaldehyde (OPA) can be used in the disinfection of contaminated article

- Environment spilled with blood and body fluids should be cleaned immediately. The infected site should be cleansed with 10,000 ppm hypochlorite solution. Ordinary environmental surface such as wall, floor and other surface have not been associated with transmission of HIV. Common housekeeping procedures are adequate for cleaning environmental surface.

- Medical wastes should be handled according to established policy of the institution. Articles contaminated with infected material should be appropriately discarded, bagged and labeled before sent for decontamination and processing.
- Work Restriction and Occupational Health Advice.

- Immunization against HIV is currently not available.

Post exposure prophylaxis:

- Post exposure prophylaxis is recommended when occupational exposure to HIV occurs. The U.S. Public Health Service (USPHS) recommends the following guidelines:

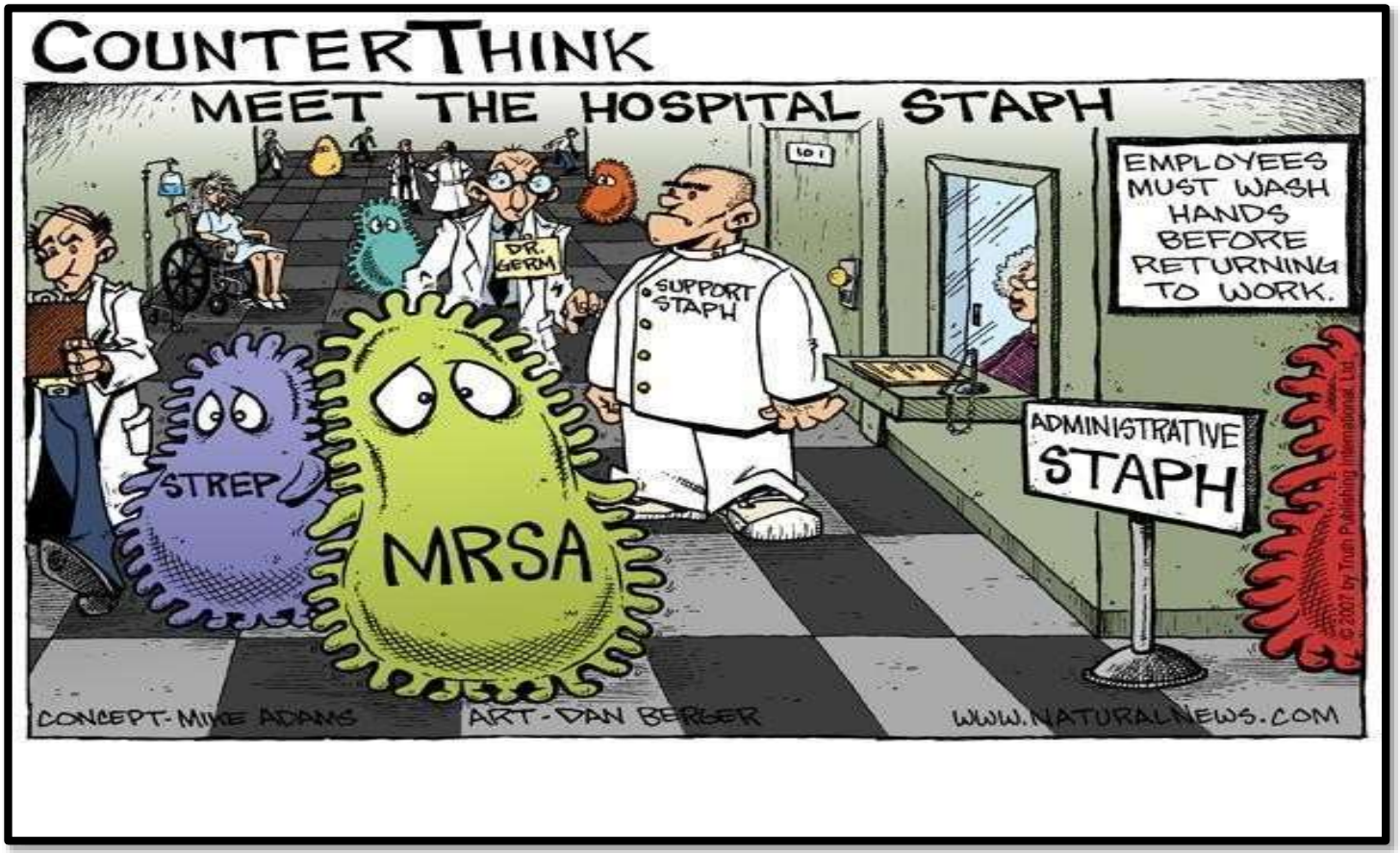
- Determine, if possible, the HIV status of the exposure source patient to guide the need for HIV PEP.
- Start PEP medication regimens as soon as possible after exposure (24 hours) and continue for 4-week duration.

