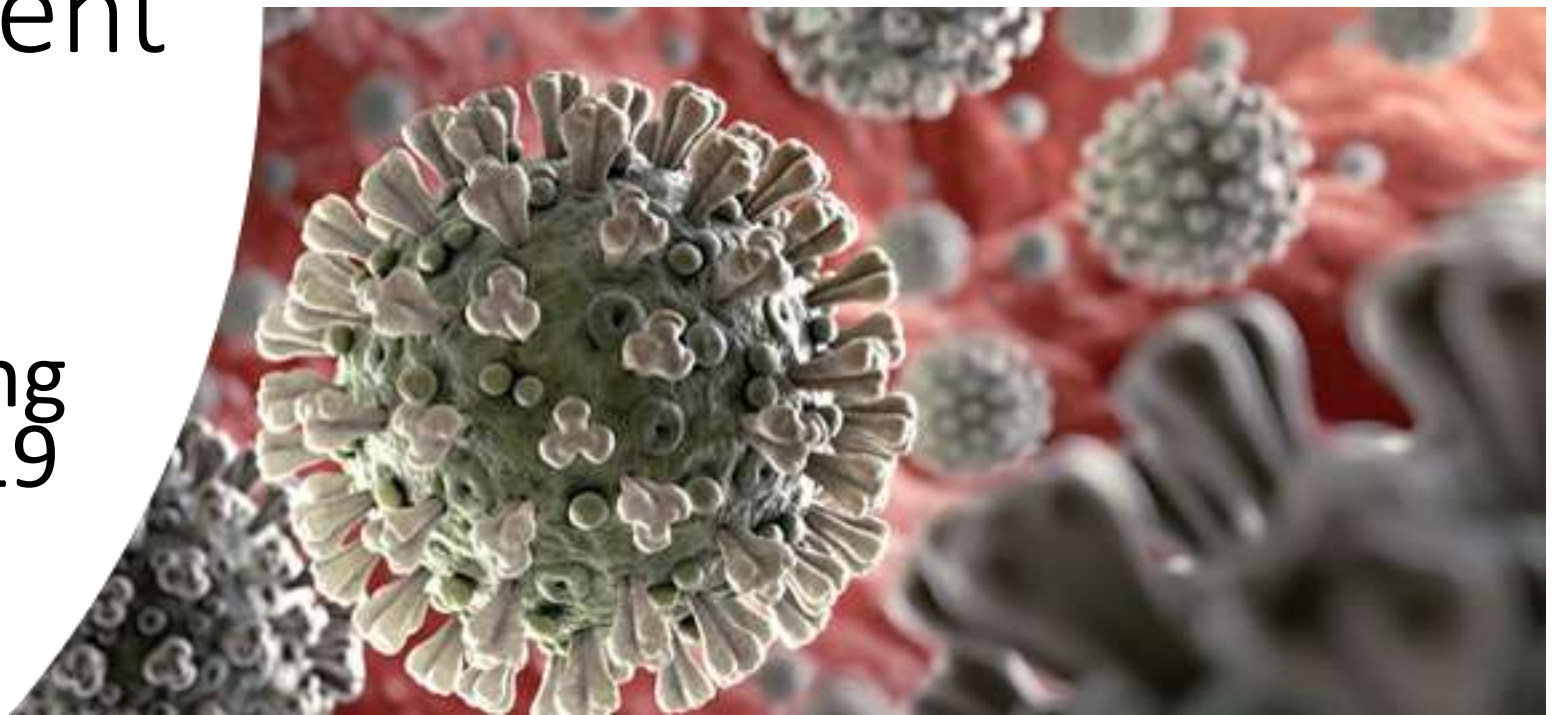
Title:Personal Protective Equipment for COVID

Preventing and controlling transmission of COVID 19 infection



Objectives

- The role of PPE in the prevention of covid-19
- Different types of PPE
- Quality standards for PPE
- Proper use of PPE
- Community masking and gloving
- Challenges and the way forward

