

# Use of PPE in Response of Public Health Emergency of International Concern

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# Outline of presentation



- To provide information on the use of PPE in implementation of IHR and disease surveillance at POE
- To demonstrate how to safely don, use and remove PPE
- To provide information on disinfection with chlorine solution

# Objective of PoEs Surveillance



- To prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade

# Objective of using of PPE in IHR Implementation



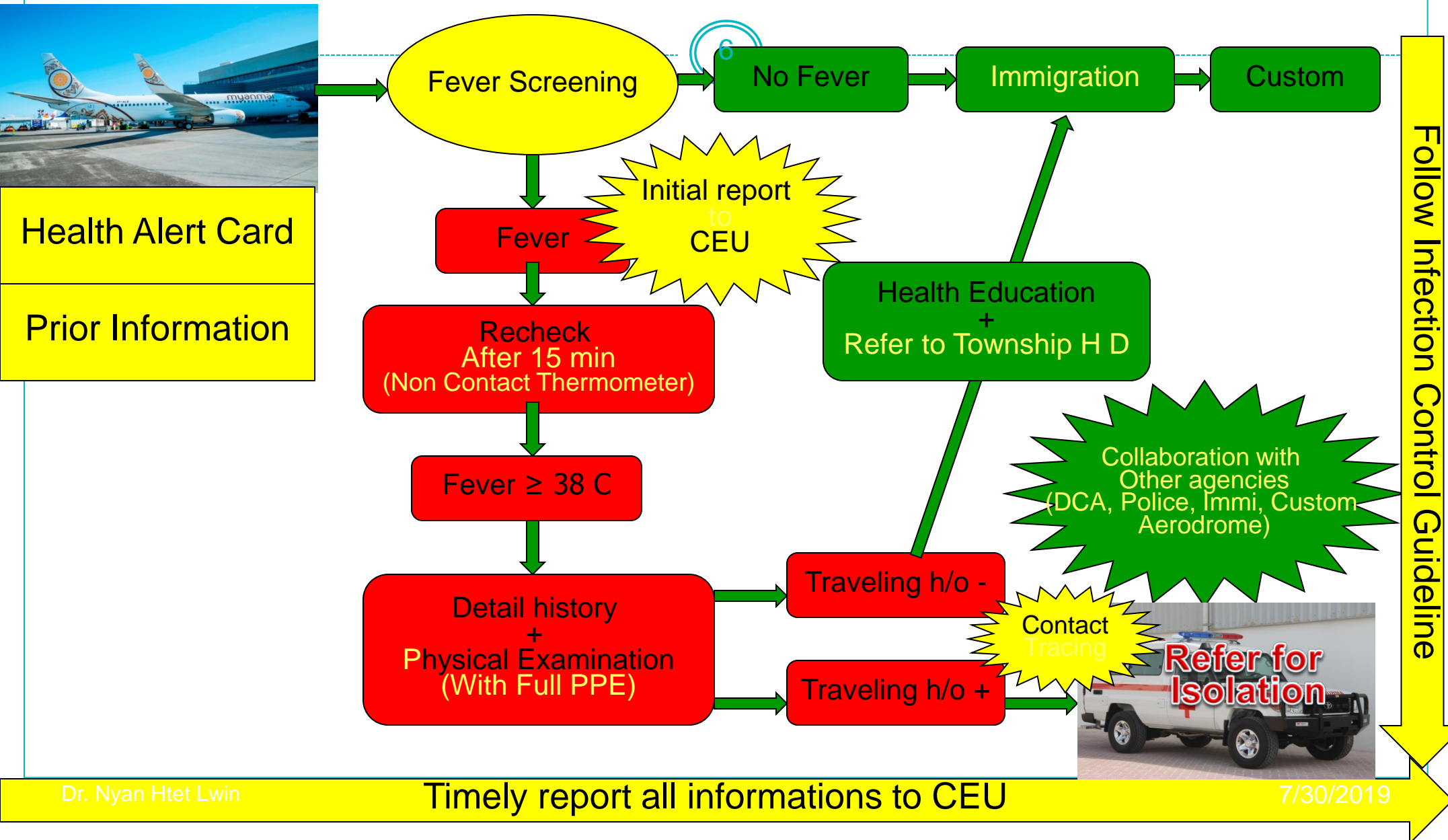
- To improve personnel safety and prevent further spread of diseases in implementation of IHR and disease surveillance at POE through appropriate use of PPE

# Definition of PPE

“specialized clothing or equipment worn by an employee for protection against infectious materials”

(Occupational Safety and Health Administration OSHA)

