Ethiopian TVET-System

Health Extension Service

Level III

Based on Jan.2018G.C Occupational Standard

Module Title: Applying Infection Prevention Technique and workplace OHS

TTLM Code: HLTHES3 MO6 TTLM 0919v1

This module includes the following Learning Guides

LG20: Follow infection prevention an patient safety guidelines

LG21: Identify and respond to infection risks

LG22: Maintain personal hygiene

LG23:Use personal protective equipment

LG24: Limit contamination

LG25:Handle, package, label, store, transport and dispose of clinical and other waste

LG26: Clean environmental surfaces

Instruction Sheet	LG20: Follow infection prevention an patient safety guidelines

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Introducing infection prevention techniques
- Listing Standard precaution
- Identifying Transmission based precautions
- Minimizing contamination of materials, equipment and instruments

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- Introduce infection prevention techniques
- List Standard precaution
- Identify Transmission based precautions
- Minimize contamination of materials, equipment and instruments

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 4.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4”.
4. Accomplish the “Self-check 1, Self-check t 2, Self-check 3 and Self-check 4” **in page -12, 16, 18 and 21** respectively.

Information Sheet-1	Introducing infection prevention techniques

Introduction

1.1 Definition of terms

- **Asepsis and aseptic Technique**: A combination of efforts made to prevent entry of microorganisms into any area of the body .The goal of aseptic technique is to reduce or eliminate the number of microorganisms on both animate (living) surfaces (skin and mucous membranes) and inanimate objects (surgical instruments and other items) to an infection free.
- **Antiseptic:** A germicide that is used on skin or living tissue for the purpose of inhibiting or destroying microorganisms. Examples include alcohols, chlorhexidine, chlorine, hexachlorophene, and iodine
- **Antisepsis:** a process of reducing the number of microorganisms on the skin, mucous membranes or other body tissue by applying an antimicrobial (antiseptic) agent.
- **Antimicrobial agents:** A general term for the drugs, chemicals, or other substances that either kill or slow the growth of microbes. Among the antimicrobial agents in use today are antibacterial drugs (which kill bacteria), antiviral agents (which kill viruses), antifungal agents (which kill fungi), and ant parasitic drugs (which kill parasites).
- **Cleaning: -** a process that physically removes all visible dust, soil blood or other body fluids from inanimate object as well as removing sufficient number of microorganisms to reduce risks for those who touch the skin or handle the object.
- **Colonization:** the presence of pathogenic (illness or disease causing) organisms in a person or animal in abundance (pathogens can be detected by cultures or other tests) usually without causing symptoms or clinical findings (they do not invade tissues, cause cellular changes or cause damages). It also defined as the presence or increased number of a particular invasive bacterial species in the resident micro flora.
- **Colonized person**: can be a major source of transfer of pathogens to other persons. For instance Neisseria meningitides colonizes nasal cavity and oropharynx with or without causing subsequent infections Endameba histolytic can colonize the large bowel without any harm to the host but are often shade in the stool as infectious cysts which may cause dysentery
- **Contamination**: The presence of an infectious agent on a body surface or on clothes, gowns, gloves, bedding, furniture, computer keyboards, or other inanimate objects that may be capable of producing disease or infection
- **Contact:** An exposed individual who might have been infected through transmission from another host or the environment
- **Decontamination:** a process that makes inanimate objects safer for the staff to handle them before cleaning (i.e. inactivates HBV, HCV and HIV and reduce, but does not eliminate, the number of other contaminating microorganisms).It is also defined as a process or treatment that renders a medical device, instrument, or environmental surface safe to handle because it is no longer capable of transmitting particles of infectious material.
- **Disinfectant**: A chemical agent used on inanimate (non-living) objects to destroy virtually all recognized pathogenic microorganisms, but not necessarily all microbial forms (e.g., bacterial spores).
- **Disinfection**: The destruction of pathogenic and other kinds of microorganisms by physical or chemical means. Disinfection is less lethal than sterilization, because it destroys most recognized pathogenic microorganisms, but not necessarily all microbial forms, such as bacterial spores.
- **Disease**: any deviation from being healthy or interruption of the normal structure or function of any body part, organ, or system manifested by a characteristics set of symptoms and signs whose etiology, pathology, and prognosis may be known or unknown

- **Endogenous infection**: Micro-organisms originating from the service user's own body which cause harm in another body site.
- **Exogenous infection**: Micro-organisms originating from a source or reservoir which are transmitted by any mechanism to a person, i.e. contact or airborne routes.
- **High level disinfection (HLD):** a process of eliminating all microorganisms except some bacterial endospores from inanimate objects by boiling, steaming or using chemical disinfectants
- **Infection:** is an invasion and multiplication of microorganisms in body tissues which may clinically be apparent or result in local cellular injury due to competitive metabolism, toxins, intracellular replication or antigen antibody response.
- **Infectious Microorganisms**: are microorganisms capable of producing disease in the appropriate hosts
- **Infection prevention:** is a systematic effort or process of placing barriers between a susceptible host (person lacking effective natural or acquired protection) and the microorganisms
- **Microorganisms**: are causative agents of infections such as bacteria, viruses, fungi and parasite
- **Nosocomial Infection:** is a term used interchangeably with "healthcare facility acquired infection" or "healthcare associated infections (HAIs)" and is defined as a situation in which patients coming to health institutions seeking treatments acquire an infection/s in healthcare facility afterwards other than disease/health problems they had
  - ✓ It also defined as infections acquired while a patient is under hospital or any health facility care which are not present or incubating at time of admission
  - ✓ It is a time related criterion which refers to infectious occurring more than 48 hours after admission
  - ✓ Also as hospital-acquired infections, hospital-associated infections, and hospital infections—are infections that are not present in the patient at the time of admission to hospital but develop during the course of the stay in hospital. There are two forms:
- **Endogenous infection, self-infection, or auto-infection.** The causative agent of the infection is present in the patient at the time of admission to hospital but there are no signs of infection. The infection develops during the stay in hospital as a result of the patient's altered resistance.
- **Cross-contamination followed by cross-infection.** During the stay in hospital the patient comes into contact with new infective agents, becomes contaminated, and subsequently develops an infection.
- **Patient Safety:** is an issue focusing at reduction or aversion of unsafe acts/circumstances within the healthcare system through the use of best practices leading to optimal patient outcomes
- **Protective Barriers**: are physical, mechanical or chemical processes that help to prevent the spread of infectious microorganisms from person to person (patient, healthcare client or health workers) and /or equipment, instruments and environmental surface to people
- **Sterilization**: a process of eliminating all microorganisms (bacteria, viruses, fungi and parasites) including bacterial endo-spores from inanimate object by high-pressure steam (autoclave), dry heat (oven), chemical sterilization or radiation.

1.2 General principles of infection prevention

- Good infection prevention and control are essential to ensure that people who use health and social care services receive safe and effective care. Effective prevention and control of infection must be part of everyday practice and be applied consistently by everyone.
- Adherence to good practice in relation to infection prevention and control has been shown to reduce the risk of infection to residents and care workers. Providers should have relevant polices in place as identified by local risk assessment, and having taken account of the Code of

Practice. Staff training is important and will improve compliance with policies, which should be regularly audited, updated and clearly marked with a review date.

- It is not always possible to identify people who may spread infection to others and precautions for the care and treatment of all residents are recommended to prevent this spread of infection. Basic infection prevention and control practices are designed to reduce the risk of cross infection from both recognized and unrecognized sources of infection and should be applied at all times by all care workers. All those who provide care should be trained in understanding the basic infection prevention and control practices.

1.3 General advice on Standard principles

- **Everyone involved in providing care should be:**

✓ Educated about the standard principles of infection prevention and control **and** trained in hand decontamination, the use of personal protective equipment, and the safe use and disposal of sharps.

- **Wherever care is delivered, healthcare workers must have available appropriate supplies of:**

✓ materials for hand decontamination
✓ Sharps containers
✓ Personal protective equipment.

- **Educate patients and care givers about:**

✓ The benefits of effective hand decontamination
✓ The correct techniques and timing of hand decontamination
✓ When it is appropriate to use liquid soap and water or hand rub
✓ The availability of hand decontamination facilities
✓ Their role in maintaining standards of healthcare workers' hand decontamination.

1.4 Risk of disease transmission in the health care facility

- Healthcare personnel including the support staff (e.g. housekeeping, laundry staff and maintenance), who work in healthcare settings are at risk of exposure to serious potentially life threatening infections such as HIV, HBV, HCV. Direct contact with blood and other body fluids is the most common or frequent risk healthcare workers encounter while caring of patients.
- In addition, the risk of acquiring HCV and HIV after being stuck with a needle from an infected person is 3 to 10% and 0.2% to 0.4% respectively. Among these, the efficiency for transmission of hepatitis B is high. For example, an accidental splash in the eye of as little as 10^{-8ml} (0.00000001m) of infected blood can transmit HBV to a susceptible host.
- Similarly, a survey conducted in the year 2003 and 2004 on about 40 health facilities in Ethiopia, reported that 32% of the healthcare workers in these institution sustained needle stick injuries in 12-months' time.

1.5. The Disease Transmission Cycle

- Microorganisms live everywhere in our environment. Human normally carry them on their skin, upper respiratory, intestinal and genital tracts. Generally, microorganisms live in animals, plants, soil, air and water. Not all, but some among these microorganism are pathogenic (likely to cause disease) in varied degrees. When they get favorable conditions, most of these microorganisms may cause infections if transmitted to immune compromised people such as patients with AIDS.
- Microorganisms can be classified as bacteria, viruses, fungi, and protozoa. Bacteria can be further divided into three categories: vegetative (e.g., Staphylococcus), mycobacteria (e.g., tuberculosis [TB]), and endospores (e.g., tetanus). Of all the common infectious agents, endospores are the most difficult to kill due to their protective coating
- All humans are susceptible to bacterial infections and also to most viral agents. The number (dose) of organisms necessary to produce infection in a susceptible host varies with the location.

▪ The essential factor for the transmission of disease-causing microorganisms from person to person comprises the following **six components**:

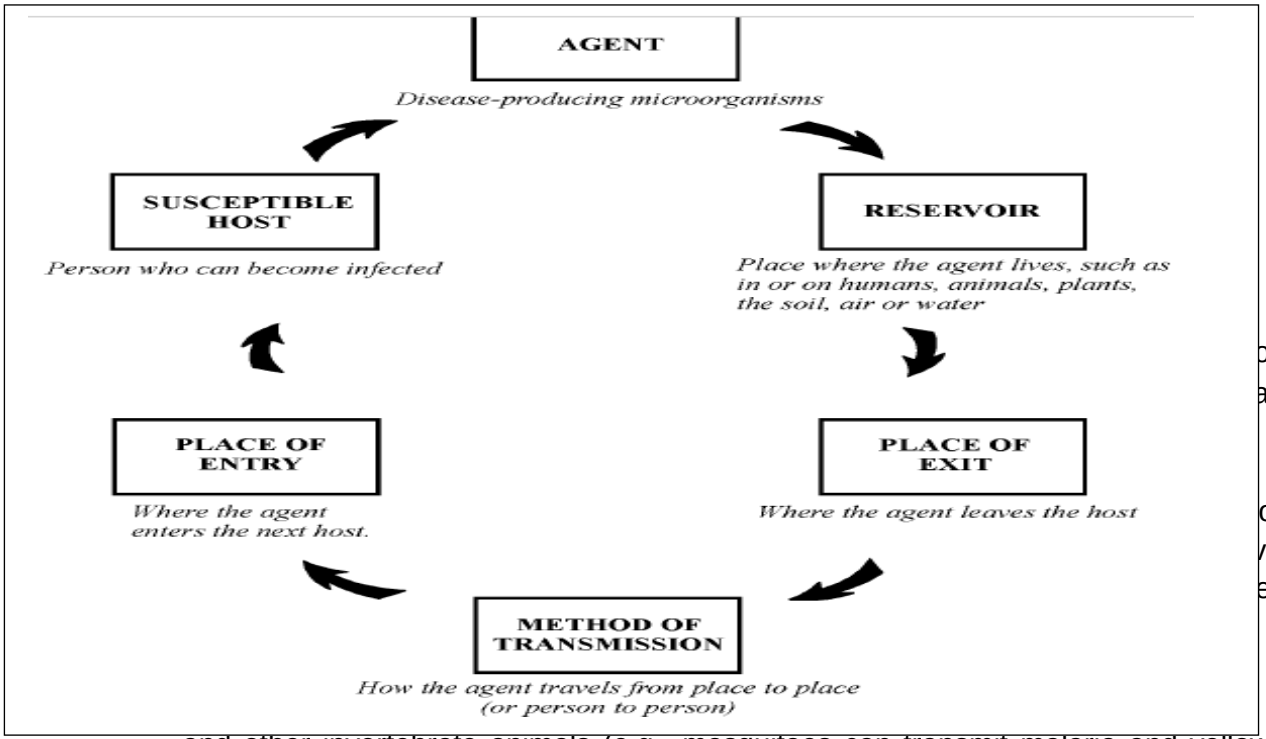
1. **Agent:** The microorganism that can cause infection or disease. The infectious agent can include bacteria, viruses, fungi, and parasites.
2. **Host or reservoir**: The reservoir of an agent is the habitat in which an infectious agent normally lives, grows, and/or multiplies. Reservoirs include humans, animals, and the environment (plants, soil, air, water, etc.). Solutions, instruments, and other items used in clinical procedures can also serve as reservoirs for potentially infectious microorganisms.
3. **Portal of exit**: The gateway through which the agent leaves the host or reservoir. The infectious agent can leave the reservoir through the bloodstream, broken skin (e.g., puncture, cut, surgical site, rash), mucous membranes (e.g., eyes, nose, mouth), respiratory tract (e.g., upper respiratory), genitourinary tract (e.g., vagina, penis), gastrointestinal tract (e.g., mouth, anus), or placenta by means of blood, excretions, secretions, or droplets that come from these places. However, the agent must have the right environment in which to survive until it infects another person. For example, the bacteria that cause TB can survive in sputum for weeks but will be killed by sunlight within a few hours.
4. **Method of transmission**: After an agent exits its natural reservoir, it may be transmitted to a susceptible host in numerous ways.

   These modes of transmission are classified as:-

   a. Direct transmission: An immediate transfer of the agent from a reservoir to a susceptible host by direct contact or droplet spread.

   i. Direct contact: This occurs through kissing, skin-to-skin contact, and sexual intercourse. Direct contact refers also to contact with soil or vegetation harboring infectious organisms. Thus, infectious mononucleosis ("kissing disease") and gonorrhea are spread from person to person by direct contact. Hookworm is spread by direct contact with contaminated soil.

   ii. Droplet spread: This refers to spray with relatively large, short-range aerosols produced by sneezing, coughing, or even talking. Droplet spread is classified as direct because transmission is by direct spray over a few feet, before the droplets fall to the ground (e.g., influenza, TB).



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insects and other invertebrate animals (e.g., mosquitoes can transmit malaria and yellow fever; fleas can transmit plague).

2. **Mechanical**: The infectious agent is carried by certain animals without having any biological change (flies can carry and transmit Vibrio cholera).

- ✓ Infection prevention in a health care setting primarily deals with preventing the spread of infectious diseases through the air, blood or body fluids, and contact, including droplet, fecaloral, and food-borne routes.

5. **Portal of entry**: The gateway through which an infectious agent enters into the susceptible host. These portals of entry could be mouth, nose, skin, or other (including the respiratory system, vascular system, genitourinary system, and placenta).
6. **Susceptible host**: An organism that catches the infectious agent/pathogen. People are exposed to disease-causing agents every day but do not always get sick. For the purpose of this training, susceptible hosts include clients, service providers, support staff, and members of the community.

1.5 Preventing Infectious Diseases

- To prevent the transmission of infections, the disease transmission cycle needs to be broken at some point. Hence, understanding the disease transmission cycle is important if health care workers are to:

✓ Prevent transmission of microorganisms from patient to patient, from patient to provider or from provider to patient during medical and surgical procedures as well as from health facilities to the general community.
✓ Teach others the factors required for transmission to occur.
✓ Most importantly, teach others how to break the disease transmission cycle.

- In a health care facility, this can be accomplished by following proper Infection Prevention and patient safety (IPPS) practice, such as the following:

✓ Reducing the number of microorganisms present (e.g., hand washing, cleaning of instruments)
✓ Killing, inhibiting, or inactivating microorganisms (e.g., hand washing with a waterless alcohol preparation, decontamination, sterilization, or high-level disinfection [HLD])
✓ Creating barriers to prevent infectious agents from spreading (e.g., wearing gloves or personal protective equipment [PPE])
✓ Reducing or eliminating risky practices (e.g., by using hands-free technique in the operation room, using disposable gloves and syringes, etc.)
✓ Making sure that people, especially health care workers, are immune or vaccinated
✓ Reducing adverse events (e.g., by improving data collection, epidemiological surveys of adverse events, training on prevention of adverse events

1.6 Spaulding Categories of Potential Infection Risk

➢ This classification has stood the test of time and still serves as a good basis for setting priorities for any infection prevention program. The Spaulding categories are summarized below:

✓ **Critical**: These items and practices affect normally sterile tissues or the blood system and represent the highest level of infection risk. Failure to provide management of sterile or, where appropriate, high-level disinfected items is most likely to result in infections that are most serious.

- Critical items confer a high risk for infection if they are contaminated with any microorganism as they are entering sterile tissue or the vascular system so they must be sterile because any microbial contamination could be a source to transmit diseases. That class includes medical devices e.g. Implants, invasive catheters , Implants and any device that touch sterile body cavities. Utmost of the articles in this class should be purchased as sterile or be sterilized before usage.

✓ **Semi-critical:** These items and practices are second in importance and affect mucous membranes and small areas of non-intact skin. Management needs are considerable and require knowledge and skills in handling many invasive devices (e.g., gastrointestinal endoscopes and vaginal specula), performing decontamination, cleaning and high-level disinfection, and gloving for personnel who touch mucous membranes and non-intact skin.

- This class includes metabolic process medical care and physiological state instrumentality, some endoscopes, medical instrument blades, passageway manometry probes, cystoscopes, body part

✓ **Noncritical:** Management of items and practices that involve intact skin and represent the lowest level of risk.

- Poor management of noncritical items such as overuse of examination gloves often consumes a major share of resources while providing only limited benefits. (Spaulding 1968).
- Noncritical things, which contact with intact skin, however, not secretion membranes. Intact skin acts as an honest barrier to most microorganisms; therefore, the sterility of things returning in touch with intact skin is "not essential."
- Objects That contact Intact skin but not Mucous membranes, and Require low level disinfection

1.7 Common health facility-acquired infections (HCFs)

- These infections earlier called **'nosocomial infections' (NI)** or simply **'hospital infections'** are infections occurring during a stay in hospital that were neither present nor incubating at the time of hospital admission. Mostly, nosocomial infections only appear in patients hospitalized for 48 hours or longer

Healthcare-associated infections:

✓ Are a consistent issue for both hospital patients and healthcare provider

✓ Occur in both adult and pediatric patients. Bloodstream infections, followed by pneumonia and urinary tract infections are the most infections in children, urinary tract infections are the most common healthcare – associated infections in adults.

- Infections in HCFs have become a major health problem especially in the health institutions located in developing countries. Therefore, identification of these infections, their source and some factors responsible for their acquisition is very important.

1.8 There are many microbes responsible for various forms of infection in health care facilities:-

Bacterial infections

- Bacteria are the major cause of infections in HCFs. The Gram-negative bacteria are most commonly isolated pathogens from all sites of infection. This is mainly because of the abundant anti-microbial that affects gram-negative bacteria for which the bacteria develop resistance.
  The following are the most important bacterial infections that deserve every health professional's awareness in HCFs:

Urinary tract infections

Urinary tract infections include infections of the urethra, bladder, the ureters and the kidneys. Most cases of UTI are caused by gram-negative bacteria especially E. coli. Escherichia coli is a normal flora in the gastro-intestinal system of humans but under certain conditions it might result in infections like urinary tract infection.

Most patients within health care facilities acquired UTIs after catheterization, instrumentation and/or operation in the lower urinary tract. Host factors also contribute for the risk of developing UTI in health care facilities.

