Pandemic influenza preparedness and mitigation in refugee and displaced populations
WHO training modules for humanitarian agencies

Module 4
Infection prevention and control

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Objectives

- Understand how to prevent infection in health facilities and in the home
- Understand specific measures to take for patients, caregivers, health and other essential staff
- Understand that a risk assessment must be performed to determine PPE usage
- Practise the use and disposal of gloves and masks
- Practise hand washing
- Understand how to manage waste and how to handle the deceased

Actions to prevent infection

1. **Cover coughs and sneezes**

   (everyone, always)

2. **Distancing / separation**

   (everyone, always)

3. **Hand hygiene**

   (everyone, always)

4. **Personal protective equipment (PPE) for essential staff**
   (according to risk assessment ie what procedures or duties you are doing)

Note: PPE = masks/gloves/goggles

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Risk assessment

- Remember transmission of influenza increases if there is:
  1. **Close contact** (usually proximity < 1 metre)
  2. **Direct contact** (with infected patients then self contamination)
  3. **Indirect contact** (with surfaces/objects contaminated with virus then self contamination)
  4. **An aerosol generating procedure** (endotracheal intubation, suctioning, nasopharyngeal aspiration/swabbing)
- A **risk assessment** helps determine **what measures** should be used and **when** to use them

Control at the source

- The first priority is control at the source of infection – the patient

- A patient should cover mouth and nose, if possible with a mask or scarf, when in close contact with other people

- During a pandemic, give a surgical or procedure mask to all patients presenting to health facilities with fever/acute respiratory symptoms (cough or shortness of breath)

  – Masks do not need to be used by patients when they are alone!
  – Wearing a mask all day long is difficult and the mask gets wet.

Distancing/separation

- In the home, distance/separate the sick person from those who are well as much as possible
  - (more details on infection prevention at home on slides 7-8)
- In health facilities, separate patients with respiratory symptoms from others
  - Ensure separate waiting areas for patients with respiratory symptoms
  - identify those with fever/acute respiratory symptoms (cough or shortness of breath) before they enter waiting rooms to separate them from patients with other symptoms
  - Maximise distance between beds
  - (more details on infection prevention in health facilities on slide 9-18)

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Preventing infection at home (What the ill person should do)

- The patient should:
  - Cover mouth and nose, if possible with a tightly-fitting mask or scarf, when in close contact with other people
  - distance/separate themselves from those who are well as much as possible
  - Avoid close contact with uninfected people for at least 7 days after the beginning of flu symptoms
  - Ensure proper hand hygiene

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Preventing infection at home (what the caregiver should do)

- The caregiver should:
  - Cover their mouth and nose, with a mask (if possible) or tightly-fitting scarf tied at the back of the head.
    - Dispose of masks (if available), or wash scarf or cloth, every 4 hours or when visibly wet
  - Perform hand hygiene
  - Limit close contact with people who are not sick.
  - Facilitate air circulation (open windows or tent when climate allows)
  - Wash clothes and bed linen (and scarves) that have been in contact with the patient's respiratory secretions or stools.
    - Running water and soap should be used for washing and dry items in the sun.

Preventing infection in healthcare facilities (Key principles)

1. Distancing / separation / restriction of movement and of visitors
2. PPE: gloves, gowns, masks, eye-protection (where appropriate)
3. Hand hygiene
4. Cleaning, disinfection and sterilization
5. Waste management
6. Staff health management: Exposure prophylaxis, health monitoring
7. Discharge of patients
8. Care of the deceased

Preventing infection in healthcare facilities (1)

- Separate patients with respiratory symptoms from others
- Identify a completely separate building or structure, for use as a temporary respiratory healthcare facility (e.g. school, open tent)
  - with its own respiratory waiting room/area
  - with its own respiratory inpatient ward
- Ensure one-way flow of people
- Ensure good ventilation to encourage air flow from the facility

Preventing infection in healthcare facilities (2)

- Patients should be triaged even before they enter usual waiting rooms in health units.
  - This means identify those with fever/acute respiratory symptoms (cough or shortness of breath) to separate them from patients with other symptoms
  - Send these people to the respiratory waiting room in the separate respiratory healthcare facility
  - This can be done with signs or posters so that people with such symptoms can self-select their appropriate waiting room
  - Have a HCW monitor correct usage of waiting rooms

Preventing infection in healthcare facilities (3)

- During a pandemic, all patients coming to health facilities with fever + acute respiratory symptoms (cough or shortness of breath) must wear a tightly-fitting mask or scarf whilst in waiting areas

- Anyone in close contact with patients (1metre or less) must also wear a tightly-fitting mask or scarf .