Outline

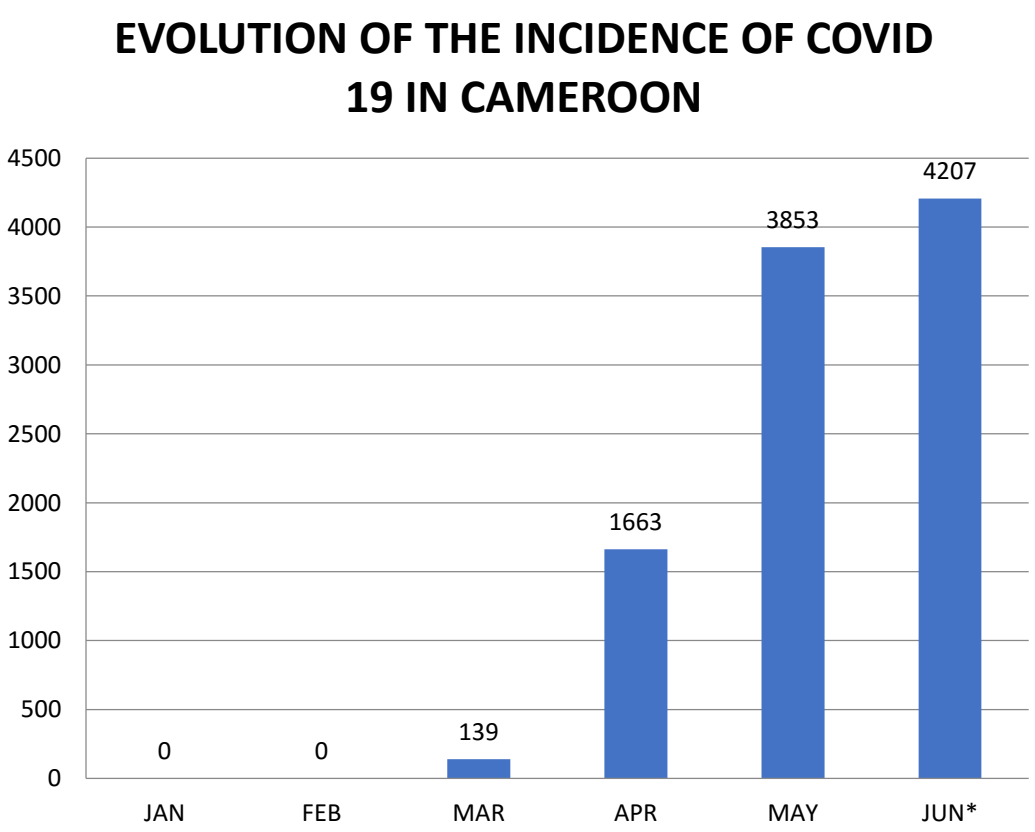
- Background
- Engineering and administrative controls.
- Types and role of PPE.
- Relevant standards and specifications.
- Rules of PPE use
- Procedure to don and doff PPE
- Understanding the Role of Cloth masks
- PPE: Extended use, challenges and solutions