Wound infection and abscess

Wounds can be broadly classified as traumatic (accidental) wounds and surgical wounds. In developing countries such as Ethiopia where sporadic disputes and poverty prevail traumatic wounds

are the more common ones. These traumatic wounds are most of the time infected (dirty) wounds. Dirty wounds are more prone to multiple micro-organism contamination.

Commonly isolated bacteria include:

Gram positive (both aerobic and anaerobic)

- ✓ Staphylococcus species
- ✓ Streptococcus especially in deep abscesses
- ✓ Clostridium species (Clostridium tetani, Clostridium perfringens)

Gram negative

- ✓ Escherichia coli
- ✓ Pseudomonas aeroginosa
- ✓ Special attention should be given to unclean burn wounds where microorganisms like clostridium species and pseudomonas are mostly isolated.

Air-borne infections

- ➢ These are infections transmitted by inhalation of pathogenic (disease causing) micro-organisms. Pneumonia, which literally means acute infection of the lung, is one the leading causes of death, especially in children, in the developing world.
- ➢ Though Streptococcus pneumoniae is a common cause at the community level, Staphylococcus aureus is known for its aggressiveness in health care facilities.
- ➢ Tuberculosis is another common bacterial infection of the lung in health care facilities. This chronic infection of the lung is caused by Mycobacterium tuberculosis. With the advent of HIV, multi-drug resistance tuberculosis is becoming a problem that needs attention by all health workers in health care facilities.

Relapsing fever

- ✓ This is a common acute febrile illness in situations where hygiene is poor (e.g. refugee camps) and is caused by spirochete called Borrelia recurrentis. Relapsing fever, if not identified early, can result in death. It needs joint management by all health worker teams in health care facilities.

Non-Bacterial causes of infections

- ✓ Previously it was mentioned that bacteria play a major role in nosocomial infections. Though not as common as bacteria other micro-organisms like viruses, fungi, protozoas, helminthes and rickettsias also play a major role in causing infection in health care facilities.

1.8 The most common ones include:

- ✓ **HIV/AIDS**

  Acquired immunodeficiency syndrome (AIDS) is a systemic viral disease caused by a virus called HIV (Human Immuno Deficiency Virus). Though it is a chronic illness with long periods of latency (3-12yrs), initial acquisition of the virus can occur in health care facilities due to negligence and accidents in handling contaminated specimens and equipment.

- ✓ **Hepatitis**

  Viral Hepatitis is inflammation (infection) of the liver caused by viruses. The most common causes are viral hepatitis - hepatitis A, B, C, D, E, and G. Feco-Oral route is the commonest way of transmission in cases of hepatitis A and E infection therefore they pose major problems in HCFs where sanitary conditions are very poor. On the other hand, contact with contaminated blood and blood products is a major way of transmission of hepatitis B, C, D, and G in HCF so they pose major problems in facilities where universal precaution is not properly followed.

- ✓ **Malaria**

  Malaria is an acute febrile illness most commonly found in the lowlands of Ethiopia. It is caused by the plasmodium species. Plasmodium falciparum and plasmodium vivax are the two most common etiologic agents in our country. Because of the high prevalence of malaria in our country identification and management of cases, as well

as the setting up of preventive measures, are important issues to be performed by members of the health care team. Health care facilities, which are located in malaria endemic areas, should follow general preventive measures (like window iron mesh, bed nets, draining of marshy areas in the vicinity of the HCF...) to control malaria infection in the HCF.

- ✓ **Fungal infections**

  Dermatophytes (tinea), Candida and aspergillus species are the most frequently encountered fungal pathogens in health care facilities. “Ringworm” infections of the skin caused by tinea species are common in poor hygienic set ups in health care facilities. Candida albicans is the candida species most commonly identified in health care facilities. It is the normal flora of the skin and gastro intestinal tract. Unsupervised or prolonged use of medication, which perhaps is due to a lack of awareness by health professionals, can result in the colonization of this pathogen in all body areas. Aspergillus species are also common in the environment. Air is the principal route of transmission of aspergillus. Acquisition of this fungal species might result in chronic respiratory infections.

- ✓ **Helmenthic infection**

  Poor handling of stool specimens especially in the laboratory set-up might result in the common helmenthic infection. These common helmentic infections include ascariasis, taeniasis, and hookworm infections. Infection due to entrobius vermicuclaris, which is highly contagious, is also possible in health care facilities where hygienic care is poor.

- ✓ **Ricketsial disease**

  One important cause of acute febrile illness in health care facilities which arises due to poor sanitary conditions is typhus (caused by ricketsia typhi). The health care worker has to give due attention to hygienic control of the disease (like proper washing and ironing of bed sheets, pajamas, fumigation of wards...).

Self-Check #1	Written Test

Directions: Choose the best answers from the given alternative.

1. ----------is Healthcare facility acquired infection
   A. Antisepsis B. Nosocomial C. Decontamination D. Disinfectant
2. General principles of infection prevention Includes?

   A. Everyone involved in providing care should be:
   B. Healthcare workers must have available appropriate supplies.
   C. Educate patients and care giver D.ALL

3. An agent is the habitat in which an infectious agent normally lives, grows, and/or multiplies.

   A. portal of entry B. Agent C. Reservoir D. Mode of transmission

4. Infections of the urethra, bladder, the urethras and the kidneys.

   A. Urinary tract infection B. Wound infection C. Upper respiratory infection D. None

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____
2._____
3. _____
4._____

Information Sheet -2	Listing Standard precaution

2.1 Standard precaution

- The use of standard precautions is the primary strategy for minimizing the transmission of healthcare-associated infections. Because most people with blood borne viral infections such as HIV and HBV do not have symptoms, nor can they easily be recognized as such, Standard precautions are designed for the care of all person-patient, clients and staff regardless of whether or not they are actually infected.
- Standard precautions combined the major features of Universal Precautions (UP) and body substances Isolation (BSI) and are based on the principle that all blood, body fluids, secretions, excretions except sweat, non-intact skin, and mucous membrane may contain transmissible infectious agents

Regarding precautions two-tier approach is currently employed. This includes

- ✓ **STANDARD PRECAUTIONS** (which applies to all patients) and **TRANSMISSION-BASED PRECAUTIONS** (which apply to patients with documented or suspected infection or colonization with certain micro-organisms).
- ✓ The application of Standard Precautions during patient care is determined by the nature of the healthcare worker-patient interaction and the extent of anticipated blood, body fluid, or pathogen exposure.

For some interactions: for example:

- ✓ For performing vein puncture, only gloves may be needed
- ✓ For intubations use of gloves, gown, and face shield or mask and googles is necessary

Standard Precautions

- ✓ Are formerly known as universal precautions underpin routine safe practice, protecting both staff and clients from infection.
- ✓ Are designed to reduce the risk of transmission of micro-organisms from both recognized and unrecognized sources of infection in the hospital.
- ✓ Applies to all patients regardless of their diagnosis.
- ✓ shall be implemented when contact with any of the following are anticipated
- ✓ All body fluids, secretions and excretions, with the exception of sweat regardless of whether or not they contain visible blood.
- ✓ Non-intact skin (this includes rashes)
- ✓ Mucous membranes

By applying standard precautions at all times and to all patients, best practice becomes second nature and the risks of infection are minimized. They include:

- ✓ achieving optimum hand hygiene
- ✓ using personal protective equipment
- ✓ safe handling and disposal of sharps
- ✓ safe handling and disposal of clinical waste
- ✓ managing blood and bodily fluids
- ✓ decontaminating equipment
- ✓ achieving and maintaining a clean clinical environment
- ✓ appropriate use of indwelling devices
- ✓ managing accidents
- ✓ good communication – with other health care workers, patients and visitors
- ✓ Training/education.

It is essential that standard precautions are applied at all times. This is because:
people may be placed at risk of infection from others who carry infectious agents

- ✓ people may be infectious before signs or symptoms of disease are recognized or detected, or before laboratory tests are confirmed in time to contribute to care;

- ✓ people may be at risk from infectious agents present in the surrounding environment including environmental surfaces or from equipment
- ✓ There may be an increased risk of transmission associated with specific procedures and practices.

The three new areas of practices that have been added in Standard precautions are

- ✓ respiratory hygiene and cough etiquette
- ✓ safe injection practice and
- ✓ use of masks for insertion of catheters or injection of material into spinal or epidural spaces via lumbar puncture procedures

Components of Standard Precautions:

Hand hygiene, before and after every episode of patient contact

- ✓ After touching blood, body fluids, secretions, excretions and contaminated items
- ✓ Immediately after removing gloves
- ✓ Between patient contacts the use of personal protective equipment
- ✓ Appropriate use of gown/apron, mask, goggles and face shield
- ✓ Use gloves for contact with blood, body fluids, secretions/excretions or contaminated items
- ✓ Use gloves for contact with mucus membranes and non-intact skin
- ✓ Use gown/apron to protect skin from blood or body fluid contact
- ✓ Use gown/apron to prevent soiling of clothing during procedures that may involve contact with blood or any body fluids (secretions/excretions)
- ✓ Use mask to protect mucous membranes of eyes, nose and mouth when contact with blood and body fluids is likely or possible
- ✓ During aerosol-generating processes in patients with suspected or confirmed infections transmitted by respiratory aerosols (e.g SARS).
  - The safe use of needles and disposal of sharps
- ✓ avoid recapping, bending, breaking, or hand manipulate used needles; if recapping is required, use a one-handed scoop technique only
- ✓ Avoid removing used needles from disposable syringes
- ✓ Place used sharps in puncture-resistant container at point of use
  - Patient resuscitation
- ✓ Use mouthpiece, resuscitation bags or other ventilation devices to avoid mouth-to-mouth resuscitation
  - Patient placement
- ✓ Place patients who contaminate the environment or cannot maintain appropriate hygiene in private rooms
- ✓ Place patients on airborne, droplet, contact precautions in appropriate rooms
  - Soiled patient-care equipment
- ✓ handle soiled equipment in a manner to prevent contact with skin or mucus membranes and to prevent contamination of clothing or the environment
- ✓ Clean reusable equipment prior to reuse

- Routine environmental cleaning
  - ✓ Develop procedures for routine care, cleaning and disinfection of equipment and environmental surfaces, especially frequently touched surfaces in patient care area
- waste management
- Textile and laundry
  - ✓ Handel in a manner that prevents transfer of microorganisms to others and to the environment
    - Appropriate handling of linen.
  - ✓ Handle soiled linen to prevent touching of skin or mucous membranes
  - ✓ Do not pre rinse soiled linens in patient care areas

- Respiratory hygiene/cough etiquette

✓ Instruct symptomatic persons to cover mouth/nose when sneezing /coughing or use tissue papers and dispose in no-touch receptacle

✓ Observe hand hygiene after soiling of hands with respiratory secretions

✓ Wear separation,>3feet if possible

- Standard precautions should be used in the handling of: blood (including dried blood); all other body substances, secretions and excretions (excluding sweat), regardless of whether they contain visible blood; non-intact skin; and mucous membranes.

Self-Check -2	Written Test

Directions: Choose the best answers from the given alternative.

1. Primary strategy for minimizing the transmission of healthcare-associated infections.
   A. Standard precaution B. PEP(post exposure prophylaxis) C. inappropriate waste disposal D. Injection
2. Components of Standard Precautions.
   A. Hand washing B.PPE C. Appropriate Disposal Of sharps D.ALL
3. From standard precaution one is **NOTE** PPE Component?
   A. use of glove B. Use of Gown C. Recapping Needle D. use of mask

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____

Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

3. _____

Information Sheet- 3	Identifying Transmission based precautions

3. 1Transmission based precautions

Any infection prevention and control strategy should be based on the use of standard precautions as a minimum level of control. Transmission-based precautions are recommended as extra work practices in situations where standard precautions alone may be insufficient to prevent transmission. Transmission-based precautions are also used in the event of an outbreak (e.g. gastroenteritis); to assist in containing the outbreak and preventing further infection.

- ✓ Transmission-based precautions are used in addition to standard precautions, where the suspected or confirmed presence of infectious agents represents an increased risk of transmission.
- ✓ The application of transmission-based precautions is particularly important in containing multi-resistant organisms (MROs) and in outbreak management.
- ✓ Medical and dental procedures increase the risk of transmission of infectious agents. Effective work practices to minimize risk of transmission of infection related to procedures require consideration of the specific situation, as well as appropriate use of standard and transmission-based precautions.

3.2 Strategies for implementing transmission-based precautions

Transmission-based precautions may include one or any combination of the following:

- ✓ Allocating a single room with closing door to patient with a suspected or confirmed infection (isolation)
- ✓ Wearing specific personal protective equipment
- ✓ providing patient-dedicated equipment
- ✓ using a TGA-registered disinfectant with label claims specifying its effectiveness against specific infectious organisms
- ✓ Using specific air handling techniques
- ✓ Restricting movement both of patients and healthcare workers.

3.3 **Contact precautions** are used when there is known or suspected risk of direct or indirect contact transmission of infectious agents that are not effectively contained by standard precautions alone.

3.4 Droplet precautions are used for patients known or suspected to be infected with agents transmitted over short distances by large respiratory droplets.

3.5 Airborne precautions are used for patients known or suspected to be infected with agents transmitted person-to-person by the airborne route

3.6 Patient-care tip

In applying standard and transmission-based infection prevention and control strategies as part of day-to-day practice, healthcare workers should ensure that their patients understand why certain practices are being undertaken, and that these practices are in place to protect everyone from infection. Patients and visitors should also be aware of their role in minimizing risks by following basic hand hygiene and respiratory hygiene and cough etiquette and informing staff about aspects of their care or services if necessary

Self-Check -3	Written Test

Directions: Choose the best answers from the given alternative.

1. Prevention of direct or indirect contact transmission of infectious agents.

A. Contact precautions B. Droplet precautions C. Airborne precautions D. None

2. Transmission-based precautions are used in addition to standard precautions. A. True B. False **Note**: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____

Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

Information Sheet- 4	Minimizing contamination of materials, equipment and instruments

4.1 Minimizing contamination of materials, equipment and instruments

- The recommended infection prevention practices for minimizing microbial contamination of specific areas in healthcare facilities are

Procedure Area

- ✓ Limit traffic to authorized staff and patients at all times.
- ✓ Permit **only** the patient and staff performing and assisting with procedures in the procedure room (family members should be limited with obstetrical procedures).
- ✓ Patients can wear their own clean clothing.
- ✓ Staff should wear attire and personal protective equipment (PPE) according to procedures performed.
- ✓ Have a covered container filled with a 0.5% chlorine solution for immediate decontamination of instruments and other items once they are no longer needed.
- ✓ Have a leak proof, covered waste container for disposal of contaminated waste items (cotton, gauze, dressings) at point of use.
- ✓ Have a puncture-resistant container for safe disposal of sharps (e.g., used suture needles, hypodermic needles and syringes, and disposable scalpel blades) at point of use.
- ✓ Have storage space in procedure rooms for clean, high-level disinfected and sterile supplies. (Storage shelves should be enclosed to minimize dust and debris collecting on stored items.)

Surgical Unit

- ✓ The surgical unit is often divided into four designated areas, which are defined by the activities performed in each—unrestricted area, transition zone, semi restricted area and restricted area. Environmental controls and use of surgical attire increase as one moves from unrestricted to restricted areas. Moreover, staff with respiratory or skin infections and uncovered open sores should not be allowed in the surgical unit

Unrestricted Area

- ✓ This area is the entrance from the main corridor and is isolated from other areas of the surgical unit. This is the point through which staff, patients and materials enter the surgical unit.

Transition Zone

- ✓ This area consists primarily of dressing rooms and lockers. It is where staff put on surgical attire that allows them to move from unrestricted to semi restricted or restricted areas in the surgical unit. Only authorized staff should enter this area.

Semi restricted Area

This is the peripheral support area of the surgical unit and includes preoperative and recovery rooms, storage space for sterile and high-level disinfected items, and corridors leading to the restricted area. Support activities (e.g., instrument processing and storage) for the operating room occur her

- ✓ Limit traffic to authorized staff and patients at all times.
- ✓ Have a work area for processing of clean instruments.
- ✓ Have storage space for clean and sterile or high-level disinfected supplies with enclosed shelves to minimize dust and debris collecting on stored items.
- ✓ Have doors limiting access to the restricted area of the surgical unit.
- ✓ Staff who work in this area should wear surgical attire and a cap.
- ✓ Staff should wear clean, closed shoes that will protect their feet from fluids and dropped items

Restricted Area

This area consists of the operating room(s) and scrub sink areas.

- ✓ Limit traffic to authorized staff and patients at all times.

- ✓ Keep the door closed at all times, except during movement of staff, patients, supplies and equipment.
- ✓ Scrubbed staff must wear full surgical attire and cover head and facial hair with a cap and mask.
- ✓ Staff should wear clean, closed shoes that will protect their feet from fluids and dropped items.
- ✓ Masks are required when sterile supplies are open and scrubbed staffs are operating.
- ✓ Patients entering the surgical unit should wear clean gowns or be covered with clean linen, and have their hair covered.
- ✓ Patients do not need to wear masks during transport (unless they require airborne precautions).

Self-Check -4	Written Test

Directions: Choose the best answers from the given alternative.

1. Area consists primarily of dressing rooms and lockers.

A. Unrestricted Area B. Transition Zone C. Semi restricted Area D. None

2. One of the Following Is Semi restricted Area?

A. Limit traffic to authorized staff and patients at all times.
B. Have a work area for processing of clean instruments.
C. Have storage space for clean and sterile
D.ALL

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

Instruction Sheet	LG21: Identify and respond to infection risks

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Identifying Infection risks
- Activities and tasks that put clients and/or other workers at risk
- Applying response to infection risks
- *Preparing Procedures for risk control*
- *Preparing Protocols for care of blood borne exposures*
- *Determining Appropriate waste disposal site indicator*
- *Applying Spills removal*

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- Identify Infection risks
- Identify Activities and tasks that put clients and/or other workers at risk
- Apply response to infection risks
- *Prepare Procedures for risk control*
- *Prepare Protocols for care of blood borne exposures*
- *Determine Appropriate waste disposal site indicator*
- *Apply Spills removal*

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
5. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 Sheet ,sheet4,sheet5 ”.
6. Accomplish the “Self-check 1, Self-check t 2, Self-check 3 and Self-check 4 & self check 5” **in page 4,5,7,9 &15** respectively.

Information Sheet-1	Identifying Infection risks

1.1 Identify Infection risks

- A risk is the chance, high or low, that a hazard will cause harm, injury or ill health, or the likelihood, or possibility, which harm (injury, illness, death, damage etc) may occur from exposure to a hazard
- A hazard is a situation or item that could cause harm. Risks and hazards should be monitored so they are minimized, protecting the health and wellbeing of all workers and clients.
- Risk Assessment: Is defined as the process of assessing the risks associated with each of the hazards identified so the nature of the risk can be understood. This includes the nature of the harm that may result from the hazard, the severity of that harm and the likelihood of this occurring.
- Risk Control: Taking actions to eliminate health and safety risks so far as is reasonably practicable. Where risks cannot be eliminated, then implementation of control measures is required, to minimize risks as far as is reasonably practicable. A hierarchy of controls has been developed and is described below to assist in selection of the most appropriate risk control measure/s.
- Monitoring and Review: This involves ongoing monitoring of the hazards identified, risks assessed and risk control processes and reviewing them to make sure they are working effectively.

Health care facilities are ideal settings for the transmission of nosocomial infections in the following ways:

- ✓ Invasive procedures have the potential to introduce microorganisms.
- ✓ Service providers and support staff are constantly performing clinical procedures or other activities (susceptible host).
- ✓ Clients receiving services may be harboring microorganisms.

Who Is at Risk of Infections?

- Service providers and support staff: Health care personnel, including support staff (e.g., housekeeping, laundry staff, and maintenance), who work in health care settings are at risk of exposure to serious, potentially life-threatening infections such as HIV, hepatitis B virus (HBV), and hepatitis C virus (HCV).
- All workplaces are legally obliged to have processes in place to identify infection risks, as well as policies and procedures to provide workers with guidance on how they should respond to such risks.
- Every person in the workplace, from trainee personal care workers through to senior management, has work health and safety (WHS) obligations. These obligations include taking all reasonable steps to prevent the spread of infection. Knowledge of infection risks and appropriate responses is an essential part of meeting WHS requirements.