# SOP for Disease Surveillance in International Airport



# Types of PPE

# Types of PPE

➤ Gloves

➤ Boot and Shoe Cover

➤ Gowns

➤ Apron

➤ Cap

➤ Masks

➤ Respirators

➤ Goggles

➤ Face shields



# Types of PPE

## Gloves

- protect hands
- Work from “clean to dirty”
- Limit opportunities for “touch contamination”
  - protect yourself, others, and the environment
  - Don't touch your face or adjust PPE with contaminated gloves
  - Don't touch environmental surfaces except as necessary during patient care

# Types of PPE

## Gloves

- Change gloves
  - During use if torn and when heavily soiled (even during use on the same patient)
  - After use on each patient
- Discard in appropriate receptacle
  - Never wash or reuse disposable gloves

# Types of PPE

## Gowns

- Protect skin and/or clothing

## Apron

- Waterproof apron prevents fluid penetration

## Boot and Shoe Cover

- Prevents fluid penetration and contamination

# Types of PPE

## Masks

- Protect nose and mouth
- Should fully cover nose and mouth and prevent fluid penetration

# Types of PPE

## Respirators

- Protect mouth/nose
- Protect respiratory tract from airborne infectious agents  
(e.g., *Mycobacterium tuberculosis*)
- PPE types for respiratory protection
  - Particulate respirators
  - Half- or full-face elastomeric respirators
  - Powered air purifying respirators (PAPR)

# Types of PPE

## Respirators

- The most commonly used respirators are N95, N99, or N100 particulate respirators.
- The device has a sub-micron filter capable of excluding particles that are less than 5 microns in diameter.

# Types of PPE

## Goggles

- Protect eyes
- Should fit snugly over and around eyes
- Personal glasses not a substitute for goggles
- Antifog feature improves clarity

# Types of PPE

## Face shields

- Protect face, nose, mouth, and eyes
- Should cover forehead, extend below chin and wrap around side of face



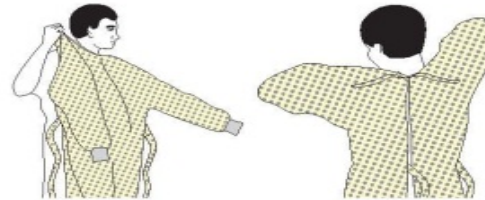
# How to Safely Don, Use and Remove PPE

## SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

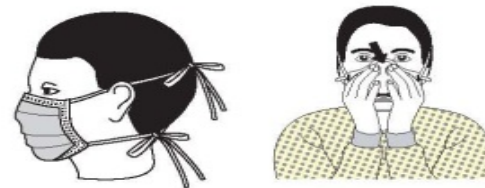
### 1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



### 2. MASK OR RESPIRATOR

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator



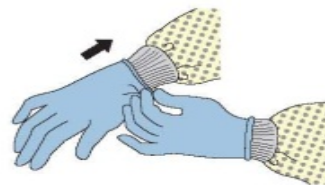
### 3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit



### 4. GLOVES

- Extend to cover wrist of isolation gown



## USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene



For more detail on PPE for Health Care Workers, please visit:

<http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html>

Source:

<http://www.cdc.gov/vhf/ebola/pdf/ppe-poster.pdf> Accessed Oct. 14, 2014

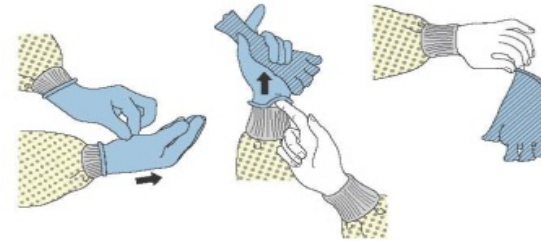
# HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE)

## EXAMPLE 1

There are a variety of ways to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. Here is one example. **Remove all PPE before exiting the patient room** except a respirator, if worn. Remove the respirator **after** leaving the patient room and closing the door. Remove PPE in the following sequence:

### 1. GLOVES

- Outside of gloves are contaminated!
- If your hands get contaminated during glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Using a gloved hand, grasp the palm area of the other gloved hand and peel off first glove
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist and peel off second glove over first glove
- Discard gloves in an infectious\* waste container



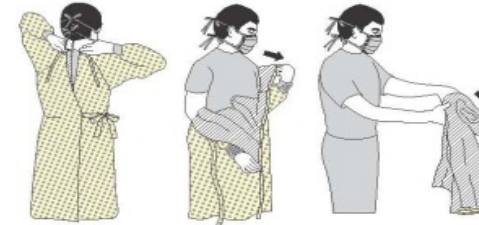
### 2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield are contaminated!
- If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Remove goggles or face shield from the back by lifting head band or ear pieces
- If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in an infectious\* waste container