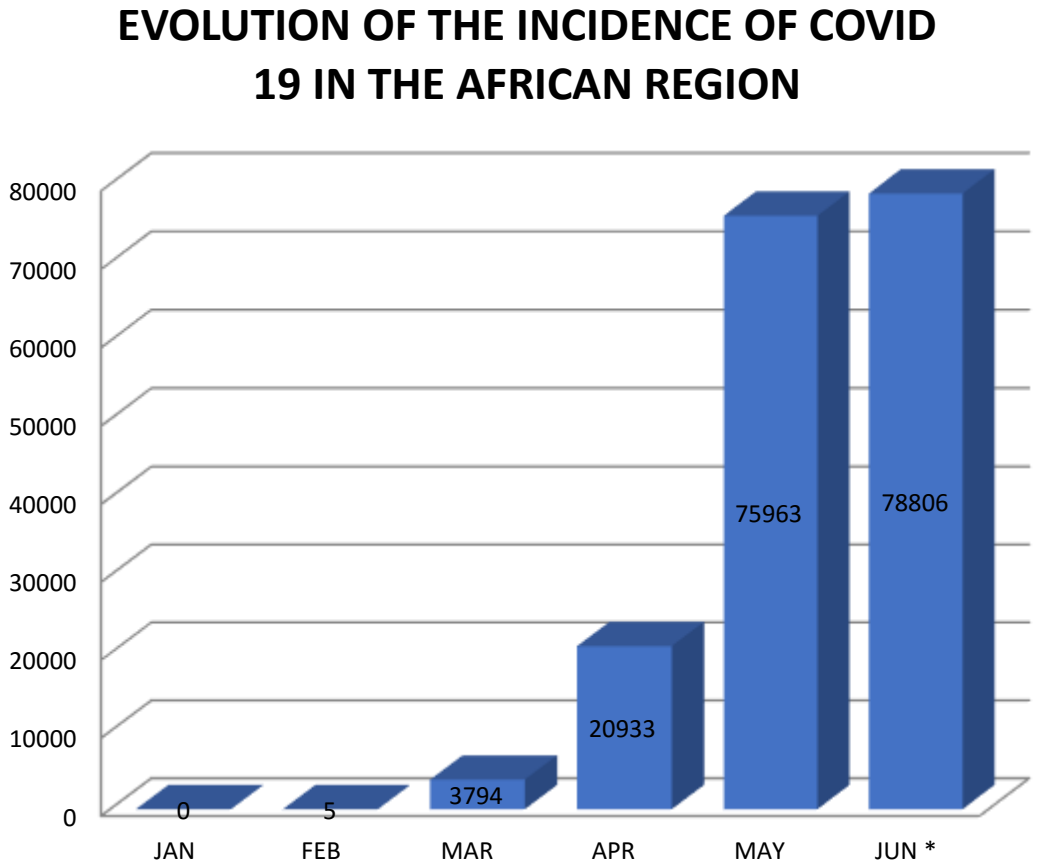
Background (Counting the figures)

- 8 million with 440,000 deaths worldwide (June 17, 2020)
- International Council of Nurses estimates at least 90,000 healthcare workers infected, more than 260 nurses died
- Zambia reported 145 and Cameroon 150 health care workers infected already.

- Healthcare workers have been put at greater risk not only because of the lack of personal protective equipment (PPE) and poor preparedness for this pandemic, but because of poor use of PPE
- Poor use of PPE may be responsible to more infections than lack of PPE

EVOLUTION OF THE INCIDENCE OF COVID-19 AS AT JUNE 17, 2020

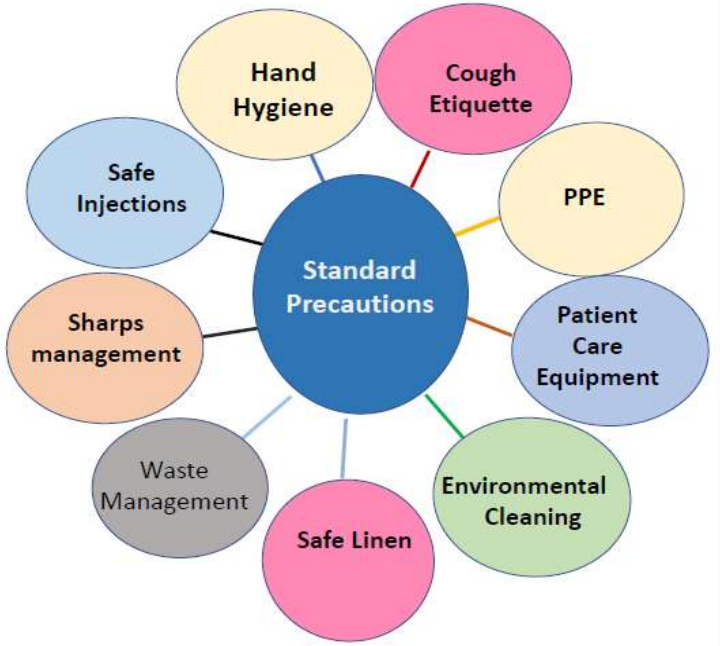




SOURCE: WORLD HEALTH ORGANIZATION

Why use PPE?

- A major component of Standard Precautions (CDC, 2020)
- The mucous membranes of the mouth, nose, and eyes are susceptible portals of entry for infectious agents
- Masks typically protect from contact with infectious material from patients



Rules & Principles about the use of PPE

- PPE can be a transmitter of microbes when contaminated.
- The use of PPE without clinical indication can sometimes increase the risk of infection
- Not a substitute for poor infection control practice (including engineering) or nursing procedure
- All PPE have a limited life and must be discarded after use as indicated, usually after each patient use

Rules & Principles for using PPE cont.