  - Clients are at risk of infections when:

- ✓ Service providers do not wash their hands before and after providing care to each client and before and after every procedure (cross-contamination).
- ✓ Service providers do not adequately prepare clients before clinical procedure.
- ✓ Service providers do not correctly process instruments and other items used in clinical procedures.
- ✓ Medical waste is disposed of inappropriately.

Self-Check -1	Written Test

Directions: MATCHING

A	**B**
1. A risk	A. Taking actions to eliminate health and safety risks
2. A hazard	B. Involves ongoing monitoring of the hazards identified
3. Risk Assessment	C. The process of the risks associated with each of the hazards identified
4. Risk Control	D. The chance Of cause harm or injury
5. Monitoring	E. A situation or item that can cause harm.

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____

Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

3. _____

4._____

5_____

Information Sheet-2	Activities and tasks that put clients and/or other workers at risk

2.1 Although healthcare workers (HCWs) are essential to the health of the world's population, they, themselves, are often put in physical jeopardy. Globally, HCWs are exposed each day to a variety of health and safety hazards, including:

- ✓ Biological, (e.g., pathogens such as Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), Hepatitis C Virus,(HCV), Ebola, Mycobacterium Tuberculosis (MTB), SARS virus and Neisseria Meningitis)
- ✓ Sharp's injuries
- ✓ Ergonomic, (e.g., heavy lifting)
- ✓ Physi(e.g., slips, trips and falls) cal,
- ✓ Psychosocial, (e.g., violence and stress)
- ✓ Chemical, (e.g., chlorine, gutaraldehyde, ethylene oxide)
- ✓ Radiological and nuclear

Safe work leads to worker well-being and retention, increased productivity and economic best outcomes. Risks and hazards are fluid and need monitoring and adjustments made to the appropriate safety plans and processes

2.2The risk to staff arises:

- ✓from sharps and hollow needles
- ✓splashing of conjunctivae and mucous membranes with contaminated blood and body fluids;
- ✓heavy contamination of broken skin, e g. cuts, dermatitis etc.
- ✓handling of large quantities of blood and body fluids without protective clothing.

2.3The risk to patients arises from: -

- ✓use of recycled hollow needles and syringes;
- ✓contaminated blood transfusion;
- ✓heavy soiling of the environment;
- ✓poor ward facilities and cleaning

Self-Check -2	Written Test

Directions: Choose the best answer from the given alternative

1. HCWs are exposed each day to a variety of health and safety hazards, including

A. Biological B. Sharp's injuries C .Ergonomic D.ALL

2. From the following one is physical hazard?

A. Falls B. Violence C. Stress D. None

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____

Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

Information Sheet-3	Applying Response to infection risks

To successfully identify and respond to infection risks we must understand and follow safe work practices that prevent the transmission of infections.

As a health worker it is also your responsibility to follow recommended procedures in your workplace and take adequate precautions to protect yourself from injury and infection.

Risk management is the process of making health care safer for the patient, staff and visitors by identifying hazards in the workplace and taking action to minimize their harm wherever possible. There are a number of steps in the risk management process:

- ✓ identifying the hazard
- ✓ assessing the risks
- ✓ Using control measures.

3.1 Identifying a hazard

- ✓ A hazard is anything with the potential to cause harm to you, the patients, your co-workers or visitors to the work area. In the sterilization setting this includes chemicals, sharps such as needles, soiled instruments, power, water, steam, noise, and heat.
- ✓ In developing procedures or buying new equipment, identify these risks early so that work practices can be developed that ensure the hazard is eliminated as much as possible. Regular safety inspections and audits can help identify and manage hazards.
- ✓ All employees, patients, volunteers, contractors and visitors that enter the work place have a responsibility to behave in a safe and responsible manner and report any hazards or near accidents.

3.2 Assessing the risks

- ✓ It is important to assess the risks associated with each hazard to determine how it can be eliminated.
- ✓ Is there a high risk of injury or is the hazard a result of a combination of unusual circumstances that may never re-occur?
- ✓ Budgets are limited in health care settings, so it is important to look at all the options for dealing with a hazard. You should also document the process to seek additional support for action.

3.3 Control measures

- ✓ The more serious the consequence, the more urgent it is for the risk to be dealt with and eliminated immediately. If the risk cannot be eliminated it may be possible to circumvent the risk of injury by changing practice. The last alternative is to use some form of personal protection when exposed to the hazard.
- ✓ When deciding on control measures this should be a team effort so that management and staff work together. The control measures should not impose another risk.

3.4 Monitoring control measures

- Once control measures have been implemented it is important to monitor and re-evaluate practice to ensure compliance with new practice.

Self-Check -3	Written Test

Directions: Choose the best answer from the given alternative

1. Steps in the risk management process:
   A. Identifying the hazard B. assessing the risk C. using control measures D. All
2. From risk management process the risk to be eliminated immediately.
   A. Identifying the hazard B. assessing the risk C. Control measures D. None

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

Information Sheet-4	*Preparing Procedures for risk control*

4.1 Strategies to identify risks

Strategies for identifying risks vary. Risk identification can be proactive or reactive. The following contains information about proactive and reactive strategies that can help management and workers identify hazards that present risks to health and safety.

Proactive strategies

- ✓ A proactive strategy is one carried out to prevent an accident or incident; for example, implementing processes to identify hazards and risks. Two examples are a job safety analysis (JSA) and an audit.
- ✓ A JSA contains information about how a job should be carried out, types of risks and control measures.
- ✓ Providers should carry out regular internal audits to check that the control measures for infection and other risks are being implemented. External bodies such as state and territory WHS authorities can also carry out audits to check that safety controls are appropriate.

Reactive strategies

- ✓ A reactive approach to risk identification involves reviewing accidents and incidents through measures such as report forms and data, as well as establishing consultation processes such as workplace health and safety committees (HSCs).
- ✓ Incident and accident report forms are filled out after any incident or accident. Data from these forms is used by HSCs, WHS officers and managers to identify hazards.
- ✓ Committees, team meetings and other forums give staff the chance to discuss infection control risks and provide suggestions for policy and procedure improvements.

4.2 Carrying out a risk assessment

Once a hazard has been identified, you need to conduct an assessment of the risk of injury, harm or damage. An example of a risk is the likelihood of a hazard resulting in an injury or disease, together with the seriousness of the injury or disease.

The five steps in carrying out a risk assessment are shown here.

Risk assessment steps

1. Evaluate the likelihood of an injury or illness occurring and the likely severity of any injury or illness
2. Review health and safety information relevant to the hazard such as incident reports, SDSs, results of workplace monitoring and inspections and supplier information
3. Identify factors that contribute to the risk such as the physical layout of the workplace, the knowledge, skills and experience of workers, and existing work practices
4. Identify actions necessary to eliminate or control the risk
5. Complete any relevant records

Self-Check -4	Written Test

Directions: Say True or False

1. Once a hazard has been identified, you need to conduct an assessment.
2. Reactive strategy is one carried out to prevent an accident or incident.

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____

Rating _____

Name: _____ Date: _____

Short Answer Question

1._____
2._____

Information Sheet-5	*Preparing Protocols for care of blood borne exposures*

***Definition**: Blood borne Pathogen Exposure - a percutaneous injury (e.g., a needle stick or cut with a sharp object) or contact of mucous membrane or non-intact skin (e.g., exposed skin that is chapped, abraded, or afflicted with dermatitis) with blood, tissue, or other body fluids that are potentially infectious. In addition to blood and body fluids containing visible blood- semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, and amniotic fluid are also considered potentially infectious. Urine or gastric contents without visible blood are not considered potentially infectious.*

Blood is the most infectious body fluid for the transmission of HIV, HBV and HCV. If the exposure incident involved a body fluid capable of transmitting any of the viruses (HIV, HBV or HCV

Exposure to blood or body substances may be defined as direct contact with blood or other body substances through broken skin, mucous membranes (eyes, nose or mouth) or needle stick injury

Health care workers (HCW) are at risk of acquiring infection through occupational exposure. Hospital employees can also transmit infections to patients and other employees. Thus, an employee's health programme must be in place to prevent and manage infections in hospital staff

5.1 Occupational injuries may be divided into:

a) Percutaneous exposure (from needles, instruments, bone fragments, human bite which penetrates the skin layer, etc.);
b) Exposure via broken skin (exposed skin that is chapped, abraded, or afflicted with dermatitis etc.) with blood, tissue, or other body fluids that are potentially infectious; and
c) Exposure via mucous membranes including the eye

Specific post-exposure policies must be developed, and compliance ensured for a number of infectious diseases for example: human immunodeficiency virus (HIV), viral hepatitis, severe acute respiratory syndrome (SARS), varicella, rubella and tuberculosis. Health care workers with infections should report their illnesses/incident to staff clinics for further evaluation and management

Hepatitis B virus (HBV), hepatitis C virus (HCV) and the human immunodeficiency virus (HIV) constitute well-recognized occupational risks for healthcare workers (HCWs). Avoiding occupational blood exposure by the adherence to principles of standard precautions through the use of appropriate work practices and personal protective equipment is a cornerstone for preventing transmission of these blood-borne pathogens (BBP) in the health-care setting.

In general, the risk of viral transmission after a percutaneous injury is highest for HBV, followed by HCV and HIV.

Occupational exposure is serious and every effort should be taken to prevent its occurrence. However, accidents may still happen and if so, risk assessment and counseling constitutes the basis of post exposure management. Appropriate post exposure prophylaxis (PEP) should be provided using a case-by-case evaluation approach.

Each healthcare institution should have personnel responsible for the Sharps Prevention Program

5.2Types of exposure

1. Percutaneous Injury

- Puncture or laceration of the skin that penetrates into or below the dermis.

- For the purposes of this protocol, a percutaneous exposure to blood/body fluids which has one or more of the following factors present will be defined as a more severe exposure Deep percutaneous injury
    - ✓ Visible blood present on the device associated with the exposure
    - ✓ Exposure from a procedure which involved a needle placed directly into the Source's vein or artery
    - ✓ Large-bore hollow needle
- A percutaneous exposure which has none of the above characteristics will be defined as a less severe exposure (e.g., superficial injury, no visible blood present on device associated with the exposure, procedure from which exposure resulted did not involve a needle being placed directly into the Source's vein or artery, solid needle

2. Mucous Membrane and Non-intact Skin Exposures

- ✓ Mucous Membrane Exposure: When blood/body fluids come into contact with mucous membranes (e.g., eyes, oral cavity)
- ✓ Non-intact Skin Exposure: When blood/body fluids come into contact with an open wound or exposed skin that is chapped, abraded or non-intact because of dermatitis

A larger volume of blood/body fluid is associated with increased transmission risk for mucous membrane and non-intact skin exposures. For the purposes of this protocol, a mucous membrane or non-intact skin exposure involving a major splash of blood/body fluids will be defined as a large volume exposure. Exposures involving lesser amounts (e.g., only a few drops of fluid) will be defined as a small volume exposure.

3. **Human Bites**: Human bites may occur in both occupational and non-occupational settings. The person bitten has a potential percutaneous exposure and the person who was the biter has a potential mucous membrane exposure. Therefore, an individual who bites may be both the Source and Exposed in bite incidents.
    a. As HBV is present in saliva at concentrations 1,000 to 10,000 times less than in blood , for the purposes of post-exposure prophylaxis, generally only exposures to saliva containing visible blood would be considered for HBV PEP (such as deep bites associated with bleeding in the mouth of the biter B)**Exposures to Blood/Body Fluids Obtained Through Cuts, Nosebleeds, Physical Assaults, Sports Injuries**
4. **Consensual Sex** (Serodiscordant Partners) HBV and/or HIV PEP should be considered for the following unprotected (e.g., condom breakage) sexual exposures where the Source is known to be positive for the respective viruses

For example

The route of transmission for hepatitis B virus is through body substances such as blood and blood products, saliva, cerebrospinal fluid, peritoneal, pleural, pericardial and synovial fluid, amniotic fluid, semen and vaginal secretions and any other body fluid containing blood**.**
The risk of a health care worker acquiring HIV after a needle stick or other "sharps" injury is less than 0.5%.

5.4 Risk reduction must be undertaken for all blood borne pathogens, including:

- adherence to standard precautions using personal protective equipment
- appropriate use of safety devices and a needle disposal system to limit sharps exposure.
- Training for health care workers in safe sharps practice should be ongoing.
- Information on preventive measures must be provided to all staff with potential exposure to blood and blood products.
- Policies which are in keeping with the local and national guidelines must include
    - ✓ screening of patients

- ✓ disposal of sharps and wastes
- ✓ protective clothing
- ✓ managing inoculation accidents
- ✓ sterilization and disinfection.

- Hospital policy must include measures to obtain serological testing of source patients promptly where necessary, usually with the patient's informed consent.
- Post exposure prophylaxis should be started as per local or national guidelines.
- In case of hepatitis B, immunization is the best way of preventing transmission to health care staff.
  - ✓ All HCWs at risk must be vaccinated.
  - ✓ Staff infected with blood-borne pathogens may transmit these infections to patients and require careful evaluation with respect to their duties. This status should not be used as cause for discrimination
- If a staff member has been exposed to **Tuberculosis** (TB) they should report to the Infection Control Practitioner or the Staff Health Nurse depending on the hospital protocol for health care worker exposures.
- Health care workers in close respiratory contact with cases such as **meningococcal meningitis** should receive chemoprophylaxis with ciprofloxacin or an effective alternative agent. Close respiratory contact with the patient includes mouth-to-mouth contact, sharing of drink containers or cigarettes

5.5 Sharp injuries Needle

- stick injuries are the most common of sharps injuries, although other contaminated sharp instruments may also cause injuries.
- The majority of reported NIs involved hollow-bore needles (55-62%), and recapping was the most common behavior associated with NI. Overall, more than half of percutaneous injuries involving hollow-bore needles were potentially preventable through safer work practices or technologies.
- HCWs should prevent skin penetrating injuries by wearing appropriate clothing, shoes and personal protective equipment (PPE) where required. As a break in the skin can allow direct contact with blood and body substances these should be protected by keeping open wounds covered e.g. with a waterproof dressing or with appropriate clothing.
- Skin penetrating injuries can introduce infectious agents directly into the blood stream, e.g. tetanus and blood borne viruses such as hepatitis B, hepatitis C and HIV. It is very important that skin penetrating injuries are minimized e.g. through safe handling and disposal of sharps
- All health care workers with potential exposure should be vaccinated.
  - For other personnel, the risk of hepatitis B, hepatitis C and HIV infection should be assessed and appropriate immunization or chemo prophylactic steps taken.
  - Immediate treatment of such injuries should encourage
    - washing thoroughly with running water and an antiseptic solution.
    - Consult the infection control team for further advice.
- An incident reporting system should be in place. It should not be seen as punitive/disciplinary; active support by managers should encourage prompt and accurate reporting.

5.6Exposures for which PEP is indicated

- Break in the skin by a sharp object (including hollow-bore, solid-bore, and cutting needles or broken glassware) that is contaminated with blood, visibly bloody fluid, or other potentially infectious material, or sharp objects had been in the source patient's blood vessel.
- Bite from a patient with visible bleeding (in the mouth) and which causes bleeding in the exposed worker.

- Splash of blood, visibly bloody fluid, or other potentially infectious material to a mucosal surface (mouth, nose, or eyes).

Remember, Health care workers should have immediate access to post exposure prophylaxis (PEP) , 24 hours a day, 7 days a week to be freely dispensed by any hospital (private or public), regardless of the location or type of work they do. The minimum care following potential exposure to HIV should be risk assessment and, if deemed necessary, the first dose of PEP medication

5.7General procedures

First Aid – when an exposure incident occurs, implement first aid

1. Following any exposure, the wound should be washed immediately and thoroughly with soap and water, flush the eyes with running water immediately following a bodily fluid splash. Alcohol, hydrogen peroxide, Betadine or other chemical cleansers are best avoided. Wound should not be squeezed or sucked.
2. For mucosal contact e.g. spillage into the conjunctivae, the exposed area should be immediately flushed with plenty of clean running water.
3. The exposed HCW is responsible for reporting the exposure incident to his/her supervisor and should then seek immediate medical advice for proper wound care and post-exposure management.

    - The following information should be recorded in the exposed worker's confidential medical record:

    i. details about the source patient (e.g. name, NRIC No, diagnosis and any relevant information)
    ii. date, time and place of the exposure
    iii. details of the procedure being performed
    iv. use of protective equipment at the time of the exposure
    v. the type, severity, and amount of fluid to which the worker was exposed

4. The health care worker should be tested for HIV antibody, HCV, HBV antigen and antibody
5. The source patient's blood (if available) should be tested for HIV, HCV & HBV

5.8 Reporting

- All institutions should have a mechanism in place for reporting and managing of sharp injuries and mucosal exposure in the occupational setting. HCWs must know the reporting process to facilitate quick and smooth flow so as to allow the attending physician to evaluate the risk of exposure and provide prompt appropriate post exposure treatment
- In addition, a surveillance system of exposure events should be available to avoid similar incidents from occurring in the future.

5.9 Counseling

Until the risk of infection is ruled out, advice should be given to the exposed staff to refrain from donating blood, plasma, organs, tissue or semen. The use of condom during sexual intercourse should also be advised. A place for psycho-social support is clearly indicated

In general

Healthcare workers should practice the following:

- ✓ Follow safe work practices at all times
- ✓ Be familiar with employer's written departmental policies
- ✓ Know the potential health and safety hazards of the job and protective measures by participating in appropriate occupational health and safety training programs

- ✓ Use personal protective equipment (PPE) as trained and report any changes in personal medical condition that would require a change in status as to wearing PPE
- ✓ Know how to report unsafe working conditions
- ✓ Report any work-related injury or illness to supervisor
- ✓ Participate in accident and injury investigations
- ✓ Know what to do in an emergency – Participate in health and safety committees (when available) can be an important way to improve conditions on the job such as: – Provide a forum for employees and management to work together to solve health and safety problems
- ✓ Help prevent injury and illness on the job i.e. conduct regular walk-a-round inspections to identify potential health and safety hazards
- ✓ Increase awareness of health and safety issues among employees, supervisors, and managers i.e. analyze injury data, accident reports and report trends
- ✓ Develop strategies to make the work environment safe and healthy

Self-Check -5	Written Test

Directions: Choose the best answer from the given alternative

1 .From Type of Exposure One Needle Stick Injuries?

A. Percutaneous exposure B. Exposure via broken skin C. Exposure via mucous membranes D. None

Directions: Matching

A	**B**
1. Percutaneous Injury	A. oral cavity
2. Mucous Membrane	B. Serodiscordant Partners
3. Human Bites	C. laceration of the skin
4. Consensual Sex	D. present in saliva.

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____

Rating _____

Name: _____ Date: _____

Information Sheet-6	*Applying Spills removal*

7.1Spills removal

Basic Principles:

- ✓ Spills of blood or body substances are to be dealt with as soon as possible. Isolate or restrict access to the area if there is an unavoidable delay.
- ✓ Standard precautions apply – assume all blood and body substances are potentially infectious and cover cuts, maintain hand hygiene and use appropriate PPE.
- ✓ Cover the spill, where applicable, to prevent the generation of splashes and aerosols from the spilled substance - o e.g. granular formulation such as vomit control o use a scraper and pan to remove the absorbed material
- ✓ after removing the bulk of the spill, clean the area thoroughly, rinse and dry.
- ✓ clean non-disposable cleaning equipment thoroughly after use, rinse and store dry.

Small Spills: e.g. spots or drops of blood and other small spills up to 10cm diameter. - wipe the area immediately with paper toweling - clean with warm water and detergent followed by rinsing - dry the area (as wet areas attract contaminants) - a sanitiser (e.g. alcohol wipe) can be used on the area after cleaning.

Large Spills: e.g. greater than 10 cm diameter.

Wet area – e.g. bathroom with a floor drain –

- ✓ wash carefully into the sewerage system using copious amounts of water, taking care to avoid splashes - clean the area with mop and bucket of warm water and detergent
- ✓ clean the bucket and mop thoroughly after use using warm soapy water and store dry.
- ✓ Carpet - contain and clean with warm water and detergent - do not use disinfectant.

