



Medical Laboratory

NTQF Level III

Learning guide #9

Unit of Competence:- Applying Infection Prevention Techniques and Workplace

Module Title: Applying Infection Prevention Techniques and Workplace

LG Code:- HLT MLT3 M02 LO4-LG9

TTLM Code:- HLT MLT3 TTLM 0919 v1

LO 4: Use PPE



Instruction Sheet

Learning Guide #1

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

Identify and respond to infection risks

- Using of **PPE**
- Changing of PPE daily

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** –

- Personal **PPE** that complies with standards, and is appropriate for the intended use are worn
- Protective clothing and gowns/aprons are changed daily, more frequently if soiled and where appropriate, after each client contact

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number **3 to 16**.
3. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-check 1” **in page 8**.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your trainer for further instructions or go back to Information sheet 1.
7. Submit your accomplished Self-check. This will form part of your training portfolio.
8. Read the information written in the “Information Sheet 2”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
9. Accomplish the “Self-check 2” **in page 16**.
10. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-check 2).



11. Read the information written in the “Information Sheets 2”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
12. Accomplish the “Self-check 3” in page 19.
13. Ask your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-check 3).
14. If you earned a satisfactory evaluation proceed to “Operation Sheet 1” in **page 21**; However, if your rating is unsatisfactory, see your trainer for further instructions or go back to Information sheet 3.
15. Read the “Operation Sheet 1 and try to understand the procedures discussed.
16. Do the “LAP test” in page 22 (if you are ready). Request your trainer to evaluate your performance and outputs. Your trainer will give you feedback and the evaluation will be either satisfactory or unsatisfactory. If unsatisfactory, your trainer shall advice you on additional work. But if satisfactory you can proceed to Learning Guide #2.

Information Sheet-1	Personal Protective Equipment
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Personal Protective 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

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	Personal Protective Equipment
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:



- _____ 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
 - Hand hygiene
 - Wearing gloves
 - Personal protective equipment
 - Massive treatment
- To contain moisture droplets expelled as health workers speak, cough, or sneeze, which of the following PPE is recommended
 - Apron
 - Scissors
 - Pickup forceps
 - Masks
- When performing invasive medical or surgical procedures, which type of glove is used
 - Surgical Glove
 - Clean glove
 - Examination glove
 - Utility glove

Note: Satisfactory rating - 16 points Unsatisfactory - below 16 points

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

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



1. _____

2. _____

3. _____

4. _____

5. _____

Information Sheet 2	Changing of PPE daily
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Changing of PPE daily

1.2 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:

1. To reduce the risk of staff acquiring bacterial infections from patients
2. To prevent staff from transmitting their skin flora to patients
3. To reduce contamination of the hands of staff by microorganisms that can be transmitted from one patient to another (cross-contamination)

Types of Gloves

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 nonintact 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:

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- 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