- Always clean your hands before and after wearing PPE
- PPE should be available where and when it is indicated
- Always put on before contact with the patient’s body fluid/or when patient has contact precaution

Rules & Principles for using PPE cont.

- Always remove immediately after completing the task and/or leaving the patient care area
- NEVER reuse disposable PPE
- Clean and disinfect reusable PPE between each use
- Training and demonstrated competency in putting on and removing personal protective equipment (PPE).

Optimizing the use of PPE

- PPE are scarce and expensive
- The use should be motivated by need, and not fear
- We need to use them rationally
- Minimizing the need for PPE is the best option

Administrative Controls:

- Ensuring resources for infection prevention and control such as appropriate infrastructure, clear IPC policies, access to laboratory testing, appropriate triage and placement of patients, separate waiting areas/rooms dedicated to patients with respiratory symptoms
- Adequate staff-to-patient ratios, and training of staff.
- Policies and procedures based on sound epidemiology and best practice
- Establish differential pathways that avoid mixing suspected and confirmed case with other patients

Environmental & Engineering Controls

- The purpose is to reduce the spread of pathogens and the contamination of surfaces and inanimate objects.
- Providing adequate space to allow social distance of at least 1.5 m to be maintained between patients and health care workers and ensuring the availability of well-ventilated isolation rooms for patients with suspected or confirmed COVID-19,
- Adequate environmental cleaning and disinfection.

Minimize the need for PPE in health care settings

- Wherever feasible, use telemedicine and telephone hotlines to initially evaluate suspected cases of COVID-195, thus minimizing the need for these persons to go to health care facilities for evaluation.

- Use physical barriers to reduce exposure to the COVID-19 virus, such as glass or plastic windows. This approach can be implemented in areas of the health care setting where patients will first present, such as triage and screening areas, the registration desk at the emergency department, or at the pharmacy window where medication is collected.

Minimize the need for PPE in health care settings cont.

- Postpone elective, non-urgent procedure, and hospitalizations, reduce frequency of visits for chronic patients, apply telemedicine and telephone solutions where possible so that health care workers, wards, and PPE can be redistributed to services in which COVID-19 patients receive care.
- Cohort confirmed COVID-19 patients without co-infection with other transmissible microorganisms in the same room in order to streamline the workflow and facilitate extended use of PPE (see below).
- Designate dedicated health care workers/teams only for COVID-19 patient care so that they can use PPE for longer periods of time (extended use of PPE), if necessary (see considerations section below for details).

Minimize the need for PPE in health care settings cont.

- Restrict the number of health care workers and visitors from entering the rooms of COVID-19 patients if they are not involved in providing direct care.
- Streamline the workflow and reduce to a safe level care that requires face-to-face interaction between health worker and patient.
- Consider bundling activities to minimize the number of times a room is entered (e.g. check vital signs during medication administration or have food delivered by health care workers while they are performing other care) and plan which activities will be performed at the bedside.

Minimize the need for PPE in health care settings cont.

- Consider using specific PPE only if in direct close contact with the patient or when touching the environment (e.g. wearing a medical mask and face shield, not using gloves or gown over the scrub suit, if entering the patient's room only to ask questions or make visual checks).
- Visitors should not be allowed to visit confirmed or probable COVID-19 patients, but if strictly necessary, restrict the number of visitors and the time allowed; provide clear instructions about what PPE is required to be used during the visit, about how to put on and remove PPE, and perform hand hygiene to ensure that visitors avoid exposure

Types of PPE Used in care of Covid-19 patient

- GLOVES – protect hands
- GOWNS/ APRONS – protect skin and/or clothing

- MASKS – protect mouth/nose

RESPIRATORS – protect respiratory tract from airborne infectious agents.

- GOGGLES – protect eyes
- FACE SHIELDS – protect Face (mouth, nose, and eyes)

Basic PPE for Covid -19 prevention

- Gloves: protect the hands from potentially infectious materials or contaminated surfaces.
- Gowns: protect the body from contamination with potentially infectious material.
- Head Covers; Provide a barrier against possible exposure OF the head within a contaminated environment.
- Masks and Respirators: Surgical masks protect the nose and mouth from splattered of body fluids, respirators filter the air before you inhale it.
- Face and Eye Protection: Goggles help protect only the eyes from splatters. A face shield provides splatter protection to facial skin, eyes, nose, and mouth.