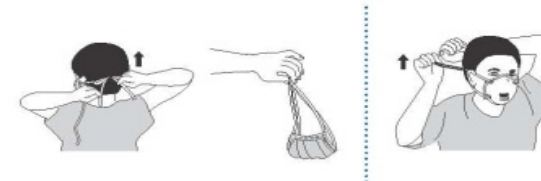
### 3. GOWN

- Gown front and sleeves are contaminated!
- If your hands get contaminated during gown removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Unfasten gown ties, taking care that sleeves don't contact your body when reaching for ties
- Pull gown away from neck and shoulders, touching inside of gown only
- Turn gown inside out
- Fold or roll into a bundle and discard in an infectious\* waste container



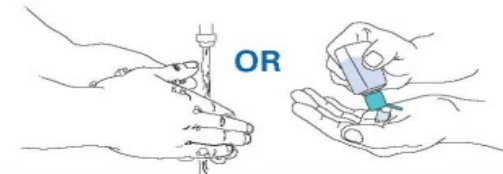
### 4. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — DO NOT TOUCH!
- If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front
- Discard in an infectious\* waste container



### 5. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE

\* An infectious waste container is used to dispose of PPE that is potentially contaminated with Ebola virus.



**PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE**



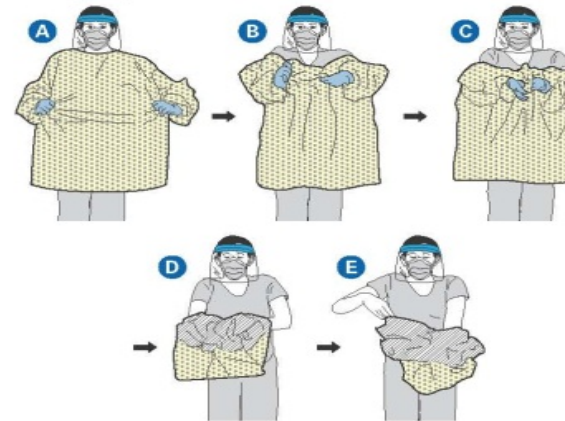


## HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE) EXAMPLE 2

Here is another way to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. **Remove all PPE before exiting the patient room** except a respirator, if worn. Remove the respirator **after** leaving the patient room and closing the door. Remove PPE in the following sequence:

### 1. GOWN AND GLOVES

- Gown front and sleeves and the outside of gloves are contaminated!
- If your hands get contaminated during gown or glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp the gown in the front and pull away from your body so that the ties break, touching outside of gown only with gloved hands
- While removing the gown, fold or roll the gown inside-out into a bundle
- As you are removing the gown, peel off your gloves at the same time, only touching the inside of the gloves and gown with your bare hands. Place the gown and gloves into an infectious\* waste container



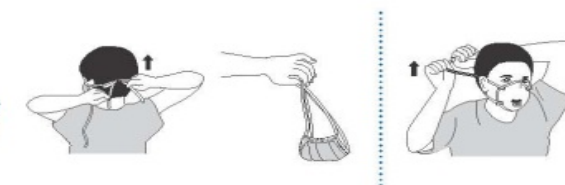
### 2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield are contaminated!
- If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Remove goggles or face shield from the back by lifting head band and without touching the front of the goggles or face shield
- If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in an infectious\* waste container

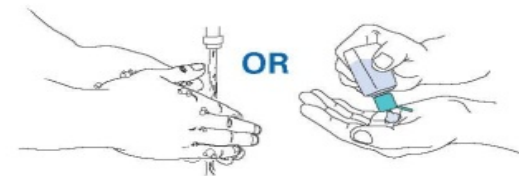


### 3. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — **DO NOT TOUCH!**
- If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front
- Discard in an infectious\* waste container



### 4. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE



\* An infectious waste container is used to dispose of PPE that is potentially contaminated with Ebola virus.

**PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS  
BECOME CONTAMINATED AND IMMEDIATELY AFTER  
REMOVING ALL PPE**



## Key Points

- ❖ Don before contact with the patient, generally before entering the room
- ❖ Use carefully – don't spread contamination
- ❖ Remove and discard carefully, either at the doorway or immediately outside patient room; remove respirator outside room
- ❖ Immediately perform hand hygiene

# How to safely don PPE

# How to safely don PPE

## Preparation

- Ensure to take off hand chain, watch, rings and ear rings
- Tie long hair neatly
- Check the PPEs
- Ensure that hand hygiene facilities are available at the point needed, e.g., sink or alcohol-based hand rub

# How to safely don PPE

## Hand Hygiene

- Perform hand hygiene before donning PPE.
- Wash hands with soap and water or use an alcohol-based hand rub



# How to safely don PPE

## Sequence for Donning PPE

- Gown
- Mask (or) Respirator
- Goggles (or) Face Shield
- Gloves

**\* Combination of PPE will affect sequence – BE PRACTICAL !**

# How to safely don PPE

## Gown

- Select appropriate type and size
- Opening is in the back/ front
- Secure at neck and waist
- If gown is too small, use two gowns
  - Gown #1 ties in front
  - Gown #2 ties in back