Figure 4.2. How to don examination gloves

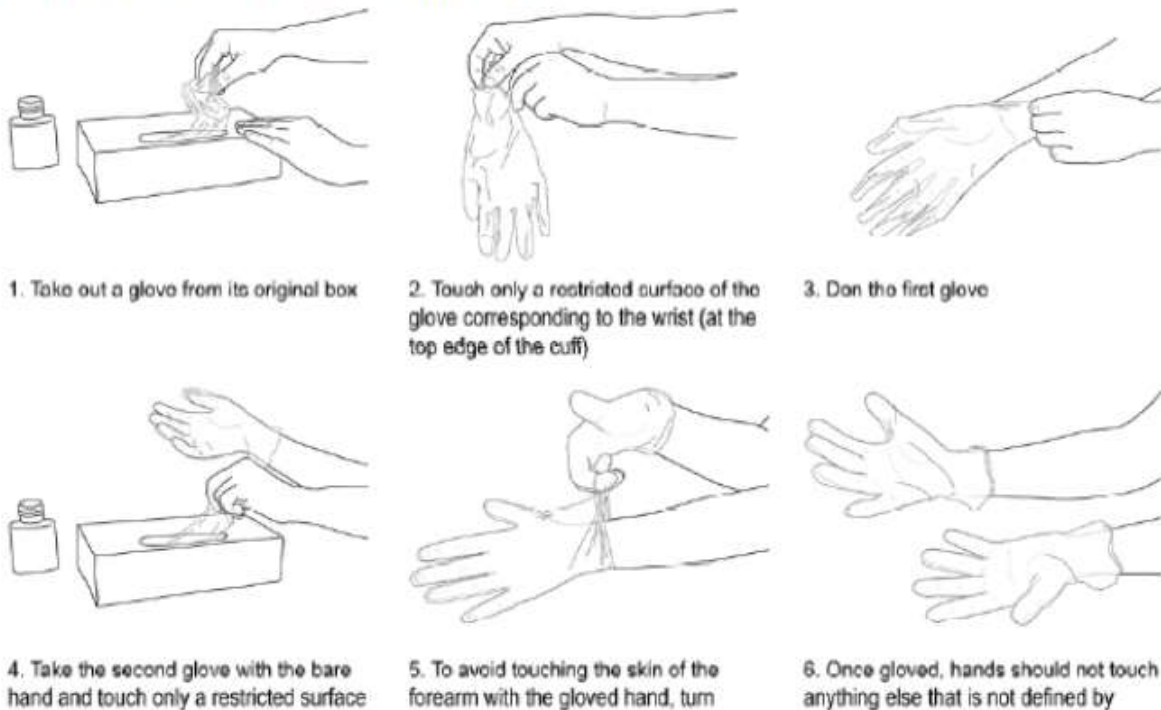


Figure 4.3. How to remove examination gloves

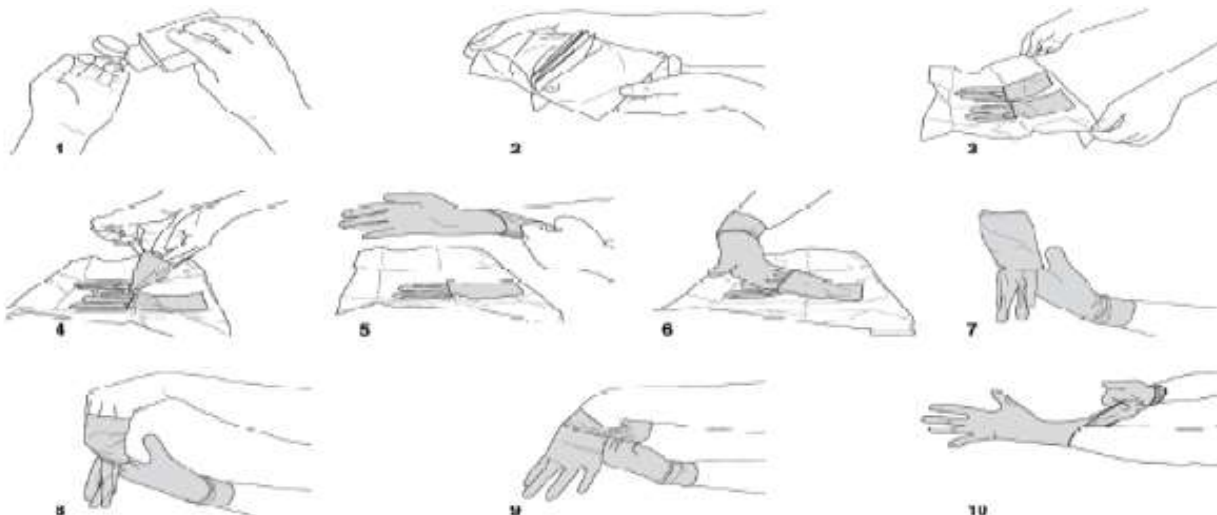
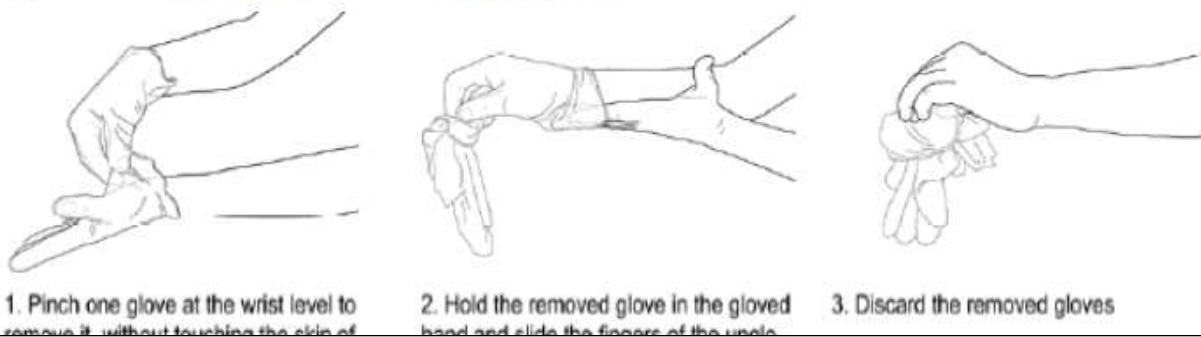
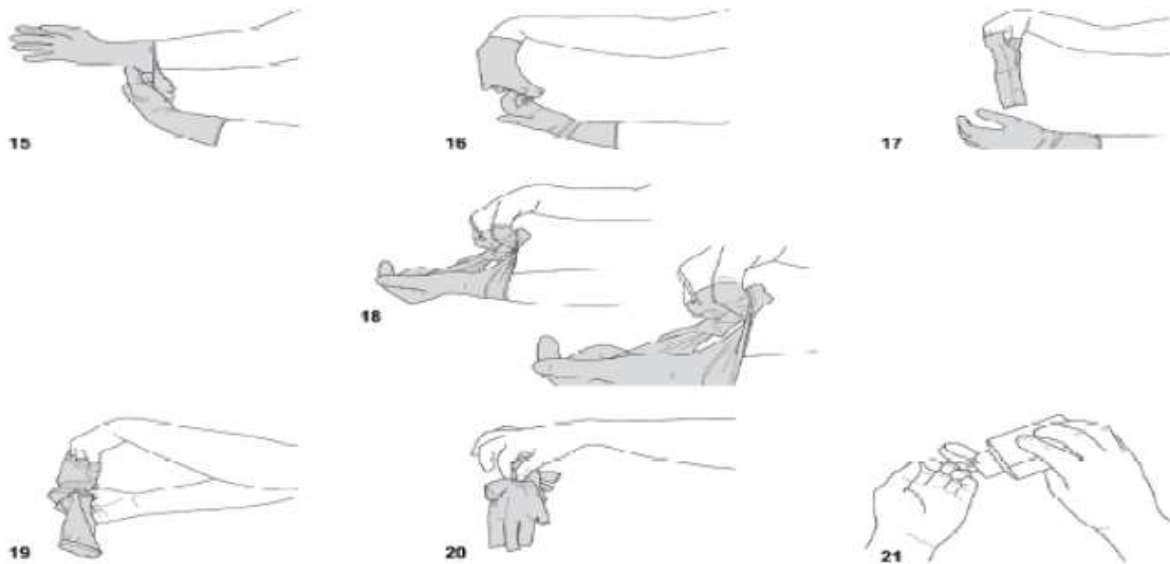