Risk assessment

- The risk depends on
  - The type of procedure
  - Amount of body fluid involved
  - Duration of the procedure
  - Type of microorganisms involved

Why and When to put PPE

- Used carefully to limit spread of infections
- To be donned before entering patient room,(patient zone)
- Perform hand hygiene before donning PPE and before after removing them
- Avoid touching face and other parts of the body
- Remove and discard carefully before leaving health care zone

When to put on PPE

- Near the patient’s room(patient zone)
- Before donning PPE, it is advisable to
  - Change into scrubs,
  - Secure long hair, and
  - Remove personal items such as jewelry.

How to put on PPE

- Before handling any PPE, wash hands with soap and water or use alcohol-based hand sanitizer.
- Visually check the integrity of the equipment.
- If possible, have an observer watch you as you put on the PPE to make sure there are no breaches in technique

Correct Sequence of Putting On and Removing Personal Protective Equipment

PUTTING ON Personal Protective Equipment

1. Perform hand hygiene 
2. PUT ON gown 
3. PUT ON mask or N95 respirator 

4. PUT ON eye protection 
5. PUT ON gloves 

REMOVING Personal Protective Equipment

1. REMOVE gloves 
2. REMOVE gown 
3. Perform hand hygiene 
4. REMOVE eye protection 
5. REMOVE mask or N95 respirator 

6. Perform hand hygiene 

Sequence of donning PPE

- Purpose if to avoid contaminating them
  1. Hand hygiene
  2. Gown
  3. Mask
  4. Goggles or face shield
  5. Gloves

Sequence of removing(doffing) PPE

- Purpose is to avoid contaminating self

1. Gloves
2. Hand hygiene
3. Face shield or goggles
4. Gown
5. Mask or respirator

How to perform a particulate respirator seal check

Step 5

-Cover the front of the respiratory with both hands, being careful not to disturb the position of the respirator

Step 5a: Positive seal check

-**Exhale sharply.** Positive pressure inside the respirator= no leakage. If leakage, adjust the position and/or tension of the straps and retest

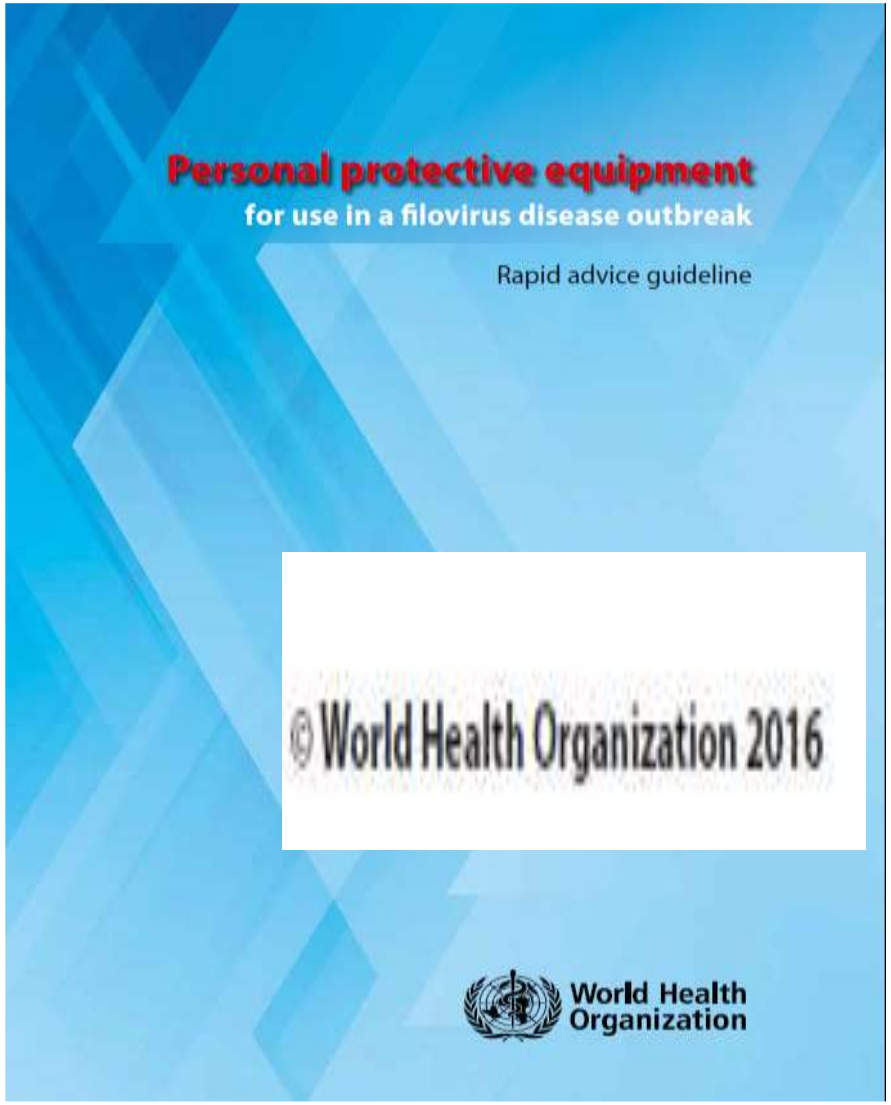
-Repeat until the respirator is secured properly