Equipment

- Equipment (mop, bucket and cleaning agents) is to be readily available in a location known to all. Prepare for a range of likely occurrences at your location considering:
  - ✓ the nature of the spill (e.g. sputum, vomit, faeces, urine, blood or laboratory culture)
  - ✓ the germs most likely to be involved in these different types of spills (e.g. gastrointestinal germs associated with spills of vomit and diarrhoea)
  - ✓ the size of the spill
  - ✓ the type of surface (e.g. carpet or impervious flooring)
  - ✓ the location e.g. whether the spill occurs in a contained area such as a toilet cubicle or in a high traffic area such as a hallway or while in a public place such as on an excursion.

A portable 'spills kit' can be made up to manage likely spills for the area/activity e.g.

- a large (10 L) reusable plastic container or bucket with fitted lid, containing the following items
  - ✓ leak proof bags and containers for disposal of waste material
  - ✓ roll(s) of paper towel to contain and cover a spill
  - ✓ a designated, sturdy scraper and pan for spills (similar to a 'pooper scooper'/dust pan)
  - ✓ sachets of a granular formulation containing 10,000 ppm available chlorine or equivalent (each sachet should contain sufficient granules to cover a 10-cm diameter spill) e.g. vomit control - disposable latex, vinyl or nitrile gloves suitable for cleaning - eye protection (disposable or reusable)

- ✓ a plastic apron
- ✓ a respiratory protective device such as a disposable P2 respirator (for protection against inhalation of powder from the disinfectant granules, or aerosols, which may be generated from high-risk spills during the cleaning process).

Instruction Sheet	LG22: Maintain personal hygiene

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Introducing Hand hygiene
- *Practicing Hand washing procedures*
- *Implementing Hand care* procedures
- Identifying risk of Cuts and abrasions

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- Introduce Hand hygiene
- *Practice Hand washing procedures*
- *Implement Hand care* procedures
- Identify risk of Cuts and abrasions

Learning Instructions:

1.Read the specific objectives of this Learning Guide.

2.Follow the instructions described below 3 to 6.

3.Read the information written in the information “Sheet 1, Sheet 2, Sheet 3’’

4.Accomplish the “Self-check 1, Self-check 2 & Self-check 3

5.If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1, Operation Sheet 2 ” **in page -50 &52.**

6.Do the “LAP test” **in page – 51 & 52** (if you are ready).

Reference

- Linda,Tietjen,Débora, BossemeyerNoel McIntosh JHPIEGO, USIAD 2003 Guidelines for Healthcare Facilities with Limited Resources, , Johns Hopkins University.

Information Sheet-1	Introducing Hand hygiene

1.1. Hand hygiene

Why Hand Hygiene Is Important

Hand hygiene is a general term referring to any action of hand cleansing. It includes care of the hands, nails, and skin.

Proper hand hygiene is a key component in minimizing the spread of disease and in maintaining an infection-free environment. Hand hygiene significantly reduces the number of disease-causing microorganisms on hands and arms and can minimize cross-contamination (e.g., from health worker to patient).

It is the most important way to reduce the spread of infections in the health care setting. Hand hygiene practices such as hand washing and surgical hand scrubbing are intended to prevent hand-borne infections by removing dirt and debris and inhibiting or killing microorganisms on skin. This includes not only most of the organisms acquired through contact with patients and the environment, but also some of the permanent ones that live in the deeper layers of the skin.

Studies indicated that failure to perform appropriate hand hygiene is considered to be the leading cause of health care–associated infections and the spread of multidrug-resistant microorganisms and has been recognized as a significant contributor to outbreaks (Boyce and Pittel 2002).

Hand washing procedures

Hand hygiene can be accomplished by:

- ***Hand washing***
- ***Hand antisepsis***
- ***Antiseptic hand rub***
- ***Surgical hand scrub***

From the various hand hygiene practices available, the use of soap and water remains the most common and the most important when hands are visibly soiled. For hand hygiene in the absence of dirt or debris, however, alternatives such as antiseptic hand rubs, which are rapid acting, inexpensive, and easy to make, are gaining acceptance, especially where access to sinks and clean water is limited

The decision of which type of hand hygiene practice to use depends on:

- ✓ *Intensity of contact with patient and/or blood and body fluids*
- ✓ *The likelihood of microbial transmission*
- ✓ *Patient's susceptibility to infection*
- ✓ *Procedure being performed*

Self-Check -1	Written Test

Directions: Say “True” or “False”

1. Proper hand hygiene is a key component in minimizing the spread of disease and in maintaining infection-free environment.

2. *The decision of hand hygiene practice depends on Patient’s susceptibility to infection.*

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

2.1 Implementing Hand care procedures

Hand Washing

Healthcare-associated infections (HCAI) are infections that are acquired in healthcare facilities or as a result of healthcare interventions and are a major problem for patient safety. Hand hygiene is one of the most effective means of preventing HCAIs.

The purpose of hand washing with plain soap and water is to mechanically remove soil and debris from skin and reduce the number of transient microorganisms. Hand washing with plain soap and clean water is as effective as washing with antimicrobial soaps (Pereira, Lee, and Wade 1997). But if the tap water is contaminated, hand washing with plain soap is only effective in removing dirt and debris. If tap water is contaminated, use water that has been boiled for 10 minutes and filtered to remove particulate matter (if necessary), or use chlorinated water.

When Do We Wash Our Hands?

- ✓Immediately after arriving and leaving work (the health facility)
- ✓Before and after examining (coming in direct contact with) a client/patient
- ✓After touching contaminated instruments or items
- ✓After exposure to mucous membranes, blood, body fluids, secretions, or excretions
- ✓Before putting on gloves and after removing them
- ✓Whenever our hands become visibly soiled
- ✓After blowing nose or covering a sneeze
- ✓Before eating or serving food
- ✓After visiting the toilet

The 'WHO five moments for hand hygiene

- ✓ before touching a patient;
- ✓ before clean/aseptic procedures;
- ✓ after bodily fluid exposure/risk
- ✓ after touching a patient; and
- ✓ after touching patient surroundings

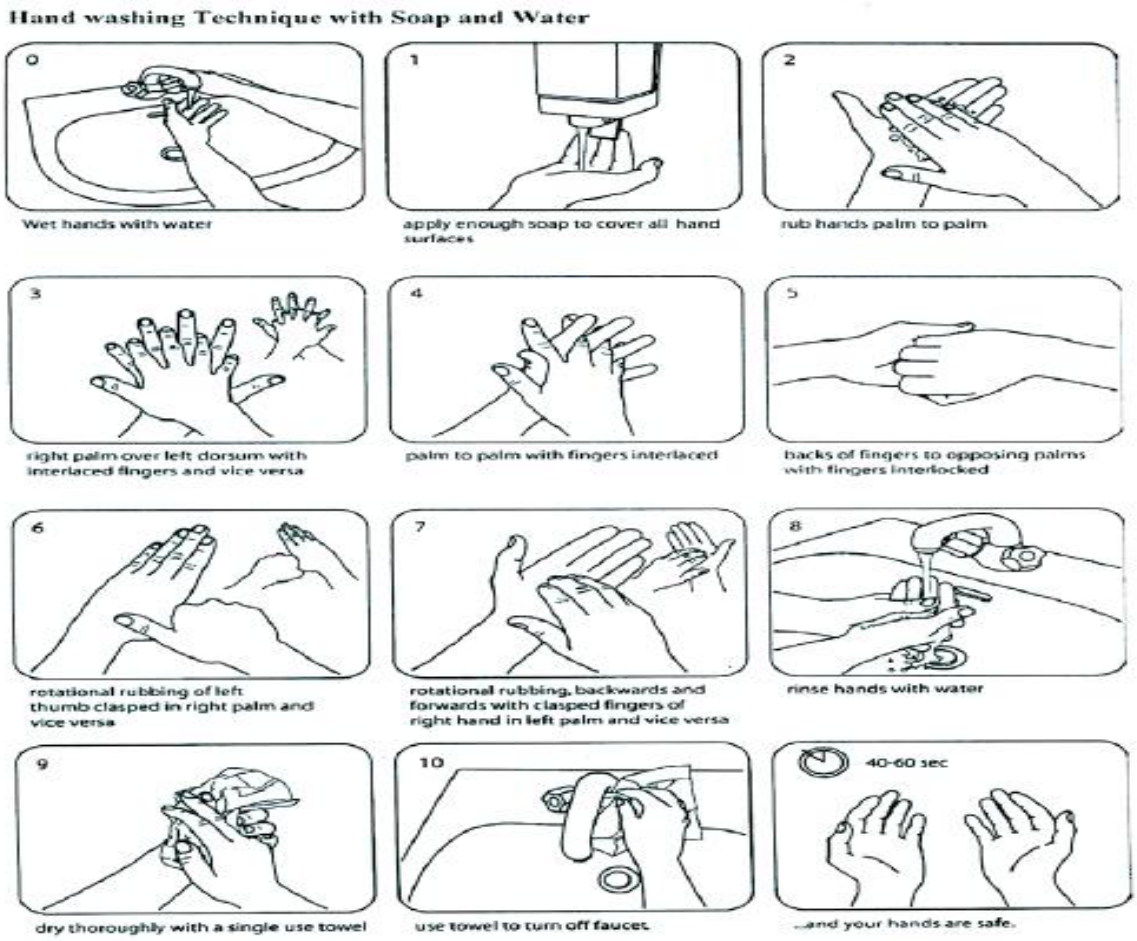
Note: Hands should be washed with soap and clean water (or an antiseptic hand rub) after removing gloves because the gloves may have tiny holes or tears, and bacteria can rapidly multiply on gloved hands due to the moist and warm environment within the glove (CDC 1989; Korniewicz et al. 1990).

When drying hands, using common towels should be avoided. Shared towels may harbor microorganisms and contaminate hands even after proper hand washing.

Note:

- ✓If bar soap is used, provide small bars and soap racks that drain.
- ✓Use running water and avoid dipping hands into a basin containing standing water.
- ✓If liquid soap is being used, do not add soap to a partially empty liquid soap dispenser. This practice of "topping off" dispensers may lead to bacterial contamination of the soap. Liquid soap dispensers should be thoroughly washed and dried before refilling.
- ✓A bucket with a tap or a bucket with a pitcher or jug can be used if running water is not available.
- ✓Used water should be collected in a basin and discarded in a latrine if a drain is not available.

Figure 3.1. Hand-washing techniques with soap and water



2.2 Hand Antisepsis and Antiseptic Hand Rub

Hand Antisepsis

The purpose of hand antisepsis is to remove soil and debris and reduce both transient and resident flora on the hands. The technique for hand antisepsis is similar to hand washing except that it involves use of soap containing an antimicrobial agent (often chlorhexidine, iodophors, or triclosan) instead of plain soap or detergent. Medicum, Life Boy, and Dettol are some of the commonly found soaps with antimicrobial agents.

Hand antisepsis should be done before:

- ✓ Examining or caring for highly susceptible patients (e.g., premature infants, elderly patients, patients with advanced AIDS)
- ✓ Performing an invasive procedure such as placement of an intravascular device
- ✓ Leaving the room of patients on contact precautions (e.g., with hepatitis A or E) or who have drug-resistant infections

Antiseptic Hand Rub

Hand rub product is more effective in killing transient and resident flora than plain or medicated soap and water. Antiseptic hand rub is quicker and easier to use and gives a greater initial reduction in hand flora (Girou et al. 2002). Hand rubs also contain a small amount of an emollient such as glycerin, propylene glycol, or sorbitol that protects and softens skin. It is also less irritating to skin than medicated soaps. But, if hands are visibly soiled, hand washing with water and a hand-washing agent should be done first.

Alcohol-based hand rubs provide several advantages compared with hand washing with soap and water because they:

- ✓ Require less time
- ✓ Act faster
- ✓ Are more accessible than sinks
- ✓ Are more effective for standard hand washing than soap
- ✓ Can provide improved skin condition

A nonirritating, antiseptic hand rub can be made by adding glycerin, propylene glycol, or sorbitol to alcohol (2 mL in 100 mL of 60 to 90 percent ethyl or isopropyl alcohol solution) (Larson 1999).

The technique for performing antiseptic hand rub is as follows:

- ✓ Apply enough (5 mL) alcohol-based hand rub to cover the entire surface of hands and fingers.
- ✓ Rub the solution vigorously into hands, especially between the fingers and under the nails until dry (15 to 30 seconds).
- ✓ Do not rinse hands after applying hand rub.

There are 2 situations where alcohol hand rub alone is not sufficient:

- ✓ After contact with a patient with known or suspected diarrhea (e.g. Clostridium Difficile or Norovirus.)
- ✓ Where hands are visibly soiled.

In these instances hand wash with antiseptic soap or plain soap followed by use of an alcohol rub is recommended

Surgical Hand Scrub

The purpose of surgical hand scrub is to mechanically remove soil, debris, and transient organisms and to reduce resident flora prior to performing any surgical procedure and for the duration of the procedure. The goal is to prevent wound contamination by microorganisms from the hands and arms of the surgeon and assistants if there is a break in the integrity of the gloves or gown.

Applying an antiseptic minimizes the number of microorganisms on hands under the gloves and minimizes growth of flora during surgery. Skin damage caused by allergic reactions provides an ideal place for microorganisms to multiply and should be avoided. Personnel with allergies to antiseptics may use plain soap followed by applying the waterless, alcohol- based hand rub.

Other Issues and Considerations Related to Hand Hygiene

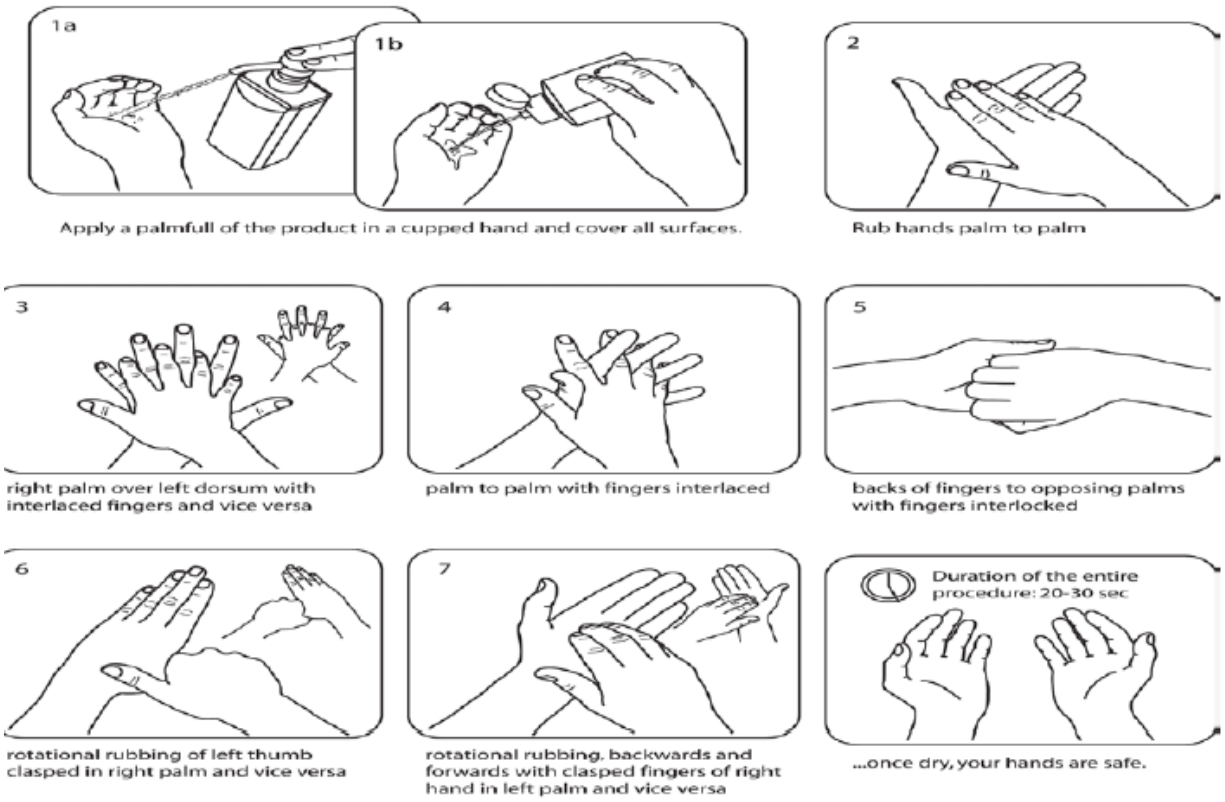
Gloves:

- ✓ Wearing gloves does not replace the need for hand hygiene.

Hand lotions and hand creams:

- ✓ To minimize contact dermatitis related to frequent hand washing (more than 30 times per shift) due to the use of harsh detergents and frequent exposures to antiseptic agents, health care workers may use hand lotions, creams, and moisturizing skin care products. Such products should be water based and without fragrance. Oil-based barrier products, such as those containing petroleum jelly (Vaseline or lanolin), should not be used because they damage latex rubber gloves.

Hand Hygiene Technique with Alcohol-Based Formulation



Self-Check -3	Written Test

Directions: Choose the best answer from the given alternative

1. The time of hand washing according to "WHO" A. before touching a patient.
   B. Before clean/aseptic procedures. C. after bodily fluid exposure D. All
2. One is **not** the advantage of Alcohol-based hand rubs.
   A. Act faster
   B. Are more accessible than sinks
   C. Are more effective for standard hand washing than soap
   D. Can provide improved skin condition E. All

Direction-2:- Say "True" or "False"

1. Hand rub product is more effective in killing transient and resident flora than medicated soap and water.
2. Applying an antiseptic minimizes the number of microorganisms on hands under the gloves.

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____
2._____

3.1Cuts and abrasions

Lesions and skin breaks:

- ✓ Cuticles, hands, and forearms should be free from lesions (dermatitis or eczema) and skin breaks. Cuts and abrasions should be covered with waterproof dressings.

Fingernails and artificial nails:

- ✓ Long nails may serve as a reservoir for microorganisms, and long nails, either natural or artificial, tend to puncture gloves more easily. As a result, it is recommended that nails be kept moderately short and be less than 0.5 cm long beyond the fingertip. The use of artificial nails by health workers should be restricted (WHO 2009a).

Nail polish:

- ✓ Dark-colored nail polish may prevent dirt and debris under fingernails from being seen and removed. Although there is no restriction to wearing nail polish, it is suggested that surgical team members and staff working in specialty areas wear freshly applied, clear nail polish. Chipped nail polish supports the growth of larger numbers of organisms on fingernails compared to freshly polished or natural nails.

Jewelry:

- ✓ Although several studies have shown that skin under rings is more heavily colonized than comparable areas of skin on fingers without rings, at the present time, it is not known whether wearing rings results in greater transmission of pathogens. It is suggested that surgical team members not wear rings because it may be more difficult for them to put on surgical gloves without tearing them

Self-Check -3	Written Test

Directions: Say “True” or “False”

1. Dark-colored nail polish may prevent dirt and debris under fingernails from being seen and removed.
2. Cuts and abrasions should be covered with waterproof dressings.

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____

Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

Operation Sheet 1	*Practicing Hand washing procedures*

Steps for Routine Hand Washing

The entire process should take 40 to 60 seconds. The steps are as follows:

1. Wet your hands with water.

2. Take enough soap to cover all the surfaces of the hand.

3. Rub your palms together.

4. Place your right palm over the dorsum of your left palm with the fingers interlaced and rub them. Do the same with the left palm over the dorsum of the right palm.

5.Rub your palms together with your fingers interlaced.

6.Rub the back of your fingers to the opposite palm while keeping your fingers interlaced.

7.Clasp the opposite thumb with the other hand and rub in a rotational direction.

8.Rinse off your hands under water.

9.Dry your hands with a towel.

10.Use the towel to turn off the tap.

LAP Test -1	Practical Demonstration

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 5min.

Task 1: perform Routine Hand Washing

Operation Sheet 2	Practicing surgical hand rub

2.1**The steps in surgical hand scrub include the following:**

1. Remove all rings, watches, and bracelets.
2. Thoroughly wash hands, especially between fingers, and forearms up to the elbows with soap and water. (If a brush is used, it should be cleaned and either sterilized or high-level disinfected before reuse or shared with others. Sponges, if used, should be discarded.)
3. Clean nails with a nail cleaner.
4. Rinse hands and forearms thoroughly with clean, running water.
5. Apply an antiseptic agent (e.g., 2 to 4 percent chlorhexidine gluconate [CHG]) to all surfaces of hands and forearms to the elbows and rub hands and forearms vigorously for at least two minutes.
6. Rinse hands and arms thoroughly, holding hands higher than the elbows (if tap water is contaminated, uses boiled and cooled water or chlorinated water and filter if necessary).
7. Keep hands up and away from the body, do not touch any surface or articles, and dry the hands and forearms with a sterile towel.
8. Put sterile surgical gloves on both hands.