# How to safely don PPE

## Mask

- Place over nose, mouth and chin
- Fit flexible nose piece over nose bridge
- Secure on head with ties or elastic
- Adjust to fit



# How to safely don PPE

## Particulate Respirator

- Select a fit tested respirator
- Place over nose, mouth and chin
- Fit flexible nose piece  
over nose bridge
- Secure on head with elastic
- Adjust to fit



# How to safely don PPE

## Particulate Respirator

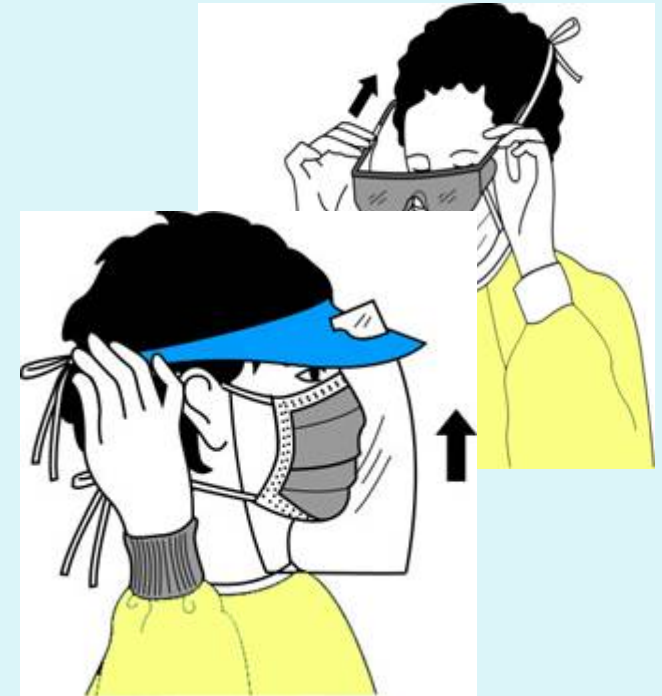
- Perform a fit check
  - Inhale – respirator should collapse
  - Exhale – check for leakage around face



# How to safely don PPE

## Eye and Face Protection

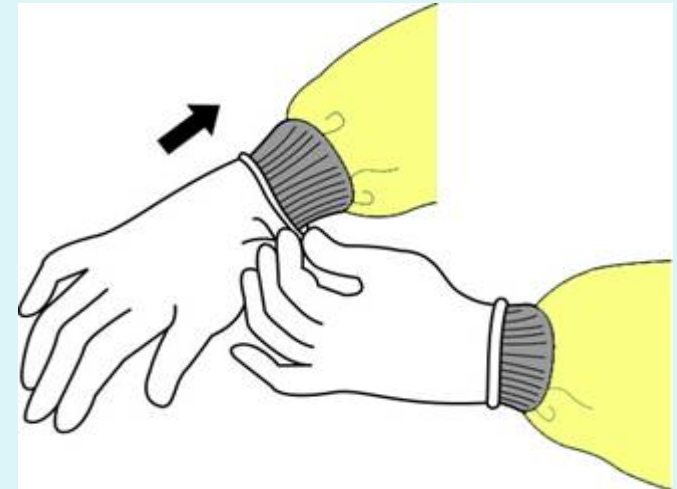
- Position goggles over eyes and secure to the head using the ear pieces or headband
- Position face shield over face and secure on brow with headband
- Adjust to fit comfortably



# How to safely don PPE

## Gloves

- Don gloves last
- Select correct type and size
- Insert hands into gloves
- Extend gloves over isolation gown cuffs



# How to safely don PPE

## Apron

- Wear waterproof apron over gown if an impermeable gown is not available





# How to safely use PPE

# How to safely use PPE

- Keep gloved hands away from face
- Avoid touching or adjusting other PPE
- Remove gloves if they become torn; perform hand hygiene before donning new gloves
- Limit surfaces and items touched

# How to safely remove PPE

# How to safely remove PPE

## “Contaminated” and “Clean” Areas of PPE

### ➤ **Contaminated** – outside front

- Areas of PPE that have or are likely to have been in contact with body sites, materials, or environmental surfaces where the infectious organism may reside

### ➤ **Clean** – inside, outside back, ties on head and back

- Areas of PPE that are not likely to have been in contact with the infectious organism

# How to safely remove PPE

## Key Points

- Remove the most heavily-contaminated items first
- Be careful to avoid any contact between the soiled items and any area of the face or non-intact skin when taking off PPE