Step 5b: Negative seal check

-**Inhale deeply.** If no leakage, a negative pressure will make respirator cling to your face

Leakage will result in air entering through gaps in seal

Technical Guidance for PPE



Technical specifications_ Gloves

- Made of well-established materials
- Must be validated as sterile – with Sterility Assurance Level (SAL) of 10^{-6}
- Should have long cuffs, reaching well above the wrist
- Must be labelled STERILE along with the method of sterilisation
- Gloves containing latex must be labelled with the symbol for latex.
- Must have an expiry date
- Must specify the size

Technical specifications_ Goggles

- Good seal
- Cover eyes and surrounding areas,
- Adjustable band
- Sufficient visibility
- Fog- and scratch-resistant
- No discomfort to the health worker (e.g.flexible frame).

Technical specifications_ Face Shield

- Made of clear plastic and provides good visibility
- Adjustable band to allow good fit
- Fog resistant
- Completely cover the sides and length of face
- May be reusable

Shape of Face shield

- Should follow the shape of the face for maximum protection

Technical specifications_ Surgical or Medical Masks

- High fluid resistant
- Good breathability
- Internal and external faces should be clearly identified
- Should not collapse through the month as the user breathes

Technical specifications_ Particulate Mask (N95)

- For aerosol generating activities
- Fluid resistant
- High filtration efficiency **of 95% or above**
- Should not collapse easily
- Good breathability

Technical specifications_ Gown

- Single use
- Fluid resistant
- Mid-calf length
- Light colors to allow for detection of possible contamination
- Thumb or finger loops to anchor sleeves

Cloth Masks

- ARE NOT PPE
- African countries are moving to make masks mandatory (Mehtar et al, 2020)
- Intended to keep the person wearing one from spreading respiratory secretions when talking, sneezing, or coughing
- Should be made of at least 2-3 layers
- Should cover the nose and the mouth, extending to the chin
- Community sensitization should be considered

Community gloving

- Seen in some countries
- Unacceptable
  - Gives a false impression of safety
  - Compromises hand hygiene
  - May contributes to spread

Key Points

- PPE is meant to protect the user from contamination
- If not used properly may serve as a means of transmission
- Correct sequence of donning and doffing is critical for its safety
- Training and return demonstration is necessary
- Community masking may be promoted, (in situation where physical distancing is impossible), along side other preventive measures
- Education and sensitization should be strongly considered

Challenges/way forward

- Limited supply of PPE
- Cost of PPE
- Abusive use in some cases
- Fragile looking PPE
- Poor compliance to use

Acknowledgements

- Infection Control African Network(ICAN)
- African Center for Disease Control and Prevention (ACDC)

References

- Mehtar, Blumberg & Mendelson. (2020). *African countries are moving to make masks mandatory: key questions answered. Available at* **https://theconversation.com/african-countries-are-moving-to-make-masks-mandatory-key-questions-answered-137516. Retrieved on May 5, 2020**
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