LAP Test	Practical Demonstration

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 5min.

Task 1: perform surgical hand rub

Instruction Sheet	LG23: Use personal protective equipment

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Identifying Personal protective clothing and equipment
- Applying Protective clothing and gloves

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- Identify Personal protective clothing and equipment
- Apply Protective clothing and gowns/aprons are changed

Learning Instructions:

1.Read the specific objectives of this Learning Guide.

2.Follow the instructions described below 3 to 6.

3.Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3”.

4.Accomplish the “Self-check 1& Self-check 2.’’

5.If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1, Operation” **in page -10&11.**

6.Do the “LAP test” **in page – 11**(if you are ready).

Information Sheet-1	Identifying Personal protective clothing and equipment

1.1. Personal Protective clothing and equipment

Personal protective equipment (PPE) refers to a range of barriers and respirators used alone or in combination to protect mucous membranes, airways, skin, and clothing from contact with infectious agents

Protective barriers and clothing are now commonly referred to as PPE. PPE includes gloves, masks/respirators, eyewear (face shields, goggles, or glasses), caps, gowns, aprons, and other items. The basic principle behind wearing PPE is to provide a physical barrier/protection for health care providers and patients/clients from microorganisms.

The most effective barriers are made of treated fabrics or synthetic materials that do not allow water or other liquids (blood or body fluids) to penetrate them. However, these fluid-resistant materials are not widely available because they are expensive. In many countries, caps, masks, gowns, and drapes are made of cloth or paper. Lightweight cotton cloth (with a thread count of 140/inch2) is the material most commonly used for surgical clothing (masks, caps, and gowns) and drapes in many countries. Unfortunately, lightweight cotton does not provide an effective barrier because moisture can pass through it easily, allowing contamination.

Table 4.1. Types of personal protective equipment

Type of Personal Protective Equipment	Must Be Used For:	Primarily Protects:
Caps, gowns/scrub suits, masks, aprons, drapes	Invasive procedures where tissue beneath the skin is exposed	Service provider and client
Closed boots or shoes (open sandals are not acceptable)	Situations involving sharp instruments or when contact with blood and/or body fluids is likely	Service provider
Goggles or glasses, masks, apron or mackintosh	Situations where splashing of blood, body fluids, secretions, or excretions is likely	Service provider
Apron or Mackintosh	Situations where splashing or spillage of blood, body fluids, secretions, or excretions is likely	Service provider
Masks	Situation that call for airborne or droplet transmission precautions	Service providers
Sterile drapes	Major or minor surgical procedures	Client

Caps

- ✓ Caps are used to keep the hair and scalp covered so that flakes of skin and hair are not shed into the wound during surgery. Caps should be large enough to cover all hair.

Masks

- ✓ Masks are worn in an attempt to contain moisture droplets expelled as health workers or surgical staff speak, cough, or sneeze, as well as to prevent accidental splashes of blood or other contaminated body fluids from entering health workers' noses or mouths. Unless the masks are made of fluid-resistant materials, they are not effective in preventing either very well.

- ✓ Masks should be large enough to cover the nose, lower face, jaw, and all facial hair. When removing, handle masks by the strings because the center of the mask contains the most contamination.

Respirators

- ✓ Particulate respirators are specialized types of masks that are worn by health care personnel to protect them from inhalation exposure to airborne infectious agents that are less than 5 μm in size. These include infectious droplet nuclei from patients with Mycobacterium tuberculosis and dust particles that contain infectious particles, such as spores of environmental fungi (e.g., Aspergillus spp.).
- ✓ The N95 disposable, particulate, air-purifying respirator is the type used most commonly by health care personnel. (For safe donning and removing of respirator, refer to page 60 of Infection Prevention and Patient Safety Reference Manual for Service Providers and Managers in Health Care Facilities of Ethiopia).

Eyewear

- ✓ Eyewear protects staff in the event of an accidental splash of blood or other body fluid by covering the eyes. Eyewear includes clear plastic goggles, safety goggles, and faces shields.

Scrub suits or cover gowns

- ✓ Scrub suits are worn over, or instead of, street clothes. The main use of cover gowns is to protect the health care workers' clothing.

Surgical gowns

- ✓ Surgical gowns are intended to protect patients from microorganisms present on the abdomen and arms of the health care staff during surgery.
- ✓ Lightweight cloth gowns, generally available in Ethiopia, however, offer little protection. Under the circumstances, either wear a plastic apron before putting on the surgical gowns or, if large spills occur, take a shower or bathe as soon as possible after completing the surgery or the procedure. When surgical gowns are worn, sleeves should either taper gently toward the wrists or end with elastic or ties around the wrists. (Large, droopy sleeves invite accidental contamination.) In addition, the cuffs of the surgical gloves should completely cover the end of the sleeves.

Mackintosh or plastic apron

- ✓ Plastic aprons are used to protect clothing or surfaces from contamination. Aprons made of rubber or plastic provide a waterproof barrier along the front of the health care worker's body and should also be worn during cleaning and procedures where there is a likelihood of splashes or spillage of blood, body fluids, secretions, or excretions (e.g., when conducting deliveries).

Footwear

- ✓ Footwear is worn to protect feet from injury by sharp or heavy items or fluids that may accidentally fall or drip on them. For this reason, sandals, "thongs," or shoes made of soft materials are not acceptable.

Drapes

- ✓ Drapes are used to create an operative field around an incision, wrap instruments and other items for sterilization, cover tables in the operating room (OR), and keep clients warm during surgical procedures.
- ✓ **There are four types of drapes**:
  - **Towel drapes** (used for drying hands, squaring off the operative site, and wrapping small items)
  - **Drapes or lap sheets** (used for covering the patient)
  - **Site drapes** (used for minor surgical procedures and have a circular opening)

- **Pack wrapper drapes** (large drapes that become a table cover when the sterile instrument pack is opened)

- **Using drapes for a surgical procedure:**
  - All drapes should be applied around a completely dry, wide area of the skin around the site of incision to reduce risk of contamination.
  - If sterile drapes are used, sterile surgical gloves should be worn when placing the drapes (when putting drapes in place, care must be taken not to touch the patient's body with gloved hands).
  - Drapes should be handled as little as possible and should never be shaken or flapped. Always hold drapes above the area to be draped, and discard the drape if it falls below this area.

Remember:

- Once a sterile drape touches the patient's skin, it is no longer sterile.
- Sterile cloth drapes do not replace good aseptic technique

Self-Check -1	Written Test

Directions: Choose the best answer from the given alternative.

1. Specialized types of masks that are worn by health care personnel to protect them from inhalation exposure to airborne infectious agents. A. Caps B. Respirators C. Gowns D. None

2. From the types of drapes one used for minor surgical procedures and have a circular opening

A. Towel drapes B. lap sheets C. Site drapes D. Pack wrapper drapes

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____

Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

Information Sheet-2	Applying Protective clothing and gloves

1.1 Protective clothing and gowns/aprons are changed

Gloves

- Hand hygiene, coupled with the use of protective gloves, is a key component in minimizing the spread of disease and maintaining an infection-free environment.
- **Health care workers wear gloves for the following three reasons:**
  - ✓ To reduce the risk of staff acquiring bacterial infections from patients
  - ✓ To prevent staff from transmitting their skin flora to patients
  - ✓ To reduce contamination of the hands of staff by microorganisms that can be transmitted from one patient to another (cross-contamination)
  - ✓ **Three types of gloves are used in health care facilities:**

1. **Surgical gloves** should be used when performing invasive medical or surgical procedures. The best surgical gloves are made of latex rubber, because of rubber's natural elasticity, sensitivity, and durability. In addition, it provides a comfortable fit. Current standards in Ethiopia recommend that high-level disinfected surgical gloves are the only acceptable alternative if sterile surgical gloves are not available, when performing surgical or invasive procedures (FMOH, Infection Prevention and Patient Safety Reference Manual for Service Providers and Managers in Health Care Facilities of Ethiopia, February 2011).
2. **Clean examination gloves** provide protection to health care workers when performing many of their routine duties. These can be used when there is contact with mucous membranes and nonintact skin (e.g., performing medical examinations and procedures such as pelvic examinations).
3. **Utility or heavy-duty household gloves** should be worn for processing instruments, equipment, and other items; for handling and disposing of contaminated waste; and when cleaning contaminated surfaces. Double gloving using either new examination gloves or reprocessed surgical gloves provides some protection in case utility gloves are not available.

When to Wear Gloves

- ✓ Depending on the situation, surgical gloves, clean examination gloves, or utility gloves should be worn by all staff when:
  - There is reasonable chance of hands coming in contact with blood or other body fluids, mucous membranes, or non intact skin.
  - They perform invasive medical procedures (e.g., inserting vascular devices such as peripheral venous lines).
  - They handle contaminated waste items or touch contaminated surfaces.

Note:

- ✓ When using latex rubber gloves, do not use hand creams or lotions that contain mineral oil, petroleum jelly (Vaseline), or lanolin to protect your hands because they may cause the gloves to break down within minutes.
- ✓ A separate pair of gloves must be used for each client to avoid cross-contamination or when moving from one site to another site on the same patient (i.e., from respiratory care to a dressing change).
- ✓ It is preferable to use new and single-use (disposable) gloves.

Removing and discarding or reprocessing gloves:

- ✓ If gloves are to be discarded, briefly immerse them in 0.5 percent chlorine solution, remove, and dispose in a container for contaminated waste.

- ✓ If gloves are to be reprocessed and reused, immerse them in a 0.5 percent chlorine solution briefly, remove gloves by inverting them, and then soak the gloves in the 0.5 percent chlorine solution for 10 minutes before cleaning and processing them

When to Double Glove

- ✓ Even the best-quality, new latex rubber surgical gloves may leak up to 4 percent of the time. Moreover, latex gloves especially when exposed to fat in wounds, gradually become weaker and lose their integrity. Although double gloving is of little benefit in preventing blood exposure if needle-sticks or other injuries occur, it may decrease the risk of blood to hand contact.

Double gloving can be used during the following:

- ✓ Procedures that involve coming in contact with large amounts of blood or other body fluids (e.g., vaginal deliveries and cesarean sections)
- ✓ Orthopedic procedures in which sharp bone fragments, wire sutures, and other sharps are likely to be encountered
- ✓ Surgical procedures lasting more than 30 minutes

Some Dos and Don'ts Regarding Gloves

- ✓ **Do**
  - ✓ Wear the correct size gloves, particularly for surgical gloves. A poorly fitting glove can limit your ability to perform the task and may get damaged easily.
  - ✓ Change surgical gloves periodically (every 45 minutes) during long cases because the protective effect of latex gloves decreases with time and unapparent tears may occur.
  - ✓ Keep fingernails trimmed moderately short (less than 3 mm beyond the fingertip) to reduce the risk of tears.
  - ✓ Pull gloves up over cuffs of gown (if worn) to protect the wrists.
  - ✓ Use water-soluble hand lotions and moisturizers often to prevent hands from drying and cracking due to frequent hand washing and gloving.
- ✓ **Don't**
  - ✓ Use oil-based hand lotions or creams because they will damage latex surgical and examination gloves.
  - ✓ Use latex gloves if you or the patient has an allergy to latex.
  - ✓ Store gloves in areas where there are extremes of temperature (e.g., direct sunlight; near the heater, air conditioner, ultraviolet light, or x-ray machine). These conditions may damage the gloves (cause breakdown of the material they are made of), thus reducing their effectiveness as a barrier.
  - ✓ Reprocess gloves that are cracked or have detectable holes/tears (FMOH, Infection Prevention and Patient Safety Reference Manual for Service Providers and Managers in Health Care Facilities of Ethiopia, February 2011).
  - ✓ Reprocess examination gloves for reuse (FMOH, Infection Prevention and Patient Safety Reference Manual for Service Providers and Managers in Health Care Facilities of Ethiopia, February 2011).

Self-Check -2	Written Test

Directions: Choose the best answer from the given alternative.

1. Used when performing invasive medical or surgical procedures.

   A. Surgical gloves B. Examination gloves C. Heavy-duty gloves D. None

2. Which one of the following is the use of double gloving.
   A. Vaginal deliveries and cesarean section.
   B. Orthopedic procedures.
   C. Surgical procedures lasting more than 30 minutes
   D. All

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

Operation Sheet -3	Practice donning and removing of used glove

1.1. Steps for donning examination glove

1. Take out glove from its original box
2. Touch only restricted surface of the glove corresponding to the wrist (at the top edge of the cuff)
3. Don the final glove
4. Take the second glove with the bare hand and touch only restricted surface
5. To avoid touching the skin of the forearm with the gloved hand turn.
6. Once gloved hands should not touch anything else that is not designed by indications and conditions for glove use.

1.2. Steps for donning surgical glove

1. Perform hand hygiene before an “aseptic procedures “by hand rubbing or hand is washing.
2. Check the package for integrity open the first non sterile package by peeling it completely off the heat seal to expose the second sterile wrapper but without touching it.
3. Place the second sterile package on a clean dry surface without touching the surface open the package and fold it toward the bottom so as to unfold the paper and keep it open.
4. Using the thumb and index finger of the hand carefully grasp the folded cuff edge of the gloves.
5. Slip the other hand in to the glove in to a single movement keeping the folded cuff at the wrist level.
6. Pick up the second glove by sliding the fingers of the gloved hand under neath the cuff of the glove.
7. In a single movement slip the second glove on to the un gloved hand while avoiding any contact/resting On the gloved hand o surface other than the glove to be donned.
8. If necessary after donning both gloves adjust the fingers and inter digital spaces until the glove fit comfortable.
9. Unfold the cuff of the first gloved hand by gently slipping the fingers of the other hand inside the fold making sure to avoid any contact with a surface other than the outer surface of the gloves (lack of asepsis requiring a change of glove.)
10. The hand is gloved and must touch exclusively sterile devices or the previously disinfected patient body area.

1.3. Steps for removing glove

1. Pinch one glove at the wrist level to remove it without touching the skin of the forearm and peel away from the hand thus allowing the glove to turn inside out.
2. Hold the removed glove in the gloved hand and slide the fingers of the un gloved hand inside b/n the gloved and the wrist remove the second glove by rolling it down the hand and fold into the first glove.
3. Discard the removed gloves

LAP Test -1	Perform donning and removing glove ?

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 10 min.

Task 1: perform donning examination glove.

Task 2: perform donning surgical glove.

Task 3: Perform removing glove**.**

Instruction Sheet	LG24: Limit contamination

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- *Demarcating* Clean and contaminated zones
- Confining

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- *Demarcate* Clean and contaminated zones
- Confine

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 2 to 4.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4”.
4. Accomplish the “Self-check 1,&Self-check 2’’ in page 70&72

1.1Demarcating ***Clean and contaminated zones***

When something has been exposed to infectious agents it is considered to have been contaminated.

Ways **to limit contamination in the healthcare setting may include:**

- ✓ cleaning surfaces
- ✓ protecting all materials, equipment and instruments from contaminants
- ✓ maintaining sterile objects
- ✓ being aware of the guidelines for single-use objects.

An important strategy to limit contamination in healthcare settings is to set and maintain:

- ✓ clean zones
- ✓ treatment zones
- ✓ contaminated zones.

Maintaining these three zones helps reduce the risk of contamination. it is the responsibility of every person working in the healthcare environment to:

- ✓ understand where the clean, treatment and contaminated zones are
- ✓ do what is required to maintain them.

Zones

✓ Maintaining clean, treatment and contaminated zones helps reduce the risk of contamination and makes it easier to remember that anything entering a clean zone must first be decontaminated.

The clean Zone

✓ Clean areas include those surfaces and drawers where clean, disinfected or sterilized instruments are stored and never come in contact with contaminated instruments or equipment

The clean zones are areas where non-contaminated items are kept. Example of these items and zones include:

✓ sterile instruments
✓ clean linen
✓ medical records
✓ kitchen preparation areas
✓ Supply stores.
➢ Before entering a clean zone it is important to remove contaminated gloves and other PPE and perform hand hygiene (decontamination).

The treatment Zone

✓ The treatment zone is where items are currently being used by the client or healthcare worker.
✓ For example, the client's bedside is a treatment zone as it has been exposed to microorganisms.

Contaminated zone

✓ Contaminated zones are for objects and waste that is waiting for decontamination sterilization or disposal
✓ The contaminated zone boundaries should be clearly defined, because this has implications for surface management and for the placement of equipment.
✓ Instruments placed into the contaminated zone for a treatment session but not used during the session must be regarded as contaminated. For this reason, all bulk supplies such as opened boxes of gloves, cotton rolls or gauze must be stored outside the contaminated zone and protected from contamination from splashes and aerosols.
✓ An example of this zone is a linen skip, in which used linen is stored while awaiting decontamination in the laundry.

- ✓ If there is any possibility that any item **may** have been contaminated, it should be treated as if it **has** been contaminated.

Workflow

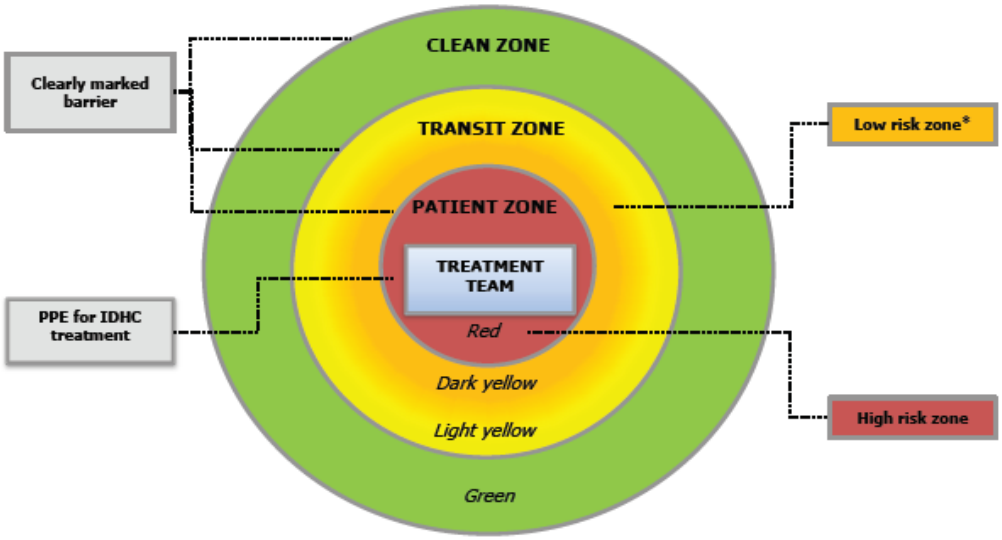
- ✓ To maintain the separation of clean and contaminated zones, workflow should be from the cleanest to the most contaminated areas – this ensures that there is never any movement of contaminated items into clean zones.
- ✓ The cleanest to most contaminated approach also applies to cleaning surfaces, when you should start at the cleanest area and work out toward the most contaminated area. Make sure that cleaning equipment is correctly decontaminated and stored after use, to prevent it becoming another source of contamination.
- ✓ Objects that have moved from the clean to the contaminated zone may only return when they have been cleaned, decontaminated, or sterilized as required. Take them from the contaminated zone, decontaminate them, and then place them in the clean zone. Be careful not to place a newly decontaminated item back in a contaminated zone, such as on a contaminated bench.
- ✓ If there is a possibility that something may possibly have been contaminated, it should be treated as if it has definitely been contaminated.
- ✓ Many healthcare facilities use dedicated trolleys and containers for holding and moving contaminated items and clean or sterile items, and you must ensure that the correct trolleys and containers are used. If a single trolley is used for both, it must be thoroughly cleaned before use for clean items. Clean and contaminated items can never be placed on the trolley together.

There are two basic rules to follow to limit contamination.

- ✓ Maintain clean zones and contaminated zones within the workplace.
- ✓ All movement of instruments and equipment must be from clean to contaminated.