  - Masks do not need to be worn when a person is alone!
  - Wearing a mask all day long is difficult and masks get wet!

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Preventing infection in healthcare facilities (4)

- Once respiratory patients are triaged and sent to the separate respiratory waiting area
  - Then admit only the severe cases to the respiratory inpatient facility, send other cases home with home-care instructions
- Suspend elective and non-essential medical services
- Continue essential medical services

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Preventing infection in healthcare facilities (the inpatient ward -1)

- The inpatient ward for patients with suspected influenza must be separate from other inpatient wards
- Ensure capacity for rapid expansion
  - ensure an overflow area if there is large increase in number of of patients
- Ensure as much spatial separation between patients as possible (at least 1m).
- If not possible, head-to-toe positioning to maximize separation between patients' heads

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Preventing infection in healthcare facilities (the inpatient ward - 2)

- Restrict access
- Minimize the number of entries and exits to the respiratory inpatient ward.
- Limit visitors
- 8-hour shift limit for health-care workers on duty in the respiratory inpatient ward.

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Preventing infection in healthcare facilities (the inpatient ward - 3)

- Doors closed
- If possible, open windows to encourage air flow from room.
- Clean PPE on trolley outside room
- Used PPE, other waste and used linen inside room
- Dedicated equipment
- Keep ward free of excessive equipment or furniture

Priority for PPE use in health care facilities

1. Control transmission at the **source** (the patient)

2. Protect **care givers / care providers** - people in close contact with patients

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Protecting care givers/care providers

- Respiratory etiquette / social distancing / hand hygiene
  - Everyone, always
- Masks
  - patients (source) when in close contact with others (receptors)
  - health care workers and care givers when in close contact with anyone with respiratory symptoms
  - other essential staff – when in close contact with anyone with respiratory symptoms
- PPE (gloves/gowns/aprons/eye protection)
  - essential staff only and when…
  - performing procedures (specialised medical, cleaning, burials) where eyes, hands or clothes could get contaminated with respiratory secretions.
  - use **protection items according to risk**, as shown in following tables.

Precautions for staff working in health care facilities

	Aerosol generating procedures	*Inpatient ward health worker*	*Outpatient health worker*	*Health unit non-health staff*	*Burial and cleaning staff***
Respiratory etiquette	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Social distance	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Hand Hygiene	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Gloves	*Yes*	*Yes*	*acc. to risk*	*acc. to risk*	*heavy duty*
Apron	*Yes*	*acc. to risk**	*No*	*acc. to risk*	*Yes*
Gown	*Yes*	*Yes*	*No*	*acc. to risk*	*Yes*
Hair cover	*Yes*	*No*	*No*	*No*	*No*
Surgical mask	*No*	*Yes*	*Yes*	*acc. to risk*	*Yes*
*Particulate respirator****	*Yes*	*No*	*No*	*No*	*No*
Eye protection	*Yes*	*Yes*	*No*	*No*	*No*
Surgical mask on patient	*No*	*acc. to risk*	*acc. to risk*	*acc. to risk*	*No*

* ***According to risk***: when transmission is possible because there is a source and a receptor. **Example**, when patients (the source) are alone, there is no "receptor" so they do not need to wear a mask. When non-health staff are not in close contact with patients, they do not need to wear a mask. Gloves, aprons or gowns may be necessary when performing procedures (including cleaning) where hands or clothes will get contaminated with respiratory secretions.

** Burial and cleaning staff should also wear impermeable heavy duty boots and gloves.

*** Special masks to be used according to manufacturer's specifications

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Precautions for communities and essential staff working in communities

	Community health worker	*Distributor of essential services*	*Home care giver*	*Patient*	*Family and community*
Respiratory etiquette	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Social distance	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Hand Hygiene	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Gloves	*No*	*No*	*No*	*No*	*No*
Apron	*No*	*No*	*No*	*No*	*No*
Gown	*No*	*No*	*No*	*No*	*No*
Hair cover	*No*	*No*	*No*	*No*	*No*
Surgical mask	*acc. to risk**	*acc. to risk*	*acc. to risk*	*acc. to risk*	*acc. to risk*
*Particulate respirator***	*No*	*No*	*No*	*No*	*No*
Eye protection	*No*	*No*	*No*	*No*	*No*
Surgical mask on patient	*acc. to risk*	*acc. to risk*	*acc. to risk*	*-*	*acc. to risk*

* ***According to risk***: where transmission is possible because there is close contact between a source and a receptor. **Example**, When patients are alone there is no receptor so they do not need to use a mask. People should maintain distance from others or at least cover their mouth and nose with a tightly-fitting mask (surgical or made of cloth) or scarf during a pandemic when near anyone with respiratory symptoms to prevent infection.