# How to safely remove PPE

## Sequence for Removing PPE

- Gloves
- Gown
- Face shield (or) Goggles
- Mask (or) Respirator

# How to safely remove PPE

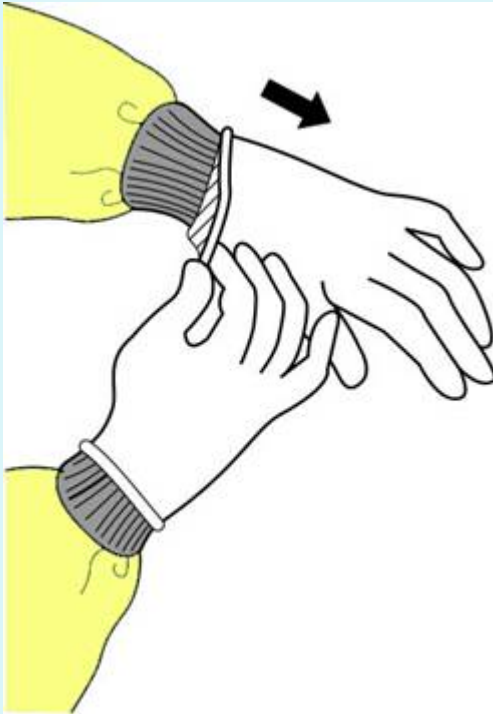
## Where to Remove PPE

- At doorway, before leaving patient room or in anteroom
- Remove respirator outside room, after door has been closed

\*Ensure that hand hygiene facilities are available at the point needed, e.g., sink or alcohol-based hand rub

# How to safely remove PPE

## Gloves

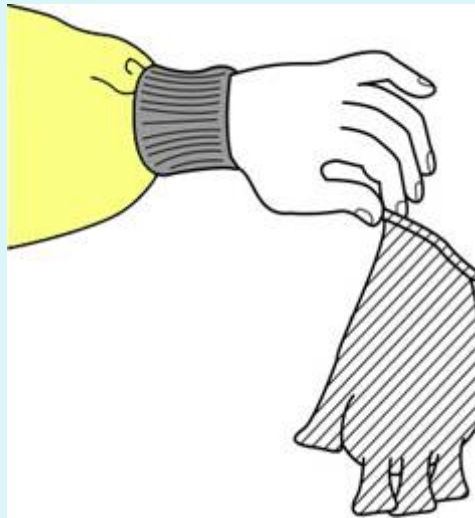


- Grasp outside edge near wrist
- Peel away from hand, turning glove inside-out
- Hold in opposite gloved hand



# How to safely remove PPE

## Gloves



- Slide ungloved finger under the wrist of the remaining glove
- Peel off from inside, creating a bag for both gloves
- Discard

# How to safely remove PPE



## Gown

- Unfasten ties
- Peel gown away from neck and shoulder
- Turn contaminated outside toward the inside
- Fold or roll into a bundle
- Discard



# How to safely remove PPE

## Goggles (or) Face Shield



- Grasp ear or head pieces with ungloved hands  
(A new disposable glove can be used)
- Lift away from face
- Place in designated receptacle for reprocessing or disposal

# How to safely remove PPE



## Mask

- Untie the bottom, then top, tie
- Remove from face
- Discard



# How to safely remove PPE

## Particulate Respirator



- Lift the bottom elastic over your head first
- Then lift off the top elastic
- Discard

# How to safely remove PPE

## Hand Hygiene

- Perform hand hygiene immediately after removing PPE.
- If hands become visibly contaminated during PPE removal, wash hands before continuing to remove PPE
- Wash hands with soap and water or use an alcohol-based hand rub

# Chlorine Solution



***"The virus can be eliminated with hypochlorite (chlorine bleach) at appropriate concentrations.***

***Correctly mixed and applied, chlorine solutions will damage pathogens on personal protective equipment (PPE) and other surfaces so that it can no longer infect patients and healthcare workers"***

## **Key Points**

- Mixing and using chlorine solution correctly can save lives by preventing pathogens from spreading.
- Chlorine solutions that are correctly mixed and applied will damage the pathogens and help prevent infection.
- Strong (0.5%) solution includes a higher concentration of HTH\* (High Test Hypochlorite) chlorine that can be used for disinfecting floors and surfaces, medical equipment, bedding, and gloved hands.
- Mild (0.05%) solution can also be used for washing hands and to disinfect other things that have been used by healthcare workers or patients infected with EVD.

# Strong (0.5%) Chlorine Solution



- **Strong solution (0.5%)** includes a higher concentration of HTH\* (High Test Hypochlorite) chlorine that can be used for disinfecting surfaces, objects, medical equipment, and gloved hands. Other uses include Floors: Use a rag soaked in 0.5% solution to carefully clean up any body fluids. Then follow up with soap and water. If there is a lot of fluid, use a rag or towel to wipe up the fluid before using the chlorine solution followed by soap and water.
- **Toilets and bathroom:** Let chlorine solution stand on surface for 15 minutes before wiping off
- **Mattress covers:** Let chlorine solution stand on surface for 15 minutes before wiping off
- **Foot baths**
- **Contaminated waste for disposal**
- **Corpses:** Wipe body, body bag, and coffin
- **Layers of packaging for transporting blood samples:** Spray each layer before packing into the next layer