➢ The aim of barrier nursing is to protect the HCW but also the community from transmission of Infectious disease. Proper barrier management is the cornerstone in containing the spread of Infectious disease. in healthcare settings.

Figure 5.1. Zones and color code



*Yellow zone needs to be conceived as with a gradient from dark yellow to light yellow according to the decrease in risk of secondary contamination.

Different zones	Activities	Specification
Red zone • Patient treatment area	• Patient treatment area • Point of care; diagnostics • After visible contamination, cleaning and disinfection of HCW	• Monitored by direct or video assisted observation
Dark yellow zone **Light yellow zone**	• First re-entry step for staff exiting the red zone • Assisted disinfection and doffing for exit HCW • Potentially contaminating processes, such as cleaning and disinfection of boots and waste bags • Preparing waste for further processing, such as packaging waste bags in containers with non-removable clip-on lids • Storage of waste • Hand disinfection for HCW before stepping into the green zone	• Critical zone for prevention and control of secondary contamination. • Abundant space required for unrestricted assisted doffing process of two HCW in PPE • Additional dedicated cleaning and disinfection areas • Additional generously dimensioned waste storage areas. • Supervisor (barrier nursing guardian)
Green Zone	• Second step re-entry of staff from light yellow zone • Complete assisted donning for entry HCW • Briefing and de-briefing of staff • Staff coordination and supervision of activities • Inbound and outbound communications	• Strict access control • Space for clean supplies • Zones for staff recreation

Functionally, the yellow zone needs to be understood as the decisive area, in which secondary contamination is prevented and controlled: Here a contaminated HCW exiting from the red zone is brought in to clean conditions, which enable him or her to safely re-enter the green zone. In addition, any material coming from the red zone, such as waste bags, re-usable PPE items, patient samples needed to be processed outside of the isolation unit are first cleaned and disinfected in the yellow zone. A particular function lies in the temporary storage of considerable amounts of waste produced every day in the nursing of a patient with an Infectious disease.

Practical hints

- ✓ Different zones need to be clearly marked.
- ✓ Prevention and control of secondary contamination happens in the yellow zone.
- ✓ The yellow zone has a virtual gradient from ‘high potential for contamination’ (dark yellow) to ‘low potential of contamination’ (light yellow).
- ✓ Instructions for staff should be displayed at the entry of the isolation area.
- ✓ If there is a cross-contamination incident outside the red zone (e.g. patient leaving the red zone), the contaminated area has also to be considered as a red zone. New yellow and green zones need to be established around the new red zone. The zones can be put back into normal function by room disinfection, once the patient has been dismissed.
- ✓ Donning and doffing areas must be separated and visually marked. The donning area is in the green zone.
- ✓ The doffing area must be in the dark yellow zone, but has to be clearly separated from the light yellow zone

Self-Check -1	Written Test

Direction: - choose the best answer from the given alternative

1. Where non-contaminated items are kept
   A. The clean Zone B. Contaminated zone C. Treatment zone D. None
2. Activities in red zone
   A. Patient treatment area B. Point of care; C. diagnostics D. All

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

2.Confining

Records, materials and medicaments

All records that are kept and archived should be kept in a clean zone. All packaging materials and medicaments should be kept in a clean zone. These items should not be stored in a contaminated zone or a risk of cross contamination will occur.

2.3 Contaminated instruments and equipment

When items are received into the sterilizing facility, all reusable items that have been used or unused during patient treatment need to be cleaned in a physically separate area to prevent possible contamination of processed items.

Self-Check -2	Written Test

Direction: - say “True” or “False”

1. All packaging materials and medicaments should be kept in a clean zone.
2. When items are received into the sterilizing facility all reusable & unused items during patient treatment need to be cleaned.

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____
2._____

Instruction Sheet	LG25: Handle, package, label, store, transport and dispose of clinical and other waste

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Identifying health care wastes
- Applying personal protective clothing and equipment during waste handling
- Applying waste separation
- Implementing Management of infectious waste
- Identifying Clinical waste storage

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- Identify health care wastes
- Apply personal protective clothing and equipment during waste handling
- Managing infectious waste
- Implementing Infectious wastes disposal
- Identify Clinical waste storage

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 4.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4 sheet5”.
4. Accomplish the “Self-check 1, Self-check t 2, Self-check 3,sef check4, and Self-check 5” **in page -77, 79, 81,85 and 87**respectively.

Information Sheet-1	Identifying health care wastes

1.1Health care wastes

Health care waste is a byproduct of health care that includes potential risk and non risk wastes. It includes all the waste generated by health care establishments, research facilities, and laboratories. Health care waste can be classified as high-risk and low-risk wastes depending on the level of the risk they pose to the health provider, patient, and community. Appropriate handling and disposal of potentially infectious waste helps to prevent the spread of infection, illness and disease

1.2 High risk waste

High-risk waste includes the following:

Infectious waste:

- ✓ Blood, blood products, and other bodily fluids or items contaminated with similar fluids
- ✓ Cultures and stocks of infectious agents from the laboratory and items contaminated with such agents
- ✓ Isolation waste from highly infectious patients (including food residue)
- ✓ Discarded live and attenuated vaccines
- ✓ Waste, bedding, bandages, surgical dressings, and other contaminated material infected with human pathogens

Anatomical waste:

- ✓ Human tissues, body parts, and fetuses
- ✓ Biopsies, carcasses, organs, and tissues infected with human pathogens

Sharps waste (used or unused):

- ✓ Syringes, needles, scalpel blades, suture needles, razors, and intravenous set needles

Chemical waste:

- ✓ Formaldehyde, photographic chemicals, solvents, organic and inorganic chemicals

Pharmaceutical waste:

- ✓ Outdated medications and residuals of drugs used in chemotherapy
- ✓ Items contaminated by or containing pharmaceutical bottles/boxes

Radioactive waste:

- ✓ Contamination with radioactive isotopes

Genotoxic waste:

- ✓ Cytostatic drugs
- ✓ Vomit, urine, or feces from patients treated with cytotoxic drugs, chemicals, and radioactive material

Pressurized containers:

- ✓ Explosion of cylinders containing gases or aerosols

Waste with high content of heavy metals:

- ✓ Batteries, broken thermometers, blood pressure gauges, etc.

1.3 Low-Risk Waste

Noninfectious waste:

Commercial waste is non-contaminated waste and poses no infectious risk to persons who handle it. Examples include paper, trash, boxes, bottles, plastic containers, leftover foods, and food products Not all health care waste is risky; most waste (80 to 85 percent) generated from health care facilities is believed to be noninfectious and non-risky (FMOH, *Infection Prevention and Patient Safety Reference Manual for Service Providers and Managers in Health Care Facilities of Ethiopia*, February 2011).

The proportion of waste generated from health care is as follows:

- ✓ Noninfectious waste: 80 percent
- ✓ Pathological waste and infectious waste: 15 percent
- ✓ Sharps waste: 1 percent
- ✓ Chemical or pharmaceutical waste: 3 percent
- ✓ Pressurized cylinders, thermometers: less than 1 percent

1.4 Risks of Health Care Waste

Inadequate and inappropriate handling of health care waste may have serious public health consequences and a significant impact on the environment. Injuries, transmission of infections, environmental pollution, fire hazards, and public nuisance (offensive smells, unsightly debris, etc.) are the major risks and hazards of poorly managed health care waste.

Improper health care waste management can expose health workers, patients, and the community to the risk of being exposed and potentially infected by blood-borne pathogens. Studies revealed that 33 percent of HBV and 42 percent of HCV infections occur due to direct or indirect exposure to infectious waste (WHO 2005a). Improper health care waste management can also expose people to gastro enteric and respiratory infections.

In addition to health risks from direct contact, health care waste can impact human health by contaminating bodies of water and polluting the air. Emission of persistent organic pollutants/toxic gases like dioxins, furans, and polychlorinated biphenyls is dangerous to human health.

Self-Check -1	Written Test

Direction: - Choose the best answer from the given alternative.

1. Which one is High risk waste? A. Sharps waste B. Anatomical waste C. Chemical waste D. All

2. Poses no infectious risk to persons who handle.

A. Infectious waste B. Non-infectious waste C. Contaminated waste D. Genotoxic waste 3 High-risk waste includes

A. Infectious waste Anatomical waste B. Sharps waste (used or unused):

C. Chemical waste: D. Chemical waste E.ALL

4. **NOT** include Anatomical waste**?**

A. Human tissues, body parts, and fetuses B. Biopsies. C. Syringes, needles. D. None

5. Commercial waste is non-contaminated waste and poses no infectious risk to persons who handle it.

A. Non-infectious waste . B. infectious waste C. segregation D.**ALL**

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____

Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

3. _____

4._____

5,_____

Information Sheet-2	Applying personal protective clothing and equipment during waste handling

2.1 Personal protective clothing and equipment during waste handling

Personal protective clothing and equipment during waste handling includes

Disposable plastic aprons and Gowns

- ✓ Aprons should be put on at the beginning of the activity

Full-body gowns

- ✓ Use where there is a risk of extensive splashing of blood, bodily fluids, secretions or excretions on to the skin or clothing of a HCW

Gloves including rubber gloves

Face masks/respirators

- ✓ The mucous membrane of the mouth, nose and eyes are portals of entry for infectious agents as other skin surfaces if not intact.

Eye protect ion/face visors/protective spectacles

- ✓ Goggles, visors or protective spectacles must be worn to protect the eye

Forearm protection

- ✓ Forearm protection should be available for use in areas that there is a risk of injury. It should be used in conjunction with a detailed plan of care to minimize injuries from scratches and bites

Foot protection

- ✓ To protect feet and legs from falling objects, moving machinery, sharp objects, hot materials, chemicals, or slippery surfaces, employees should wear closed-toed shoes, boots, foot guards, leggings, or safety shoes as appropriate

Self-Check -2	Written Test

Direction: - Say “True” or “False”

1. Forearm protection should be used in areas that there is a risk of injury.
2. Face masks must be worn to protect the eye

Directions: Choose the best answers from the given alternative

1. Disposable plastic aprons and Gowns used for?

A. Use where there is a risk of

B. Aprons should be put on at the beginning of the activity.

C. Bodily fluids, secretions or excretions D. All

2. Personal protective clothing and equipment during waste handling includes?

A. Disposable plastic aprons and Gowns

B. Full-body gowns

C. Gloves including rubber gloves

D. Face masks/respirators E.ALL

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____

Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

3. _____

4._____

5.__

Information Sheet-3	Managing infectious waste

3.1 waste separation

Contaminated and non-contaminated wastes should be separated at origin, to reduce the volume
of contaminated waste and minimize the cost to the institution for more expensive procedures equired for managing and disposing of contaminated waste properly.

- ✓ When possible, use separate containers for combustible and non-combustible waste.
- ✓ Never sort through contaminated wastes (e.g., do not try to separate non-contaminated waste from contaminated wastes, or combustible from non-combustible, after they have been combined).

3.2 STEPS OF WASTE MANAGEMENT

- Waste Minimization/Containment
- Segregation
- Collection
- Transportation
- Disposal

- **Waste Minimization/Containment**

Waste minimization is the first and best way to reduce health care waste quantities and costs, environmental impact, and exposure to health care workers, patients, and communities. Effective waste minimization practices require that the purchases of all materials and supplies be made with waste reduction in mind.

- **Segregation**

Waste segregation is separating waste by type at the place where it is generated. Waste should immediately be separated by the person generating the waste, according to its type, and placed in a bin with an appropriate colored bin liner or into a sharps container. Waste handlers should never sort through waste after it has been placed in the bin. The color-coding system aims at ensuring immediate and non equivocal identification and segregation of the hazards associated with the type of health care waste that is handled or treated. It is very important that both providers and waste handlers understand the color-coding system and handle waste accordingly.

- **Waste handling** refers to activities involving the handling of waste at the health care facility as well as its collection and storage.
- **Waste collection** is the process of removing waste bags from the service point and taking to storage or disposal area. It also includes quantifying waste by volume, labeling as to its source, and recording.
- **Waste storing** is the process of placing waste in a secure place until it can be disposed of. The ideal storage area should be designated (for waste only), secure (only authorized persons should have access), and kept clean, dry, and pest free. The designated central storage facility should be located within the premises of the health facility, close to the treatment unit but away from food storage or food preparation areas. Health care wasteshould be stored for no longer than two to three days, depending on weather conditions. However, in the case of safety boxes, the filled box can be stored in a locked room for up to one week at lower- level health care facilities where there is no incinerator. Organic waste should be disposed of daily. Segregation must be maintained throughout until final disposal.
- **Waste Transportation:**-Waste transportation is movement of waste from one place to another. Waste transportation can be either on-site or off-site and should also maintain waste segregation.
  - ✓ **On-site:** Moving waste from one point to another within the health care facility
  - ✓ **Off-site:** Transporting waste outside the health facility

Self-Check -3	Written Test

Direction: Matching

"A"	**"B"**
1. Waste Minimization	A. Placing waste in a secure place until it can be disposed
2. Segregation	B. Reduce health care waste quantities and costs
3. Storing	C. Movement of waste from one place to another
4. Transportation	D. Separating waste by type at the place where it is generated

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____

Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

3. _____

4._____

5._____

4.1 Treatment and Disposal

Health care waste is treated to render it nonhazardous. Noninfectious waste does not need to be treated. Disposal is a process of eliminating health care waste without posing any risk to health facility workers or the general public.

The following are health care waste treatment and disposal options at the health care facility level: **Sharps waste:**

- ✓ Incineration using properly built and maintained medium- or high-temperature incinerator on-site
- ✓ Transport to off-site incinerators, if there is centralized treatment service
- ✓ On-site burial in a protected pit

- **Infectious waste:**

- ✓ On-site burial in a protected pit
- ✓ On-site incineration in a medium- or high-temperature incinerator provided that the incinerator is standard and capable of destroying such wastes
- ✓ Transport to off-site treatment/disposal site, if the service is available

- **Non-risk waste:**

- ✓ Collection by municipal truck or other private trash collection firm for landfill disposal

4.2 Health care wastes disposal methods

Recommended Disposal Methods of Health Care Waste

- **Burial in a protected pit:**

- ✓ Waste is placed into a pit (1 to 2 meters wide, 2 to 5 meters deep, and at least 1.5 meters above the water table) and covered with soil.
- ✓ Protected burial pits are an acceptable, and perhaps the most appropriate, disposal option for infectious wastes in rural health care facilities.
- ✓ Pits should be at least 50 meters away from any waster source, be fenced to restrict unauthorized access, and be located away from public areas.
- ✓ Keep waste covered with a 10- to 30-cm layer of soil every time waste is added to the pit.
- ✓ Only contaminated and hazardous waste needs to be buried.
- ✓ Expired vaccines and drugs should be encapsulated and buried. Place the expired drugs and vaccines in a hard container such as a metal drum.
- ✓ When the container is mostly full (3/4) add a mixture of 1 part cement, 1 part lime, 4 parts sand, and 1/3 to 1/2 part water. Lime works as a disinfectant, and it also helps the cement flow into empty spaces to completely surround the waste.
- ✓ Seal the container and bury it in a pit. Expired vaccines and drugs should not be burned unless there is appropriate incineration technology.
- ✓ When the level of waste reaches to within 30 to 50 cm to the surface of the ground, completely fill the pit in with soil and dig another pit.
- ✓ **Advantages:** Simple and inexpensive
- ✓ **Disadvantages:** Can handle only a small volume of waste in areas where there is shortage of space and presents a danger to the community if not buried or covered properly

- **Burn**

- ✓ Waste is placed into a pit and burned on a regular basis (at least once a week, according to volume of waste and size of pit). Waste must be burned thoroughly, and ashes must be covered with soil.
- ✓ Pits should be dug 1 to 2 meters wide and to a depth of 2 to 5 meters, but also at least 1.5 meters above water table
- ✓ The pit should be fenced off to restrict unauthorized access. The burn pit must be located away from public areas, and smoke from burning waste must not affect the surrounding area.
- ✓ Open burning (outside of a pit, on the ground) should not be practiced.
- ✓ Medical waste may not burn easily, especially if it is wet. Add kerosene to make the fire hot enough to burn all wastes.

- **Medium- or high-temperature incineration:**

- ✓ Incineration is medium- or high-temperature burning. It reduces the volume of the waste and, if high enough temperatures are reached, eliminates pathogens.
- ✓ Proper incineration produces fewer pollutants than open-air burning and is preferred if a good-quality incinerator is available with a well-trained operator.

Proper incineration includes: -

- ✓ Clear operation procedures
- ✓ Trained operator
- ✓ Reliable segregation system
- ✓ Reliable transport system
- ✓ Ash pit
- ✓ Maintenance performed on schedule
- ✓ Adequate supply of fuel
- ✓ Secured incinerator

- **When using incinerator:**

- ✓ Keep incinerator clean. Remove ash from ash chamber and grate and dispose the ash into ash pit. Do not store waste in incinerator.
- ✓ Some incinerators need to be preheated by burning general or nonmedical waste (e.g., paper) until the incinerator reaches the recommended temperature for incinerating health care waste (800°C in the burning chamber).
- ✓ Polyvinyl chloride plastics (like blood bags and intravenous lines), large amounts of reactive chemical waste, silver salts and photographic or radiographic waste (x-ray materials), waste with high mercury (such as broken mercury thermometers) or cadmium content, batteries, aerosol cans or pressurized gas containers, and glass vials must never be incinerated.

- **N.B. Syringes are not made of polyvinyl chloride plastic and are therefore safe to burn.**

Advantages: Treats and greatly reduces waste volume

Disadvantages: Overfilling the combustion chamber and wastes with high moisture content can produce smoke, and also may produce emission and hazardous ash that contain dioxins and metals. It may require pollution control equipment to meet local environmental regulation.

In general,

- ✓ Medical wastes require careful disposal and containment before collection and consolidation for treatment. These measures are designed to protect the workers who generate medical wastes and who manage the wastes from point of generation to disposal.
- ✓ A single, leak-resistant biohazard bag is usually adequate for containment of regulated medical wastes, provided the bag is sturdy and the waste can be discarded without contaminating the bag's exterior.
- ✓ All bags should be securely closed for disposal.
- ✓ Puncture-resistant containers located at the point of use (e.g., sharps containers) are used as containment for discarded slides or tubes with small amounts of blood, scalpel blades, needles and syringes, and unused sterile sharps.
- ✓ To prevent needle stick injuries, needles and other contaminated sharps should not be recapped, purposefully bent, or broken by hand.
- ✓ Infected materials should be put in impermeable bags or hard plastic containers. These bags and containers need to be clearly labeled as highly infectious waste.
- ✓ Considerations on waste management: Solid non-sharp waste should be placed in impermeable, clearly labeled bags to be discarded following applicable environmental regulations for the disposal and inactivation of infectious medical waste.
- ✓ Temporary disposal sites should be located as close as possible to the patient care area.
- ✓ Sharp, pointed objects (e.g. open vials, needles) should be placed in hard plastic containers and labelled clearly.
- ✓ Liquid waste (e.g. vomit, urine and diarrheal fluids) may only be disposed in the sanitary sewer if the pathogen in question would allow such procedure. Alternatively all bodily fluids need to be collected in tissues/diapers and then been disposed with other waste.

Self-Check -4	Written Test

1. False about Burial pit?

A. 1 to 2 meters wide, 2 to 5 meters deep, and at least 1.5 meters above the water table

B .Pits should be at least 50 meters away from any waster source

C .Keep waste covered with a 10- to 30-cm layer of soil every time waste is added to the pit

D. None.

2. It reduces the volume of the waste and, if high enough temperatures are reached, eliminates pathogens?

A. Incinerator B. Burial Pit C. Segregation D .All

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

Information Sheet-5	Identifying Clinical waste storage

The following table shows the recommended color coding for categories of health care waste.