** Special masks to be used according to manufacturer's specifications

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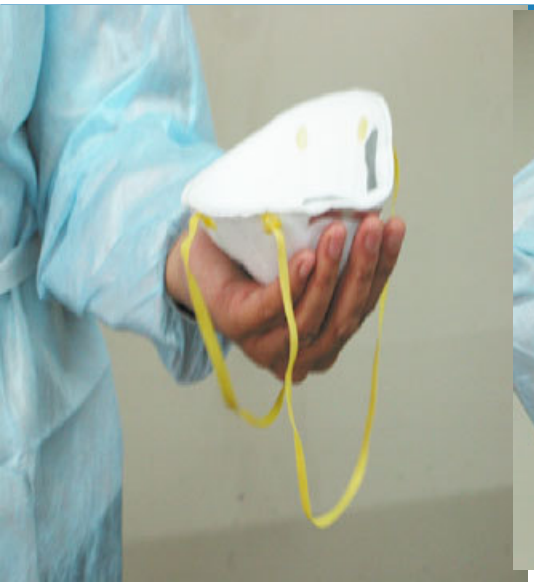
Masks (1)

- Health-care workers who have direct close contact with influenza patients should wear a particulate respirator* if available or a tightly-fitting surgical mask and eye protection
  - or a tightly-fitting scarf or a piece of cloth over the nose and mouth, if masks are unavailable

  *special masks that should be used according to manufacturer's specifications

- Masks, if worn and disposed of properly, are likely to be the most effective **PPE** intervention (ie out of gloves, aprons, gowns, goggles)

Putting on a mask



Cup mask in your hand with the nosepiece at your fingertips allowing the headbands to hang freely below your hand.

Position mask under your chin with the nosepiece up.

Pull top strap over your head resting it high at the top back of your head.

Pull the bottom strap over your head and position it around the neck below ears.

Place fingertips of both hands at top of the metal nosepiece. Mould nosepiece to shape of your nose. Do not pinch nosepiece

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Masks (2)

- Any respiratory aerosol-generating procedure (suctioning, intubation, nasopharyngeal swabbing) must NOT be performed without full PPE
  - (particulate respirator and not a surgical mask, long-sleeved gown, goggle, gloves)
- Particulate respirator masks should be used as per manufacturer's instructions. They should at least have a seal check performed (see picture)

Exhale sharply. If leakage, adjust position and/or tension straps. Retest the seal.

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

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Masks (3)

- Masks should be thrown away (or scarves removed & washed)
  - when leaving isolation wards, OR
  - every 4 hours OR
  - when wet or visibly soiled
- After disposing of/removing masks/scarves, hand hygiene must be performed
- Other essential staff (without direct patient responsibilities)
  - Should also wear masks (or scarves) but
  - change masks (or scarves) twice a day, or when wet or visibly soiled.

Removing a mask

- Do NOT touch the mask itself.
- Lift the bottom elastic over your head first
- Then lift off the top elastic
- If no elastics, untie.
- Discard
- Wash hands afterwards.

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Gowns

- A new gown should be worn for every patient contact or if resources limited, for every entry into inpatient respiratory ward
- The sleeve cuff should be tucked into the gloves
- Discard immediately if visibly contaminated.

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Removing gowns

1

- *Unfasten ties*

2

- *Peel gown away from neck and shoulder*
- *Turn contaminated outside toward the inside*