# Mild (0.05%) Chlorine Solution



- **Mild solution (0.05%)** is a more gentle solution of HTH\* chlorine that can be used for washing bare hands in settings where other methods, such as soap and running water or alcohol-based hand rubs, are not available or cannot be used. **Warning: Washing bare hands with the strong solution (0.5%) can cause chlorine burns on hands.** Mild solution can also be used to disinfect other things that come into direct contact with the skin or body, including

- **Medical equipment, including thermometers**
- **Patient bedding and clothing that is not visibly soiled:** Soak in warm water and soap, then empty the drum of clothing and solution, and refill with mild chlorine solution. Soak in chlorine solution for 30 minutes.
- **Plates, cups, and eating utensils**
- **Everyday cleaning of surfaces and floors when there is no visible body fluids**

*\***High Test Hypochlorite** (HTH) chlorinating granules (also known as Calcium Hypochloride, or*

*CaOCl, or High Test Chlorine) can be carefully mixed with water to create some types of chlorine solutions used for cleaning or handwashing to protect against Ebola virus.*

# How to Make Strong (0.5%) Chlorine Solution from 70% Chlorine Powder

Use strong (0.5%) chlorine solution to clean and disinfect surfaces, objects, and body fluid spills.

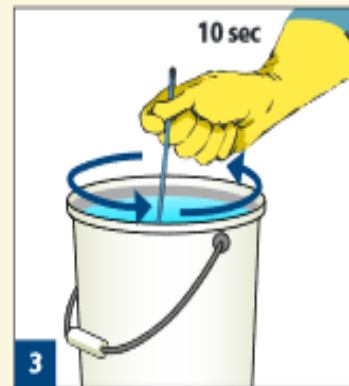
**Make new strong (0.5%) chlorine solution every day.** Throw away any leftover solution from the day before.



Make sure you are wearing **extended PPE**.



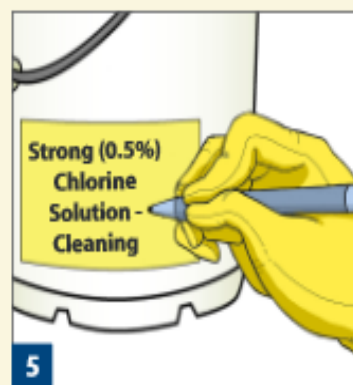
Add 10 tablespoons of HTH (70% chlorine) to 20 liters of water in a bucket.



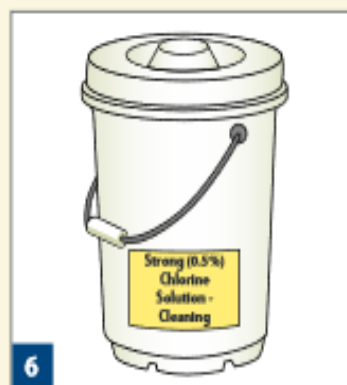
Stir well for 10 seconds, or until the HTH has dissolved.



Wait 30 minutes before use.



Label bucket "**Strong (0.5%) Chlorine Solution - Cleaning.**"



Cover bucket with lid.



Store in shade. Do not store in direct sunlight.



# How to Make Strong (0.5%) Chlorine Solution from Liquid Bleach

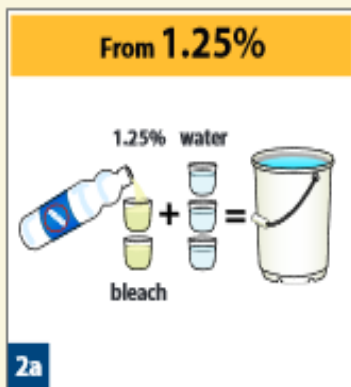
Use strong (0.5%) chlorine solution to clean and disinfect surfaces, objects, and body fluid spills.

**Make new strong (0.5%) chlorine solution every day.** Throw away any leftover solution from the day before.



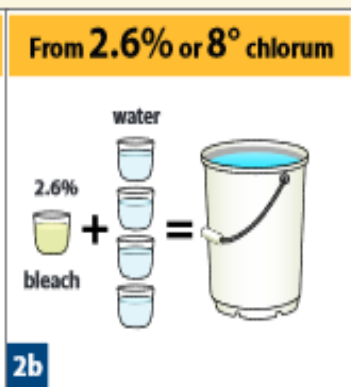
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Make sure you are wearing **extended PPE**.



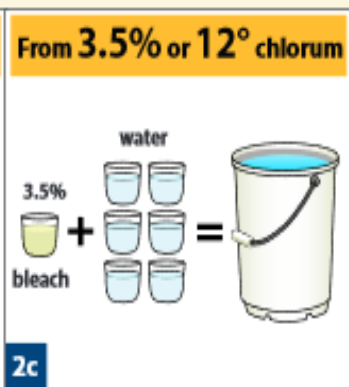
2a

Pour 2 parts liquid bleach and 3 parts water into a bucket. Repeat until full.