Category	Example	Color of Bin Liner
Noninfectious	Paper, packing materials, plastic bottles, food, cartons	Black
Infectious	Gloves, dressings, blood, body fluids, used specimen containers	Yellow with biohazard symbol
Highly infectious	Anatomical waste, pathological waste	Red with biohazard symbol
Chemical	Formaldehyde, pathological chemicals, solvents, organic and inorganic chemicals	Brown
Radioactive	Any solid, liquid, or pathological waste contaminated with radioactive isotopes of any kind	Yellow with radioactive label
Sharps	Needles, needles from intravenous sets, scalpels, blades, lancets, broken glass, syringes, and needles	Yellow box marked "SHARPS" with biohazard symbol

Self-Check -5	Written Test

Directions: Choose the best answers from the given alternative

1. Which one is Miss-Match color coding for categories of health care waste

A. Non infectious placed in Black B. Infectious –White

C. Chemical- Brown D. Highly infectious – Red

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____

Rating _____

Name: _____ Date: _____

Instruction Sheet	LG26: Clean environmental surfaces

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Apply Cleaning
- Applying Personal protective clothing and equipment during *cleaning procedures*
- Removing dust, dirt and physical debris
- Cleaning agents
- Instruments processing

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to**:

- Apply Cleaning
- Apply Personal protective clothing and equipment during *cleaning procedures*
- Remove dust, dirt and physical debris
- Cleaning agents
- Instruments processing

Learning Instructions:

1.Read the specific objectives of this Learning Guide.

2.Follow the instructions described below 3 to 6.

3.Read the information written in the information "Sheet 1, Sheet 2, Sheet 3, sheet5 and Sheet 4".

4.Accomplish the "Self-check 1, Self-check t 2, Self-check 3 and Self-check 4" **in page -6, 9, 12 and 14** respectively.

5.If you earned a satisfactory evaluation from the "Self-check" proceed to "Operation Sheet 1, Operation Sheet 2,operation sheet3,operation sheet4 and Operation Sheet 5 " **in page - 110,112,114,116&117,**

6.Do the "LAP test" **110,112,114,116&117,** (if you are ready).

Information Sheet-1	Apply Cleaning

1.1Cleaning

- **Cleaning** is the process that physically removes soiling, including large numbers of microorganisms and the organic material on which they grow. This is usually carried out using neutral detergent and warm water. or
- **Cleaning** is the removal of visible soil, organic, and inorganic contamination from a device or surface, using either the physical action of scrubbing with a surfactant or detergent and water or an energy based process with appropriate chemical agents
- Routine environmental cleaning is required to minimize the number of microorganisms in the environment. A risk assessment must be undertaken to determine the method of decontamination required. Items not in close contact with patients or their immediate surroundings, e.g., floors, walls, ceiling, sinks and drains, present a minimal risk to patients and do not usually require disinfection. In most cases cleaning with a neutral detergent and warm water will be sufficient.
- **Disinfection:** describes a process that eliminates **many** or all pathogenic microorganisms, except **bacterial** spores, on inanimate objects
- **Sterilization** is a process that destroys or eliminates all forms of microbial life, including bacterial spores
- **Routine cleaning** is the standard, everyday procedure for cleaning of clinical areas, including mopping of floors, damp dusting of surfaces with detergent, etc.
- **Terminal cleaning** is performed when a patient with a transmissible illness is discharged (usually for isolation rooms), e.g. MRSA and other drug-resistant bacteria, tuberculosis, Clostridium edificial.

The terminal cleaning process requires:

- ✓ Removal and discarding of all unused consumables and personal protective equipment (PPE) from the room
- ✓ Removal and laundering of all linen
- ✓ Removal and safe disposal of all waste
- ✓ Washing of all surfaces with detergent (including walls to a height of 2 metres)
- ✓ Wiping of all surfaces with an appropriate disinfectant (including bed frame, mattress and pillows). The IPC practitioner should be asked to advise on an appropriate disinfectant (usually alcohol-based or chlorine-based disinfectants at an appropriate strength or dilution). Remember that chlorine can be corrosive (causing damage to metal surfaces).
- ✓ Allowing all surfaces to dry before admission of a new patient.

7.2 Cleaning Methods

Dry Methods

- ✓ Dust attractant mop
- ✓ Dry dusting is not recommended as it may disperse dust and micro-organisms
- ✓ Sweeping brushes must not be used in clinical areas as they disperse dust and micro-organisms

Wet Methods

- ✓ Scrubbing
- ✓ Mopping
- ✓ Damp dusting

- Once an item is washed it also needs to be rinsed and usually dried. Thorough rinsing with **clean** water removes any soap residue that can interfere with sterilization or HLD.
- After rinsing, items should be dried, especially if they will be sterilized or high-level disinfected using chemical disinfectants. Water remaining on the items (e.g., surgical instruments) dilutes the solution and may cause the process to fail

1.3Purposes of cleaning

- Cleaning in healthcare serves the dual functions of providing surface cleanliness and infection prevention and control
- Cleaning holds special importance for hospitals and other healthcare facilities. The healthcare industry represents a significant population for health studies on cleaners because of the intensive and frequent cleaning with a wide range of cleaning and disinfecting products.
- While the aesthetic benefits of cleaning are necessary for attracting and retaining patients, cleaning and disinfection play an essential role in healthcare settings by preventing healthcare-associated infections (HAIs)

Cleaning is important because:

- ✓ It is an effective way to reduce the number of microorganisms, especially endospores that cause tetanus, on soiled instruments and equipment.
- ✓ Neither sterilization nor high-level disinfection is effective without prior

A thorough washing with soap and clean water also physically removes organic material such as blood and body fluids.2 This is important because dried organic material can entrap microorganisms, including endospores, in a residue that protects them against sterilization or disinfection. Organic matter also can partially inactivate some high-level disinfectants, rendering them less effective (AORN 1992; Rutala et al 1998).

Use of soap is important for effective cleaning because water alone will not remove protein, oils and grease (Nyström 1981). The use of hand (bar) or powdered soap is discouraged because the fatty acids in bar soap react with the minerals in hard water leaving a residue or scum (insoluble calcium salt), which is difficult to remove. Using liquid soap, if available, is preferable because it mixes more easily with water than bar or powdered soaps. In addition, liquid soap breaks up and dissolves or suspends grease, oil and other foreign matter in solution so that they can be removed more easily by the cleaning process.

1.4Maintaining a clean work place

The importance of a clean workplace

The workplace environment influences employees' productivity, performance and well-being. No matter the industry, maintaining a clean workplace may help keep staff members safe, healthy and efficient. However, busy production schedules and increasing workloads may cause standards to dip.

- ❖ **Essential to safety**
  - ✓ When employees work in a messy environment, they may not notice all hazards, which increases the risk of an accident. According to the Occupational Safety and Health Administration (OSHA), an occupational hazard is anything in the workplace that may cause harm.

An occupational hazard is commonly caused by neglect on the part of the employer or a lack of awareness by workers. When the office or worksite isn't clean, it may increase the chance that a hazard will go unnoticed by a supervisor and staff members.

- Employers may want to remember to keep the workplace free of debris and remind workers to put all equipment, such as personal protective equipment (PPE), in designated places to prevent an accident

Crucial to health

- ✓ Flu season is rapidly approaching and workplaces may see an increase in the number of employees using sick days if they become ill. According to Kimberly-Clark Professional, germs can spread quickly through the workplace if supervisors and employees don't adequately sanitize their hands and their workspaces. Commonly used spaces, such as break rooms, can be hot spots for germs to accumulate.

Cleanliness is crucial in healthcare settings

- ✓ Controlling the spread of infections or viruses is vitally important in many different locations and settings – such as schools, leisure centres and the workplace – but it is even more crucial for healthcare providers. People visiting or receiving treatment in these environments are already vulnerable to the spread of infection, so making sure that effective cleaning regimes are in place for waiting rooms, corridors, reception areas and wards is key. A clean and welcoming environment is also important from an aesthetic point of view, engendering feelings of well-being and trust in people who may be anxious or unwell.

The guidance goes on to say that the arrangements for cleaning should include:

- ✓ Clear definition of specific roles and responsibilities for cleaning
- ✓ Clear, agreed and available cleaning routines
- ✓ Sufficient resources dedicated to keeping the environment clean and fit for purpose
- ✓ Consultation with Infection Control Teams (ICTs) or equivalent local expertise on cleaning protocols when internal or external contracts are being prepared
- ✓ Details of how staff can request additional cleaning, both urgently and routinely

Reasons Why a Clean Workplace Means a Safe Workplace

- ✓ A clean workplace means more than just having a sparkling, fresh building. A clean workplace also ensures the safety and health of employees and visitors. In 2012 alone, nearly 3 million nonfatal workplace injuries and illnesses were reported by private industry employers. Workplace injuries can be prevented by taking action to ensure a clean, safe work environment.

Here are six reasons why a clean workplace also means a safe workplace:

1. **Clean, dry floors to prevent slips and falls.**

- ✓ Maintaining clean, dry floors is essential for the prevention of slips and falls in the workplace.

2. **Disinfectants prevent the spread of germs and illness, including the flu.**

- ✓ Germs can easily spread throughout a workplace, particularly during flu season—but disinfecting surfaces and objects stop germs in their tracks.

3. **Proper air filtration lowers employee exposure to hazardous substances.**

- ✓ Dusts and vapors are hazardous substances that can create an unsafe environment for employees. Building ventilation is one important factor in reducing airborne transmission of respiratory infections and maintaining the health and productivity of workers. Regularly cleaning prevents them from becoming saturated, which could lead to potential microbial growth and odor concerns..

4. **Clean light fixtures improve lighting efficiency.**

- ✓ Dirty light fixtures can reduce essential light levels, making it difficult and unsafe for employees to complete their daily tasks. Clean light fixtures significantly improve lighting efficiency in the workplace.

5. **Green cleaning products are safer for both your employees and the environment.**

- ✓ Not all cleaning products are the same, and some are held to a higher standard than others. Products with third-party certifications, such as Green Seal or GREENGUARD, must meet specific standards and guidelines, which ensures they're safer for both people and the environment.

6. **Proper disposal of waste and recyclable materials keeps work areas clutter-free.**

Allowing trash to pile up not only produces clutter, but it also presents a breeding ground for pests that pose a threat to your work environment. Placing "no-touch" wastebaskets in key locations throughout your facility ensures materials are disposed of and reduces the spread of germs. Recycling materials using clearly labeled waste receptacles also makes for a more sustainable environment.

1.5 General Principles of Cleaning

2. Ensure any electrical equipment to be cleaned is unplugged before commencing the decontamination cleaning. (Ensure cold chain for vaccine storage is maintained if fridge is unplugged).
3. Refer to the health and safety data sheets before using any product.
4. Display warning signs in the area, ensuring all signs are visible.
5. Wear suitable personal protective equipment. For most tasks gloves and aprons are sufficient. If there is the potential of a splash/irritation to the conjunctiva or mucous membranes face protection such as a mask and visor or goggles must be worn.
6. Prepare a fresh solution of cleaning agent or disinfectant as required.
7. Do not over-wet the floor.
8. Clean using lightly moistened clean disposable cloths (color coded as per National Hospital Office, below).The number of cloths required for cleaning per room depends on the level of activity being carried out e.g one for patient examination area, one for desk area, one for washbasin to prevent transfer of microorganism from one area to another.

9. Particular attention should be given to frequently touched surfaces and those most likely to be contaminated with blood or body fluids e.g., toilet seats/flush handles, sinks/taps and doorknobs.
10. Sodium hypochlorite may damage metal surfaces. Remove disinfectant solution with clean water and dry with a disposable paper towel.
11. Dry equipment with paper towel.
12. Change gloves and perform hand hygiene between different tasks.
13. Dispose of solution in the toilet or designated household sink. Do not discard into wash hand basins
14. Dispose of cleaning cloth.
15. All chemicals must be used in accordance with manufacturer's instructions to ensure correct dilution and usage. These should be stored in a locked cupboard/room safely away from public access.
16. All equipment should be left clean, dry and tidy in storage area after use.
17. Do not use abrasive cleaners (e.g., Vim® or Comet®) or steel wool because these products can scratch or pit metal or stainless steel. These scratches then become a nesting place for microorganisms, making cleaning more difficult, as well as increasing the chance of corrosion (rusting).

Self-Check -1	Written Test

Directions: Choose the best answers from the given alternative.

1. Describes a process that eliminates many or all pathogenic microorganisms, except bacterial spores, on inanimate objects.

A. Disinfection B. Sterilization C. Routine cleaning D. Terminal cleaning

2. The process that physically removes soiling, including large numbers of microorganisms and the organic material on which they grow.

A. Disinfection B. Sterilization C. Routine cleaning D. cleaning

3 commonly caused by neglect on the part of the employer or a lack of awareness by workers.

A. Essential to safety B. An occupational hazard C. Crucial to health D. All

4. Reasons why a clean workplace also means a safe workplace?

A. Clean, dry floors to prevent slips and falls.
B. Disinfectants prevent the spread of germs and illness, including the flu.
C. Proper air filtration lowers employee exposure to hazardous substances.
D. Clean light fixtures improve lighting efficiency. E. ALL

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Information Sheet-2	Applying Personal protective clothing and equipment during *cleaning procedure*

2.1Personal protective clothing and equipment during *cleaning procedures*

- Wear **gloves** while cleaning instruments and equipment. (Thick household or utility gloves work well.) If torn or damaged, they should be discarded; otherwise they should be cleaned and left to dry at the end of the day for use the following day.
  - ✓ Even when wearing heavy-duty utility gloves, care should be taken to prevent needle sticks or cuts when washing sharps.
- Wear protective eyewear (**plastic visors, face shields, goggles or glasses**) and a plastic apron, if available, while cleaning instruments and equipment to minimize the risk of splashing contaminated fluids into the eyes and onto the body.
  - ✓ In most cleaning situations, gloves and aprons are sufficient.
  - ✓ If there is risk of splashing waste into the face or eyes, face shields should also be used.
  - ✓ PPE can only work if it is intact and undamaged, is fit for the purpose and is worn correctly
  - ✓ Make sure the PPE fits you securely.
  - ✓ If you notice any damaged PPE, notify your supervisor immediately
  - ✓ Be familiar with the type of clothing you are required to wear for the purpose; for example, should the apron be waterproof

Self-Check -2	Written Test

Directions: Choose the best answers from the given alternative.

1. Which One is **Not** protective eye wear?
   A. plastic visors B. face shields C. goggles D. None
2. Only work if it is intact and undamaged, is fit for the purpose and is worn correctly?
   A.PEP B. universal precaution C. Antisepsis D.ALL

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____ 2._____

Information Sheet-3	Removing dust, dirt and physical debris

3.1Removing dust, dirt and physical debris

- Dust, soil and microbes on surfaces can all transmit infection. Cleaning removes foreign material and reduces the numbers of infectious agents and thus makes transmission of infectious organisms less likely

- **Floors**
  - ✓Vacuum carpets and clean hard floors daily. Sweeping with an ordinary broom releases dust and bacteria into the air and so is not suitable.
  - ✓Wash buckets and mops after use with detergent and water and store them dr
- **Walls and fittings**
  - ✓ Generally, walls, blinds and curtains need less attention than floors unless they are in areas where soiling often happens (particularly if soiling is with blood or other body fluids). They should all be cleaned regularly and when visibly soiled. Curtains need changing regularly.

Self-Check -3	Written Test

Directions: Choose the best answers from the given alternative.

1. The purpose of Removing dust, dirt and physical debris
   A. To prevent transmission infection B. To increase transmission infection
   C. makes transmission of infectious organisms less likely D.A&C

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

Information Sheet-4	Cleaning agents

4.1Cleaning agents

All work surfaces must be cleaned correctly both before and after each session and when visibly soiled. There are different procedures depending on the level of risk; that is, the probability and the consequences of contamination. The following outlines some of the cleaning products that are commonly used in cleaning different surfaces in different areas.

Detergents

- ✓ When dealing with non-critical areas, detergent and warm water is all that is needed to clean the work area.
- ✓ Typically, detergents with a neutral pH are used. This means that they are neither alkaline nor acidic. Both alkaline and acidic substances can damage the skin and eyes and will also reduce the life of equipment and furnishings.
- ✓ Detergents with a neutral pH are far gentler and they clean most work areas effectively.
- ✓ Always complete any documentation necessary to indicate that cleaning has been carried out

Sanitizers and disinfectants

- ➢ Stronger cleaning products can be used when appropriate. These vary in strength:
  - ✓ **Low-level** disinfectants are effective in killing some bacteria and viruses; these can be used in most domestic settings.
  - ✓ **Medium-level** disinfectants are effective at killing a range of bacteria and viruses; these should be used if clients have tuberculosis or where there is a high likelihood that tuberculoid-causing pathogens are present.
  - ✓ **High-level** disinfectants are effective in killing all pathogens except for bacterial spores; these disinfectants should be used when cleaning medical equipment.

Self-Check -4	Written Test

Directions: Choose the best answers from the given alternative.

1. Disinfectants effective in killing some bacteria and viruses?
   A. Low-level disinfectants B. Medium-level disinfectants C. High-level disinfectants D.ALL
2. **False** About Detergents
   A. Have neutral PH are used. B. Neither alkaline nor acidic C. Both

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Short Answer Question

1._____

2._____

Information Sheet-5	Instruments processing

5.1Instruments processing

One area of infection prevention and control (IPC) in health facilities is the proper processing of instruments and other items that have come in contact with patients' bodily fluids. It is critical in reducing the transmission of infections during clinical procedures and patient care.

Every item, whether it is soiled metal instruments or a pair of surgical gloves, requires special handling and processing in order to minimize the risk of accidental injury or blood or body fluid exposure to cleaning and housekeeping staff; provide a high-quality end product (i.e., sterile or high-level disinfected instruments and other items).

The basic IPC practices recommended to reduce disease transmission from soiled instruments and other reusable items are decontamination, cleaning, and either sterilization or HLD.

After completing an operation or invasive medical procedure, and while still wearing gloves, the health worker should

- ✓ Dispose of contaminated objects (gauze or cotton and other waste items) in a plastic bag or leak-proof, covered container.
- ✓ Next, disposable sharps (e.g., scalpel blades and suture needles) should be placed in a sharps container.
- ✓ Finally, all instruments and reusable items such as surgical gloves and suction cannulas, whether or not they were used in the operation, should be decontaminated by soaking for 10 minutes in a disinfectant (e.g., 0.5 percent chlorine solution).

- **Following decontamination**
  - ✓ The instruments and reusable items should be thoroughly cleaned with soap and water, completely rinsed, and dried.
  - ✓ The surgical instruments and those items that come in contact with the bloodstream or that normally touch sterile tissue beneath the skin (critical items) should be sterilized to destroy all microorganisms including bacterial endospores.
  - ✓ When sterilization is not feasible or equipment is not available, however, HLD by boiling, steaming, or soaking in a chemical disinfectant is the only acceptable alternative.
  - ✓ Instruments and other items that touch only mucous membranes or broken skin (semi-critical items), however, only need to be high-level disinfected

5.2 Disinfection and sterilization

- **Decontamination:** This is a process that makes inanimate objects safer to be handled by staff before cleaning (i.e., inactivates HBV, HCV, and HIV, and reduces the number of other microorganisms but does not eliminate them).
- **Cleaning:** A process that physically removes all visible dust, soil, blood, or other body fluids from inanimate objects as well as removing sufficient numbers of microorganisms to reduce risks for those who touch the skin or handle the object. It consists of thoroughly washing with soap or detergent and water, rinsing with clean water, and drying.
- **HLD:** A process that eliminates all microorganisms except some bacterial endospores from inanimate objects by boiling, steaming, or using chemical disinfectants.