3

- *Fold or roll into a bundle*
- *Discard*

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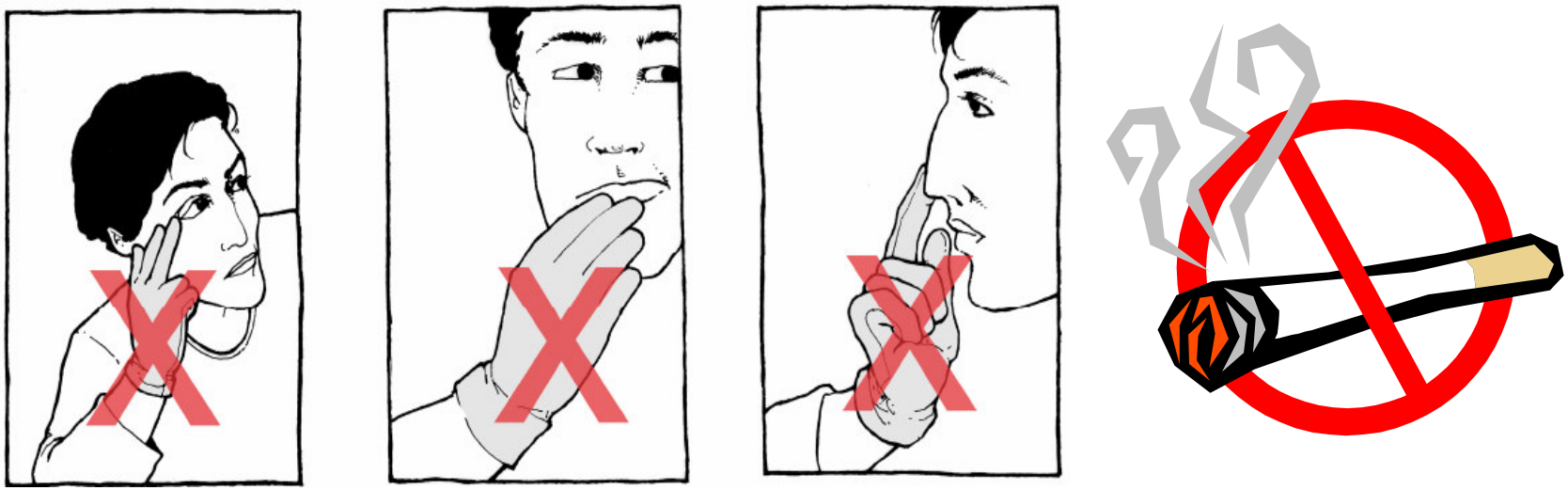
Gloves

- Gloves should be worn if contact with blood and body fluids is anticipated, but are not a substitute for hand hygiene
  - Before all patient contact
  - Before all cleaning
  - Before handling soiled linen & waste or contact with lab specimens
- Gloves must be disposed of after each use
- Dispose of gloves before exiting the inpatient ward - do not keep the gloves on outside of the patient's room
- Hands should be washed after disposal of gloves

Dos and Don’ts of PPE Use

- Protect yourself, others, and the environment
- Limit opportunities for “touch contamination”
- Avoid touching:
  - your face or mask or adjusting PPE with contaminated gloves
  - environmental surfaces except as necessary during patient care



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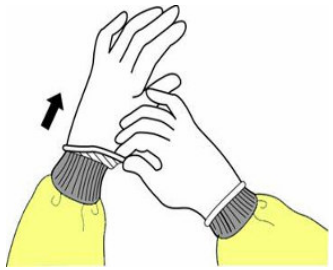
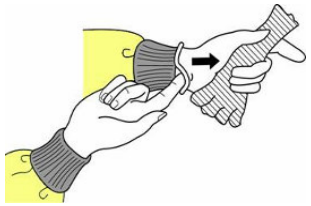
Removing gloves

1



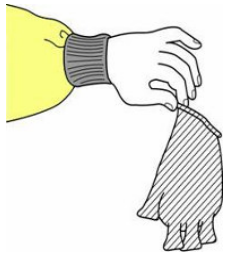
- *Grasp outside edge near wrist*
- *Peel away from hand, turning glove inside-out*
- *Hold in opposite gloved hand*

2



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

3



- *Discard*

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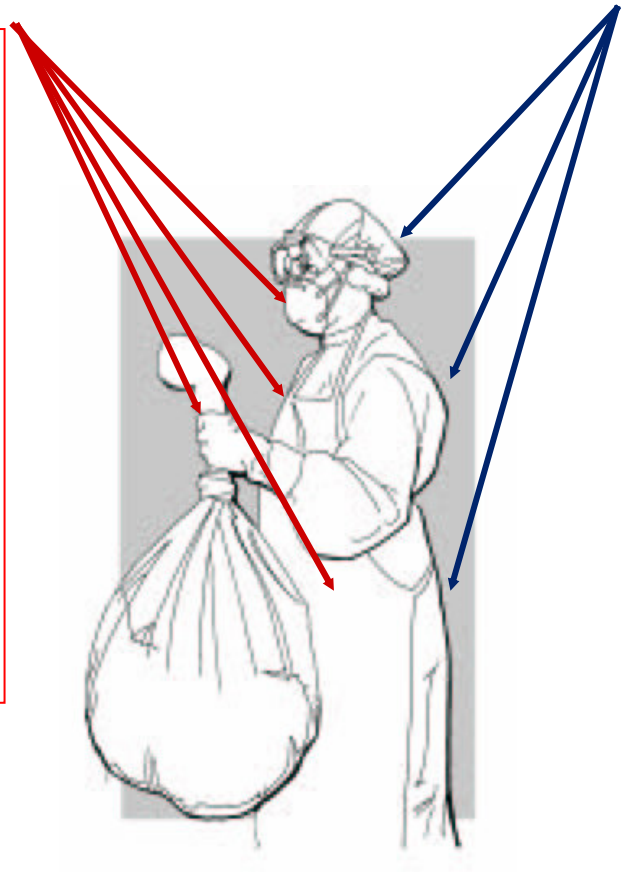
Principles for use and removal of PPE