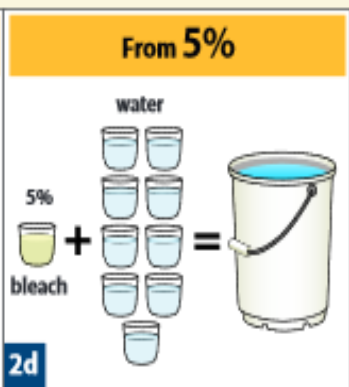
2b

Pour 1 part liquid bleach and 4 parts water into a bucket. Repeat until full.



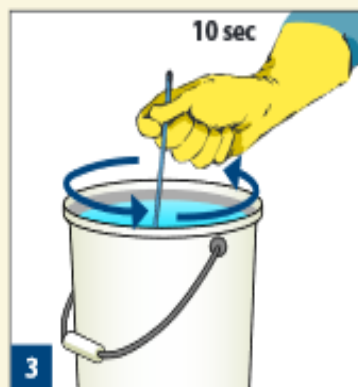
2c

Pour 1 part liquid bleach and 6 parts water into a bucket. Repeat until full.



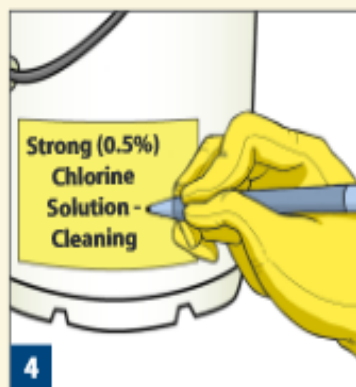
2d

Pour 1 part liquid bleach and 9 parts water into a bucket. Repeat until full.



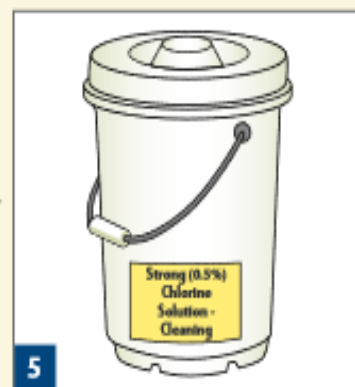
3

Stir well for 10 seconds.



4

Label bucket "**Strong (0.5%) Chlorine Solution - Cleaning.**"



5

Cover bucket with lid.



6

Store in shade. Do not store in direct sunlight.



## WARNING

Do NOT drink chlorine water.  
Do NOT put chlorine water in mouth or eyes.



# How to Make Mild (0.05%) Chlorine Solution

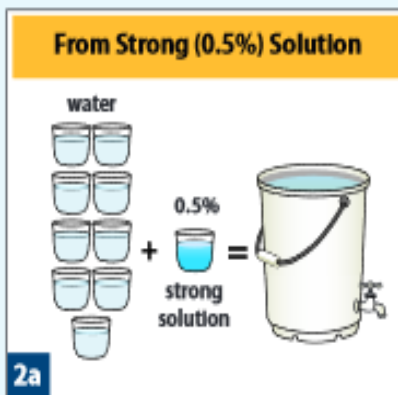
Use mild (0.05%) chlorine solution to wash ungloved hands.

**Make new mild (0.05%) chlorine solution every day.** Throw away any leftover solution from the day before.



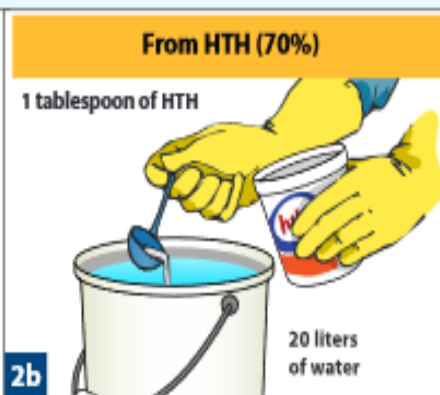
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Make sure you are wearing **extended PPE**.



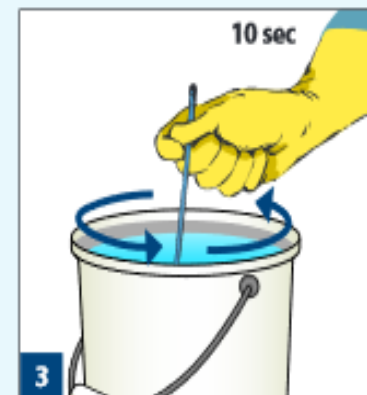
2a

Pour 9 parts water and 1 part strong (0.5%) solution into a bucket. Repeat until full.