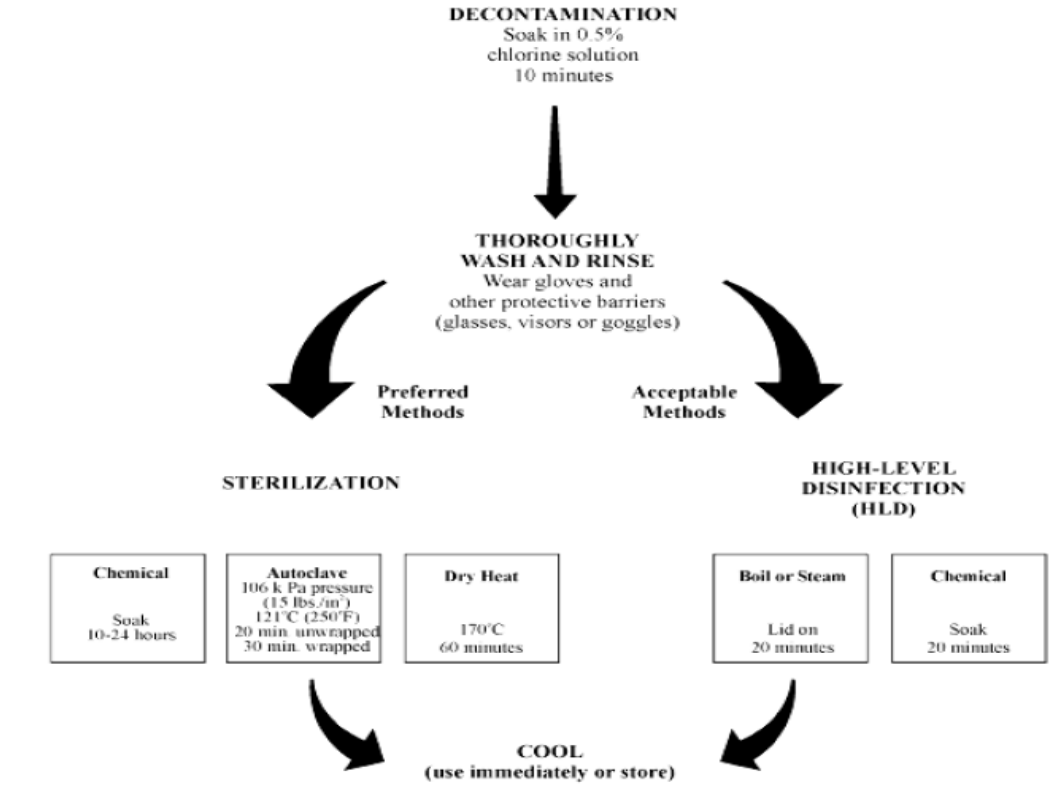
- **Sterilization:** A process that eliminates all microorganisms (bacteria, viruses, fungi, and parasites) including bacterial endospores from inanimate objects by high-pressure steam (autoclave), dry heat (oven), chemical sterilants, or radiation

1. Chemical Disinfectants

- ✓ Disinfectants are chemicals that destroy or inactivate microorganisms on inanimate objects, such as instruments and surfaces. Disinfectants are not meant to be used on the skin or mucous membranes. Many disinfectants are used alone or in combination (e.g., hydrogen peroxide and peracetic acid) in the health care setting. In most instances, a given product is designed for a specific purpose and is to be

used in a certain manner. Therefore, users should read labels carefully to ensure the correct product is selected for the intended use and applied efficiently.

- **Decontamination**
  - ✓ In instrument processing, decontamination is the first step in handling used instruments and gloves. Decontamination inactivates HBV, HCV, and HIV and reduces the number of microorganisms. It is one of the most highly effective IP measures that can minimize the risk of transmission of these viruses to health care workers, especially cleaning and housekeeping staff, when they handle soiled medical instruments, surgical gloves, or other items. The objective of decontamination is to protect individuals who handle surgical instruments and other items that have been in contact with blood or bodily fluids from serious diseases.
  - ✓ Before cleaning, all soiled surgical instruments, surgical gloves, and other items should be first decontaminated by placing them in a 0.5 percent chlorine solution for 10 minutes. Because of the potentially high load of microorganisms and/or other organic material (blood or other bodily fluids) on soiled items, using a 0.5 percent solution for decontamination.



3. Sterilization

Sterilization is the destruction of all microorganisms, including bacterial endospores. Sterilization in health facilities can be achieved by high-pressure steam (autoclaves), dry heat (oven), chemical sterilants (glutaraldehyde or formaldehyde solutions), or physical agents (radiation).

To be effective, sterilization requires time, contact, temperature, and, with steam sterilization, high pressure. Because sterilization is a process, not a single event, all components must be carried out correctly for sterilization to occur.

- The effectiveness of any method of sterilization is also dependent on the following four factors:
  1. The type of microorganism present.
  2. The number of microorganisms present.
  3. The amount and type of organic material that protects the microorganisms. Blood or tissue remaining on poorly cleaned instruments acts as a shield to microorganisms during the sterilization process.
  4. The number of cracks and crevices on an instrument that might harbor microorganisms.
- **Methods of Heat Sterilization**

  The most common and readily available sterilization methods are:

1. High-pressure steam sterilization (autoclaves)
2. Dry heat sterilization (oven)
3. Chemical sterilization

- **High-Pressure Steam Sterilization (Autoclaves)**
  - ✓ High-pressure steam sterilization (autoclave) is an effective method of sterilization but is the most difficult to do correctly.
  - ➢ The temperature, pressure, and time combinations for steam sterilization are as follows:
    - ✓ At a temperature of 121°C (250°F), pressure of 106 kPa (15 lb/in2) for 20 minutes for unwrapped items and 30 minutes for wrapped items.
    - ✓ At a higher temperature of 132°C (270°F), pressure of 30 lb/in2 for 15 minutes for wrapped items
  - ➢ Note: Pressure settings (kPa or lb/in2) may vary slightly depending on the sterilizer used. When possible, follow the manufacturer's recommendations.

  The two reasons why steam sterilization is an effective sterilization are as follows:
    - ✓ Saturated steam is an extremely effective carrier of thermal energy that makes it many times more effective in conveying the necessary energy to the items to be sterilized than dry air.
    - ✓ Steam is an effective sterilant because any resistant, protective outer layer of the microorganisms can be softened by steam, allowing coagulation of the inner sensitive portion of the microorganisms.
- **Advantages:**
  - ✓ Most commonly used effective method of sterilization.
  - ✓ Sterilization cycle time is shorter than with dry heat or chemical sterilants.
- **Limitations:**
  - ✓ Requires a continuous source of heat (wood fuel, kerosene, or electricity).
  - ✓ Requires equipment (steam sterilizer) that must be expertly maintained to keep it in working condition.
  - ✓ Requires strict adherence to time, temperature, and pressure settings.
  - ✓ Difficult to produce dry packs because breaks in procedure are common (e.g., not allowing items to dry before removing, especially in hot, humid climates).
  - ✓ Repeated sterilization cycles can cause pitting and dulling of cutting edges of instruments (i.e., scissors).
  - ✓ Plastic items cannot withstand high temperatures.
- **Preparing Items for Steam Sterilization**
  - ➢ All instruments and other items should be decontaminated and thoroughly cleaned and dried before being sterilized. All jointed instruments should be open (or in the unlocked position) and disassembled. Reusable cloth items should be laundered and dried prior to sterilization.
- **Packing and Wrapping**
  - ➢ Wrapping items to be sterilized permits sterile items to be handled and stored without being contaminated. Materials used for wrappers should:
    - ✓ Allow air removal and steam penetration
    - ✓ Act as a barrier to microorganisms and fluids
    - ✓ Resist tears and punctures and be free of holes
    - ✓ Be inexpensive
- **Dry Heat Sterilization (Oven)**
  - ➢ Dry heat sterilization is caused by hot air that destroys microorganisms through oxidation that causes slow destruction of the microorganisms' protein. Initially heat is absorbed by the exterior surface of an item and then passed to the next layer. Eventually, the entire object reaches the temperature needed for sterilization. Dry heat sterilization can be achieved with a simple oven as long as a thermometer is used to verify the temperature inside the oven.
- **Advantages:**
  - ✓ Effective method, as dry heat by conduction reaches all surfaces of instruments, even of instruments that cannot be disassembled
  - ✓ Protective of sharps or instruments with a cutting edge (fewer problems with dulling of cutting edges)

- ✓ Leaves no chemical residue
- ✓ Eliminates "wet pack" problems in humid climates

- **Limitations:**
  - ➢ Plastic and rubber items cannot be dry heat sterilized because temperatures used (160–170°C) are too high for these materials.
  - ✓ Dry heat penetrates materials slowly and unevenly.
  - ✓ It requires oven and continuous source of electricity.

- **Chemical Sterilization**

Some high-level disinfectants will kill endospores after prolonged (10- to 24-hour) exposure. If objects need to be sterilized, but using high-pressure steam or dry heat sterilization would damage them or equipment is not available (or operational), they can be chemically sterilized. Common disinfectants that can be used for chemical sterilization include glutaraldehydes and formaldehyde. Sterilization takes place by soaking for at least 10 hours in 2 to 4 percent glutaraldehyde solution or at least 24 hours in 8 percent formaldehyde. Glutaraldehydes, such as Cidex, are often in short supply and very expensive, but they are the only practical sterilants for some instruments, such as laparoscopes, that cannot be heated. Both glutaraldehydes and formaldehyde require special handling and leave a residue on treated instruments; therefore, rinsing with sterile water is essential if the item must be kept sterile.

- **Advantages:**
  - Glutaraldehydes and formaldehyde solutions are not readily inactivated by organic materials.
  - Both can be used for items that will not tolerate heat sterilization such as laparoscopes.
  - Formaldehyde solutions can be used for up to 14 days (replace sooner if cloudy); some glutaraldehydes can be used for up to 28 days.
- **Limitations:**
  - Glutaraldehydes and formaldehyde are chemicals that cause skin irritation; therefore, all equipment soaked in either solution must be thoroughly rinsed with sterile water after soaking.
- **Storage of Sterile Instruments and Items**

All sterile items should be stored appropriately to protect them from dust, dirt, moisture, animals, and insects. The storage area should be located next to or connected to where sterilization occurs and in a separate enclosed area with limited access that is used only to store sterile and clean patient care supplies.

- ***High-Level Disinfection and Storage***

When sterilization equipment is either not available or not suitable, HLD is the only acceptable alternative method for the final processing of instruments. The HLD process destroys all microorganisms (including vegetative bacteria, tuberculosis, yeasts, and viruses) except some bacterial endospores.

HLD can be achieved by:

- ✓ Boiling in water
- ✓ Steaming (moist heat)
- ✓ Soaking instruments in chemical disinfectants (chemical disinfection)

- **Boiling**

Boiling in water is an effective, practical way to high-level disinfect instruments and other items. Although boiling instruments in water for 20 minutes will kill all vegetative forms of bacteria, viruses (including HBV, HCV, and HIV), yeasts, and fungi, boiling will not reliably kill all endospores.

- **Steaming**

The best method for HLD of gloves and a useful method of HLD of cannulas used during MVA is to steam them in a steamer containing one to three tiers of gloves or cannulas.

- **Soaking Instruments in Chemical Disinfectants**

Although a number of disinfectants are commercially available in most countries, four disinfectants—chlorine, glutaraldehydes, formaldehyde, and peroxide—are routinely used as high-level disinfectants. A high-level disinfectant should be selected for use based on the characteristics of the items to be disinfected, the physical area (i.e., is it well ventilated?), and the skills of personnel available to do the procedure.

HLD by chlorine solutions

- ✓ Prepare 0.1 percent chlorine solution using boiled water that has been filtered if the tap water is cloudy.
- ✓ Soak for 20 minutes.

Formaldehyde

- ✓ Use 8 percent formaldehyde, which is inexpensive and readily available.
- ✓ Soak for 20 minutes.

Hydrogen peroxide

- ✓ Use a 6 percent solution. The 3 percent hydrogen peroxide solutions used as antiseptics should not be used as a disinfectant.
- ✓ Soak for 20 minutes.

Glutaraldehydes

- ✓ Use a 2 to 4 percent solution.
- ✓ Soak for 20 minutes at 25°C

Self-Check -5	Written Test

- **Directions:** Choose the best answers from the given alternative.

1. A process that makes inanimate objects safer to be handled by staff before cleaning.

   A. Decontamination B. Cleaning C. HLD D. Sterilization

2. Methods of Heat Sterilization

   A. High-pressure (autoclaves) B. Dry heat sterilization (oven) C. Chemical D.ALL

3. Destroys microorganisms through oxidation that causes slow destruction of the microorganisms' protein.

   A. High-pressure (autoclaves) B. Dry heat sterilization (oven) C. Chemical D. None

4. Limitations of High-Pressure Steam Sterilization (Autoclaves)

   A. Requires a continuous source of heat. B. Requires equipment (steam sterilizer).
   C. Requires strict adherence D.ALL

Note: Satisfactory rating - 4 points unsatisfactory below-4 points

You can ask you teacher for the copy of the correct answers

Answer Sheet

Score _____
Rating _____

Name: _____ Date: _____

Operation Sheet 1	Cleaning of health care instrument

The steps for cleaning are:

1. Wear gloves while cleaning instruments and equipment. (Thick household or utility gloves work well.)
2. Wear protective eyewear (plastic visors, face shields, goggles, or glasses), protective shoes, and a plastic apron, if available, while cleaning instruments and equipment to minimize the risk of splashing contaminated fluids into the eyes and onto the body.
3. Using a soft brush or old toothbrush, detergent, and water, scrub instruments and other items vigorously to completely remove all blood, other bodily fluids, tissue, and other foreign matter.
4. Hold items under the surface of the water while scrubbing and cleaning to avoid splashing. Disassemble instruments and other items with multiple parts, and be sure to brush in the grooves, teeth, and joints of items where organic materials can collect and stick.
5. Rinse items thoroughly with clean water to remove all detergent. Any detergent left on the items can reduce the effectiveness of further chemical processing.
6. Allow items to air dry (or dry them with a clean towel).

LAP Test	Practical Demonstration

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 5min.

Task 1: Perform cleaning

Operation Sheet 2	Decontaminating Used Instruments and Other Items

❖ Steps decontaminating used instruments and Other Items

1. Place all instruments in a 0.5 percent chlorine solution for 10 minutes immediately after completing the procedure
2. Decontaminate any surfaces contaminated during the procedure by wiping them with a cloth soaked in a 0.5 percent chlorine solution.
3. Immerse gloved hands in a 0.5 percent chlorine solution.
4. Remove gloves by turning inside out. If disposing of gloves, place them in a leak-proof container or heavy-duty plastic container.
5. If reusing gloves, soak in a 0.5 percent chlorine solution for 10 minutes for decontamination.
6. Remove instruments from the 0.5 percent chlorine solution after 10 minutes and immediately rinse them with cool water to remove residual chlorine before being thoroughly cleaned.
7. Two buckets can be used in the procedure areas or operating rooms, one filled with 0.5 percent chlorine solution and one with water, so instruments can be placed in the water after 10 minutes to help prevent corrosion.
8. Use a plastic container for decontamination to help prevent:
    i. Dulling of sharps (e.g., scissors) due to contact with metal containers
    ii. Rusting of instruments

LAP Test	Practical Demonstration

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 5min.

Task 1: Perform cleaning

Operation Sheet 3	Drying heat sterilization (Oven)

❖ **Step for dry heat sterilization (Oven)**

1. Decontaminate, clean, and dry all instruments and other items to be sterilized.
2. If desired, wrap instruments in aluminum foil or place in a metal container with a tight-fitting, closed lid. Wrapping helps prevent recontamination prior to use. Hypodermic or suture needles should be placed in glass tubes with cotton stoppers.
   - ✓ When using dry heat to sterilize instruments wrapped in cloth, be sure that the temperature does not exceed 170°C/340°F.
3. .Place loose (unwrapped) instruments in metal containers or on trays in the oven and heat to desired temperature.
4. After the desired temperature is reached, begin timing
   - ✓ Use dry heat only for items that can withstand a temperature of 170°C (340°F). Needles and other instruments with cutting edges should be sterilized at lower temperatures (160°C [320°F]), because higher temperatures can destroy the sharpness of cutting edges.
   - ✓ Depending on the temperature selected, the total cycle time (preheating, sterilization time, and cool down) will range from about 2.5 hours at 170°C to more than 8 hours at 121°C.
5. After cooling, remove packs and/or metal containers and store. Loose items should be removed with sterile forceps/pickups and used immediately or placed in a sterile container with a tight fitting lid.

LAP Test	Practical Demonstration

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 5min.

Task 1: Perform **dry heat sterilization**

Operation Sheet 4	storing sterile items

Steps for storing sterile items

1. Keep the storage area clean, dry, dust-free, and lint-free.
2. Control temperature and humidity (approximate temperature 24°C and relative humidity less than 70 percent) when possible.
3. Packs and containers with sterile (or high-level disinfected) items should be stored 20 to 25 cm off the floor, 45 to 50 cm from the ceiling, and 15 to 20 cm from an outside wall.
4. Do not use cardboard boxes for storage. Cardboard boxes shed dust and debris and may harbor insects.
5. Date and rotate the supplies (first in/first out). This process serves as a reminder, but does not guarantee sterility of the packs.
6. Distribute sterile and high-level disinfected items from this area.

LAP Test	Practical Demonstration

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 5min.

Task 1: Perform **storing sterile items**

Operation Sheet 5	High-Level Disinfection by Boiling

❖ **Steps for High-Level Disinfection by Boiling**

1. Decontaminate and clean all instruments and other items to be high-level disinfected
2. If possible, completely immerse items in water.
   - ✓ Adjust the water level so that there is at least 2.5 cm (1 inch) of water above the instruments. In addition, make sure all bowls and containers to be boiled are full of water. For example, empty bowls that turn bottom side up and float to the surface contain air pockets.
3. Close lid over pan and bring water to a gentle, rolling boil. (Boiling too vigorously wastes fuel, rapidly evaporates the water, and may damage delicate [or sharp] instruments or other items.) Hence, a gentle rolling boil is sufficient and will prevent instruments or other items from being bounced around and possibly damaged by striking other instruments or the side walls of the boiling pot.
4. Boil all items for 20 minutes. Start timing when the water begins to boil.
5. After boiling for 20 minutes, remove objects with previously high-level disinfected forceps. Never leave boiled instruments in water that has stopped boiling.
   - ✓ As the water cools and steam condenses, air and dust particles are drawn down into the container and may contaminate those instruments.
   - ✓ Use instruments and other items immediately, or with high-level disinfected forceps or gloves, place objects in a high-level disinfected container with a tight-fitting cover.
   - ✓ Once the instruments are dry, if any pooled water remains in the bottom of the container, remove the dry items and place them in another high-level disinfected container that is dry and can be tightly covered

LAP Test	Practical Demonstration

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 5min.

Task 1: Perform **High-Level Disinfection by Boiling**

Operation Sheet 6	High-Level Disinfection by Steaming

Steps for High-Level Disinfection by Steaming.

1. Place instruments, plastic MVA cannulas, and other items in one of the steamer pans with holes in its bottom. To make removal from the pan easier, do not overfill the pan.
2. Repeat this process until up to three steamer pans have been filled. Stack the filled steamer pans on top of a bottom pan containing water for boiling. A second empty pan without holes should be placed on the counter next to the heat source.
   - ✓ **Remember:** Be sure there is sufficient water in the bottom pan for the entire 20 minutes of steaming.
3. Place a lid on the top pan and bring the water to a full rolling boil. (When water only simmers, very little steam is formed and the temperature may not get high enough to kill microorganisms.)
4. When steam begins to come out between the pans and the lid, start the timer or note the time on a clock and record the time in the HLD log.
5. Steam items for 20 minutes.
6. Remove the top steamer pan and put the lid on the pan that was below it (the pan now on top). Gently shake excess water from the pan just removed.
7. Put the pan that was just removed onto the empty pan (see Step 3). Repeat until all pans are restacked on this empty pan and the top pan is covered with the lid. (This step allows the items to cool and dry without becoming contaminated.)
8. Allow items to air dry in the steamer pans (one to two hours) before using.
9. Using a high-level disinfected forceps, transfer the dry items to a dry, high-level disinfected container with a tight-fitting cover. Instruments and other items can also be stored in the stacked and covered steamer pans as long as a bottom pan (no holes) is used.

LAP Test	Practical Demonstration

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 5min.

Task 1: Perform **High-Level Disinfection by Steaming**

Operation Sheet 7	Disinfecting by high level chemical

Steps in Disinfection High-Level Chemical

1. Decontaminate instruments and other items that may have been contaminated with blood and bodily fluids, and thoroughly clean and dry them before placing them in the disinfectant solution.
2. Completely immerse all items in the high-level disinfectant.
3. Soak for 20 minutes.
4. Remove items using high-level disinfected or sterile forceps or gloves.
5. Rinse well with boiled and filtered (if necessary) water three times and air dry
6. Use promptly or store in a dry, high-level disinfected, covered container

LAP Test	Practical Demonstration

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 5min.

Task 1: Perform **Disinfecting high-level chemical**

Reference

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- WHO, , 2004, Practical Guidelines for Infection Control in Health Care Facilities World Health Organization Regional Office for Western Pacific, Manila Regional Office for South-East Asia, New Delhi
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