- PEP medication regimens should contain three or more antiretroviral drugs for all occupational exposures to HIV.
- Expert consultation is recommended for any occupational exposure to HIV situation as defined by the USPHS.
- Close follow-up should be provided, including counseling, baseline and follow-up HIV testing, and monitoring for drug toxicity beginning 72 hours after exposure.

- If a fourth-generation combination of HIV antigen-HIV antibody test is used for follow-up HIV testing, testing may be ended four months following exposure. If a new testing platform is not available, follow-up HIV testing is to be concluded six months after exposure.

- An antiretroviral drug includes **zidovudine, imivudine, indinavir** and **nelfinavir**.

NOSOCOMIAL INFECTIONS



Introduction:

- Clients in health care setting may have an increased risk of acquiring infection. HAI results from delivery of health services in the health care facility. A hospital is one of the most likely places for acquiring infection because it harbors a high population of virulent strains of micro-organism that may be resistant to antibiotics. The intensive care unit is one area in the hospital where that risks of acquiring a HAI is especially high.

Definition:

- A hospital-acquired infection is usually one that first appears three days after a patient is admitted to a hospital or other health care facility. Infections acquired in a hospital are also called Nosocomial infections.

- **For a HAI, the infection must occur:**
- Up to 48 hours after hospital admission.
- Up to 3 days after discharge.
- Up to 30 days after an operation.
- In a healthcare facility when someone was admitted for reasons other than the infection.

Sites and cause of HAI:

- **Urinary tract:**
- **Surgical and traumatic wounds:**
- **Respiratory infection:**
- **Blood stream:**

Nursing process in infection control

1. Assessment:

- **Inadequate primary defense:** broken skin or mucosa, traumatized tissues, use ciliary action, obstructed out flow, altered peristalsis and reduce mobility.
- **Inadequate secondary defense**: reduced Hb level, suppression of WBC, suppressed inflammatory response.

Client's susceptibility:

- **Age:**

- An infant has immature defense against infection.
- The young middle age adult has refined defense against infection..
- Defense against infection may changes with aging. The immune response, particularly cell mediated immunity declines.

Nutritional status:

- Reduction in intake of proteins and other nutrients such as carbohydrates and fats reduces the body's defense against infection and Impairs wound healing

- **Stress:**
- The body response to emotional or physical stress by general adaptation syndrome, if stress continued or become intense, then elevated cortisone level result in used resistance to infection

- **Hereditary:**
- Certain hereditary conditions impair an individual's response to infection.
- For example gammaglobuinemia is rare inherited or acquired characterized by absence of serum

Disease process:

- Client with disease of immune system are of particular risk for infection. Leukemia, AIDS, lymphoma and aplastic anemia are conditions that compromise a host by weakening defenses against infectious organisms.
- Burn client have a very high susceptibility to infection because of damage to skin surface.

Medical therapy:

- Some drugs and medical therapies compromise immunity to infection.
- **Cyclosporine** and other **immunosuppressant drugs**, clients receiving **radiotherapy and chemotherapy** are also risk for infection.

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2. **Nursing diagnosis:**

The following are example of nursing diagnosis that may apply;

- Disturbed body image
- Risk of infection
- Risk for injury
- Imbalanced nutrition less than body requirements
- Risk for impaired skin integrity
- Impaired tissue integrity

3. Planning:

- Preventing exposure to infectious organism.
- Controlling or reducing the extent of infection.
- Maintaining resistance to infection.

4. Implementation:

Through practical thinking the nurse may prevent infection from developing, spreading by minimizing the numbers and kinds of organism transmitted to potential sites.

5. Evaluation:

- To evaluate whether your client has achieved the expect outcome and has remained free of infection.
- Maintain high standard of medical and surgical asepsis and constantly monitor the client for sign in infection.

HOSPITAL/ BIO MEDICAL WASTE

Introduction:

- Hospital or health care waste is generally named and popular as Bio Medical Waste.

- According to bio-medical waste management and handling rule 1998 of India:

  Bio-medical waste means any waste which is generated during the diagnosis, treatment or immunization of human being o animals or in research activities.