2b

Add one tablespoon of HTH (70%) to 20 Liters of water in a bucket.



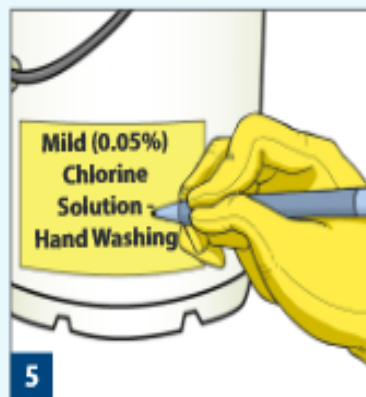
3

Stir well for 10 seconds, or until the HTH has dissolved



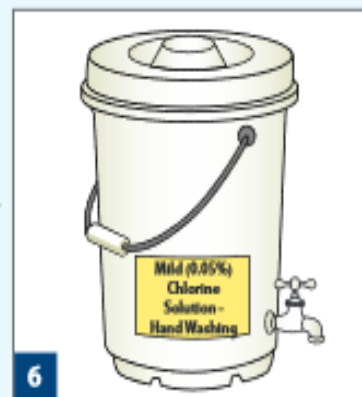
4

Wait 30 minutes before use.



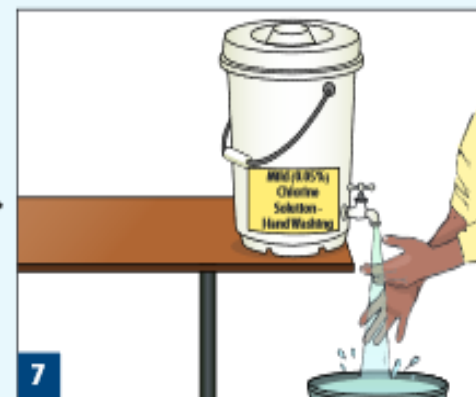
5

Label bucket "**Mild (0.05%) Chlorine Solution - Hand Washing.**"



6

Cover bucket with lid.



7

Place at hand washing stations.



Tablespoon



Measuring cup or liter bottle



Bucket with lid and spigot



Water



70% HTH

Stick for stirring



Label



**WARNING**

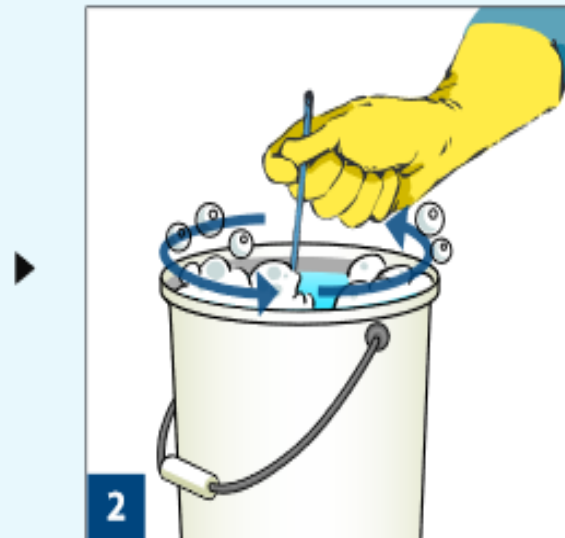
Do NOT drink chlorine water.  
Do NOT put chlorine water in mouth or eyes.

# How to Make Soapy Water

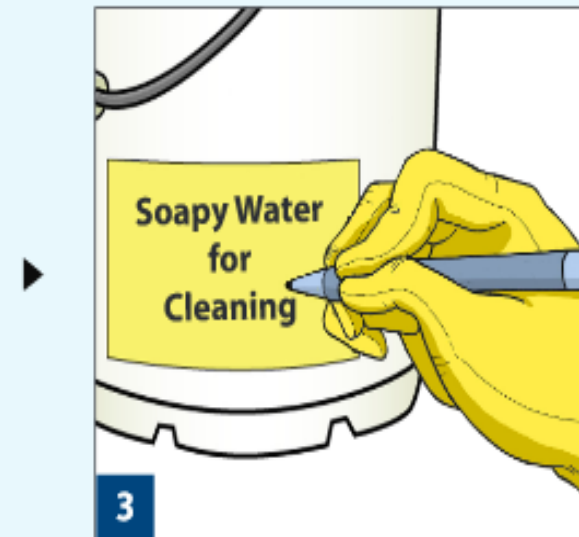
Use soapy water to clean and disinfect surfaces, objects, and body fluid spills.  
**Make new soapy water every day.** Throw away any leftover solution from the day before.



Add 5 tablespoons of soap powder to 20 liters of water in a bucket.



Stir well until suds form.



Label bucket "Soapy Water for Cleaning."



Powder soap or  
powdered laundry  
detergent



Bucket  
with lid



Water



Stick for stirring



Label

Supplies Needed



Thank You