Figure 4.5. How to remove sterile gloves



- 15-17. Remove the first glove by peeling it back with the fingers of the opposite hand. Remove the glove by rolling it inside out to the second finger joints (do not remove completely).
18. Remove the other glove by turning its outer edge on the fingers of the partially ungloved hand.
19. Remove the glove by turning it inside out entirely to ensure that the skin of the health-care worker is always and exclusively in contact with the inner surface of the glove.
20. Discard gloves.
21. Perform hand hygiene after glove removal according to the recommended indication.

NB: Donning surgical sterile gloves at the time of a surgical intervention follows the same sequences except that:

- it is preceded by a surgical hand preparation;
- donning gloves is performed after putting on the sterile surgical gown;
- the opening of the first packaging (non-sterile) is done by an assistant;
- the second packaging (sterile) is placed on a sterile surface other than that used for the intervention;
- gloves should cover the wrists of the sterile gown.

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
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Instructions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers. Write your answers in the sheet provided in the next page.

1. Health care workers wear gloves for the following three reasons: (4 points)
 - A. To reduce the risk of staff acquiring bacterial infections from patients
 - B. To prevent staff from transmitting their skin flora to patients
 - C. To reduce contamination of the hands of staff
 - D. ALL

2.provide protection to health care workers when performing many of their routine duties
 - A. Surgical gloves
 - B. Clean examination gloves
 - C. heavy-duty household gloves
 - D. ALL

3. When to Wear Gloves
 - A. hands coming in contact with blood or other body fluids



- B. perform invasive medical procedures
- C. handle contaminated waste items or touch contaminated surfaces
- D. ALL**

4. Double gloving can be used during the following: (4 points)
- A. Orthopedic procedures
 - B. Surgical procedures lasting more than 30 minutes
 - C. contact with large amounts of blood or other body fluids
 - D. **ALL**

Note: Satisfactory rating - 12 points Unsatisfactory – below 12 points
You can ask your trainer for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

2. _____

3. _____



4. _____

5. _____

Operation Sheet 3	<i>Practice donning and removing of used glove</i>
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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	Practical Demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

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

Task 1: perform donning examination glove.

Task 2: perform donning surgical glove.

Task 3: Perform removing glove.



List of Reference Materials

1. Federal Ministry of Health Ethiopia, April 2012, Infection Prevention and Patient Safety, Addis Ababa, Ethiopia: Federal Ministry of Health
2. Federal Ministry of Health, Ethiopia. 2004. *Infection Prevention Guidelines for Health Care Facilities in Ethiopia*. Addis Ababa, Ethiopia: Federal Ministry of Health.
3. Linda, Tietjen, Débora, Bossemeyer Noel McIntosh JHPIEGO, USIAD 2003 Guidelines for Healthcare Facilities with Limited Resources, , Johns Hopkins University,
4. 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
5. Helen Lemass , Niamh McDonnell , Dr. Nuala O'Connor , Dr. Sheila Rochford HCAI/AMR 2013, "INFECTION PREVENTION AND CONTROL FOR PRIMARY CARE IN IRELAND" ,
6. AG, Australian Guidelines for the Prevention and Control of Infection in Healthcare (2010)

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