Sources of bio-medical waste:

- Hospital and health care centers:
- Clinics/ office:
- Medical research center and laboratories:
- Animal's institute:
- Blood bank and collection centers/ donation camp
- Biotechnology institutes

BIOMEDICAL WASTE (MANAGEMENT AND HANDLING) RULES 2011

SCHEDULE I

CATOGORY OF BIOMEDICAL WASTE

CATEGORY	WASTE TYPE	TREATMENT / DISPOSAL
1	HUMAN ANATOMICAL WASTE (tissues ,organs ,body parts)	INCINERATION
2	ANIMAL WASTE	INCINERATION
3	MICROBIOLOGY & BIOTECHNOLOGY & 0THER LABORATORY WASTE (lab waste included in category 8 in earlier rules is included here , note that category 8 has been scraped in 2011 rule)	DISINFECTION AT SOURCE BY CHEMICAL TREATMENT. OR AUTOCLAVING/MICROWAVING followed by MUTILATION/SHREDDING. THEN FINAL DISPOSAL OF ABOVE BY SECURED LANDFILL OR DISPOSAL OF RECYCLABLE WASTE (PLASTIC/GLASS) BY AUTHORISED CYCLERS

CATEGORY	WASTE CATEGORY	TREATMENT/DISPOSAL
4	WASTE SHARPS (NEEDLE , SYRINGES,BLADE SCALPEL) NOTE: THAT GLASS SYRINGES WITH FIXED NEEDLE COME IN THIS CATOGORY AND DISPOSABLE SYRINGE WITH NEEDLE REMOVED IN CAT 7	DISINFECTION BY CHEMICAL TREATMENT OR DESTRUCTION BY NEEDLE CUTTERS, AUTOCLAVING, MICROWAVING FOLLOWED BY MUTILATION /SHREDDING THEN FINAL DISPOSAL INTO SECURED LAND FILL OR IN DESIGNATED CONCRETE WASTE SHARP PIT.
5	DISCARDED MEDICINE / CYTOTOXIC DRUGS	DISPOSAL IN SECURED LANDFILL / INCINERATION
6	SOILED WASTE (ITEMS CONTAMINATED WITH BLOOD AND BODY FLUID AS COTTON ,DRESSING, SOILED POP, LINEN, BEDDINGS)	INCINERATION
7	INFECTIOUS SOLID WASTE (DISPOSABLE WASTE OTHER THAN SHARPS INCLUDING TUBINGS , IV SETS, GLOVES ,SALINE BOTTLE, CATHETERS)	DISINFECTION BY CHEMICAL/ AUTOCLAVING/ MICROWAVING FOLLOWED BY MUTILATION/ SHREDDING. THEN FINALLY SENT FOR RECYCLING.
8	CHEMICAL WASTE (CHEMICL USED IN PRODUCTION OF BIOLOGICALS/USED IN DISINFECTION	CHEMICAL TREATMENT AND DISCHARGE INTO DRAINS, SOLIDS INTO SECURED LANDFILL

SCHEDULE II

COLOUR CODING AND TYPE OF CONTAINER USED FOR DISPOSAL OF BIOMEDICAL WASTE

COLOUR CODING	TYPE OF CONTAINER TO BE USED	WASTE CATEGORY NO	TREATMENT OPTION
YELLOW	NON CHLORINATED PLASTIC BAGS	1 , 2 , 5 , 6	INCINERATION
RED	NON CHLORINATED PLASTIC BAGS / PUNCTURE PROOF CONTAINER	3 , 4 , 7	AS PER SCHEDULE I
BLUE	NON CHLORINATED PLASTIC BAGS	8	AS PER SCHEDULE I
BLACK	NON CHLORINATED PLASTIC BAGS	MUNICIPAL WASTE	MUNICIPAL DUMP SITE

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Disposal of biomedical waste includes three stages:

- Collection and segregation
- Transportation and storage
- Disposal techniques

DISPOSAL TECHNIQUES:

1. Chemicaldisinfection:

- Solid waste must be disinfected before they are sent for final disposal. Chemical disinfection is most appropriate method for to treat the liquid waste such as blood, urine, and stool or hospital sewage.

2. Thermal measures:

- **Autoclave (wet thermal treatment):** It is effective method of sterilization for microbiology and biotechnology waste.

- **Hydroclave(dry thermal treatment):**

  In this method shredded infectious waste is exposed to high temperature, high pressure steam like autoclaving. **It dries 80% liquid of waste and waste is reduced to 20-30% in weight.** Adequately trained operators or technicians are needed for its operation.

3. Microwave irradiation:

- This technique is also effective like autoclave in sterilizing infected disposable waste. Most of micro-organism destroyed by action of microwaves.

4. Incineration:

- It is a high temperature dry oxidation process that reduces organic, incombustible matter. It also reduces the volume and weight of waste.

5. Inertization:

- In this process cement and other substance are mixed with waste before disposal. Mixing of cement etc. reduces risk of migrating toxic substance into surface water or ground water. After making homogeneous mixture, cubes are prepared at site, and then transported to final disposable site.

6. Landfill:

- It is quite effective, provided practiced appropriately a sanitary landfill observing certain rues can be acceptable choice for disposal of biomedical waste, particularly in developing countries like India