- Outside dirty, inside clean; front dirty, back clean

- Dirty
  - Outside front
  - Contact with
    - body sites,
    - materials,
    - environmental surfaces



- Clean
  - Inside
  - Outside back
  - Ties on head and back

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Order of removal of PPE

1. Face shield / goggles
2. (Cap)
3. Apron
4. Gown
5. (Shoe Covers)
6. Gloves
7. Alcohol hand rub or wash hands
8. Mask, WITHOUT touching the front part
9. Alcohol hand rub or wash hands

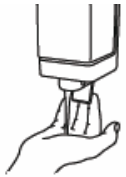
Hand hygiene

- Hand hygiene prevents the spread of many infections in a health-care facility
- Hands should be cleaned after touching people or contaminated objects or surfaces
  - Wash with soap and water or ash, rubbing for 20 seconds before rinsing
  - Rub hands with an alcohol-based preparation until hands dry

Hand hygiene with soap and water

1

Wet hands with water

2 

apply enough soap to cover all hand surfaces

3

rub hands palm to palm

4

right palm over left dorsum with interlaced fingers and vice versa

5

palm to palm with fingers interlaced

6

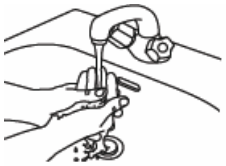
backs of fingers to opposing palms with fingers interlocked

7

rotational rubbing of left thumb clasped in right palm and vice versa

8

rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa

9 

rinse hands with water

10

dry thoroughly with a single use towel

11

use towel to turn off faucet

12

...and your hands are safe.

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Hand hygiene with alcohol–based rub

1

Apply a palmful of the product in a cupped hand and cover all surfaces.

2

Rub hands palm to palm

3

Right palm over left dorsum with interlaced fingers and vice versa

4

palm to palm with fingers interlaced

5

backs of fingers to opposing palms with fingers interlocked

6

rotational rubbing of left thumb clasped in right palm and vice versa

7

rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa

8

…once dry, your hands are safe.

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Environmental cleaning and disinfection

- **PPE** : mask (or scarf), heavy duty gloves and boots, gown, apron.
- **Clean first then disinfect**, 2 buckets – one each for washing, rinsing
- **Bleach (sodium hypochlorite) 1%** for disinfection of material contaminated with body fluids
  - Several concentrations may be marketed (e.g., 2.5%, 5%)
  - If 5% solution available, mix 1 part 5% solution with 5 parts clean water.
  - If 2.5% solution available, mix 2 parts 2.5% solution with 5 parts clean water.
- **Clean and disinfect patient areas daily**, with particular attention to frequently touched surfaces – counter tops, door handles, medical equipment.
- **Use bleaching powder** (7g/1L water ie 70% available chlorine) for disinfection of **toilets/bathrooms**
- **Clean and dry cleaning/disinfection equipment after each use**. Clean and disinfect mop heads daily and dry thoroughly before re-use
- Put **used linen** in linen bag inside the room; place in another bag outside the room when taking to laundry area for washing – **treat as soiled/contaminated**

Discharging the patient

- Ensure appropriate cleaning and disinfection of the room and bed
- Do not spray disinfectant
- Ensure appropriate cleaning, disinfection and/or sterilization of medical equipment

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Contaminated waste management

- Follow routine procedures for waste management generated at health facilities
- Used PPE and other waste material from respiratory health facility should be placed in "biohazard" waste bags inside the room where waste comes from. At collection, this bag can be put inside another bag outside the room and then treated as "normal"
- Gloves must be worn when removing waste bags
- Perform hand hygiene afterwards
- Incinerate waste
- Goggles are re-usable – clean prior to sterilization and re-use

Handling the deceased

- The risk that dead bodies pose for public health is very small. The living pose a greater risk!
- Identify burial sites in advance and ensure capacity for large numbers of bodies.
- Respect culturally appropriate means of disposal of the deceased while avoiding contact with fluids from the body
- PPE: non-sterile ambidextrous gloves, waterproof gown or apron, surgical or procedure masks and boots
- If splashing of body fluids anticipated, use hair cover and face shield (preferably) or goggles
- After removing PPE, perform hand hygiene
- Family should wear gloves and gowns and perform hand hygiene
- Seal body in impermeable body bag prior to transfer to mortuary or burial site