

PPE During the Management of Ebola

Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On (Donning) and Removing (Doffing)

This guidance is current as of October 20, 2014

The following procedures provide detailed guidance on the types of personal protective equipment (PPE) to be used and on the processes for donning and doffing (i.e., putting on and removing) PPE for all healthcare workers entering the room of a patient hospitalized with Ebola virus disease (Ebola). The guidance in this document reflects lessons learned from the recent experiences of U.S. hospitals caring for Ebola patients and emphasizes the importance of **training, practice, competence, and observation** of healthcare workers in correct donning and doffing of PPE selected by the facility.

This guidance contains the following key principles:

1. Prior to working with Ebola patients, all healthcare workers involved in the care of Ebola patients must have received repeated training and have demonstrated competency in performing all Ebola-related infection control practices and procedures, and specifically in donning/doffing proper PPE.
2. While working in PPE, healthcare workers caring for Ebola patients should have no skin exposed.
3. The overall safe care of Ebola patients in a facility must be overseen by an onsite manager at all times, and each step of every PPE donning/doffing procedure must be supervised by a trained observer to ensure proper completion of established PPE protocols.

In healthcare settings, Ebola is [spread through direct contact](#) (e.g., through broken skin or through mucous membranes of the eyes, nose, or mouth) with blood or body fluids of a person who is sick with Ebola or with objects (e.g., needles, syringes) that have been contaminated with the virus. For all healthcare workers caring for Ebola patients, PPE with full body coverage is recommended to further reduce the risk of self-contamination.

External (Non-CDC) Resources on PPE

- [Emory Healthcare: Ebola Preparedness Protocols](#)
- [University of Nebraska Medical Center: PPE for Ebola](#)
- [Médecins Sans Frontières \(Doctors without Borders\): Filovirus Haemorrhagic Fever Guideline, 2008\[PDF - 134pages\]](#)
- [World Health Organization \(WHO\): Infection prevention and control guidance for care of patients in health-care settings, with focus on Ebola](#)

To protect healthcare workers during care of an Ebola patient, healthcare facilities must provide onsite management and oversight on the safe use of PPE and implement administrative and environmental controls with continuous safety checks through direct observation of healthcare workers during the PPE donning and doffing processes.

Recommended Administrative and Environmental Controls for Healthcare Facilities

Protecting healthcare workers and preventing spread of Ebola requires that proper administrative procedures and safe work practices be carried out in appropriate physical settings. These controls include the following:

- At an administrative level, the facility's infection prevention management system, in collaboration with the facility's occupational health department, should
 - Establish and implement triage protocols to effectively identify patients who may have Ebola and institute the precautions detailed in this document.
 - Designate individuals as site managers responsible for overseeing the implementation of precautions for healthcare workers and patient safety. A site manager's sole responsibility is to ensure the safe and effective delivery of Ebola treatment. These individuals are responsible for all aspects of Ebola infection control including supply monitoring and evaluation with direct observation of care before, during, and after staff enter an isolation and treatment area.
 - At least one site manager should be on-site at all times in the location where the Ebola patient is being cared for.
 - Identify critical patient care functions and essential healthcare workers for care of Ebola patients, for collection of laboratory specimens, and for management of the environment and waste ahead of time.
 - Ensure healthcare workers have been trained in all recommended protocols for safe care of Ebola patients before they enter the patient care area.
 - Train healthcare workers on all PPE recommended in the facility's protocols. Healthcare workers should practice donning and doffing procedures and must demonstrate during the training process competency through testing and assessment before caring for Ebola patients.
 - Use trained observers to monitor for correct PPE use and adherence to protocols for donning and doffing PPE, and guide healthcare workers at each point of use using a checklist for every donning and doffing procedure.
 - Document training of observers and healthcare workers for proficiency and competency in donning and doffing PPE, and in performing all necessary care-related duties while wearing PPE.
 - Designate spaces so that PPE can be donned and doffed in separate areas.
- Key safe work practices include the following:
 - Identify and isolate the Ebola patient in a single patient room with a closed door and a private bathroom as soon as possible.
 - Limit the number of healthcare workers who come into contact with the Ebola patient (e.g., avoid short shifts), and restrict non-essential personnel and visitors from the patient care area.
 - Monitor the patient care area at all times, and log at a minimum entry and exit of all healthcare workers who enter the room of an Ebola patient.
 - Ensure that a trained observer watches closely each donning and each doffing procedure, and provides supervisory assurance that donning and doffing protocols are followed.
 - Ensure that healthcare workers have sufficient time to don and doff PPE correctly without disturbances.
 - Ensure that practical precautions are taken during patient care, such as keeping hands away from the face, limiting touch of surfaces and body fluids, preventing needlestick

and sharps injuries, and performing frequent disinfection of gloved hands using an alcohol-based hand rub (ABHR), particularly after handling body fluids.

- Disinfect immediately any visibly contaminated PPE surfaces, equipment, or patient care area surfaces using an *EPA-registered disinfectant wipe.
- Perform regular cleaning and disinfection of patient care area surfaces, even absent visible contamination.
 - This should be performed only by nurses or physicians as part of patient care activities in order to limit the number of additional healthcare workers who enter the room.
- Implement observation of healthcare workers in the patient room, if possible (e.g., glass-walled intensive care unit [ICU] room, video link).
- Establish a facility exposure management plan that addresses decontamination and follow-up of an affected healthcare worker in case of any unprotected exposure. Training on this plan and follow-up should be part of the healthcare worker training.

Principles of PPE

Healthcare workers must understand the following basic principles to ensure safe and effective PPE use, which include that no skin may be exposed while working in PPE:

- Donning
 - PPE must be donned correctly in proper order before entry into the patient care area and not be later modified while in the patient care area. The donning activities must be directly observed by a trained observer.
- During Patient Care
 - PPE must remain in place and be worn correctly for the duration of exposure to potentially contaminated areas. PPE should not be adjusted during patient care.
 - Healthcare workers should perform frequent disinfection of gloved hands using an ABHR, particularly after handling body fluids.
 - If during patient care a partial or total breach in PPE (e.g., gloves separate from sleeves leaving exposed skin, a tear develops in an outer glove, a needlestick) occurs, the healthcare worker must move immediately to the doffing area to assess the exposure. Implement the facility exposure plan, if indicated by assessment.
- Doffing
 - The removal of used PPE is a high-risk process that requires a structured procedure, a trained observer, and a designated area for removal to ensure protection
 - PPE must be removed slowly and deliberately in the correct sequence to reduce the possibility of self-contamination or other exposure to Ebola virus
 - A stepwise process should be developed and used during training and daily practice

Double gloving provides an extra layer of safety during direct patient care and during the PPE removal process. Beyond this, more layers of PPE may make it more difficult to perform patient care duties and put healthcare workers at greater risk for percutaneous injury (e.g., needlesticks), self-contamination during care or doffing, or other exposures to Ebola. If healthcare facilities decide to add additional PPE or modify this PPE guidance, they must consider the risk/benefit of any modification, and train healthcare workers on correct donning and doffing in the modified procedures.

Training on Correct Use of PPE

Training ensures that healthcare workers are knowledgeable and proficient in the donning and doffing of PPE prior to engaging in management of an Ebola patient. Comfort and proficiency when donning and doffing are only achieved through repeated practice on the correct use of PPE. Healthcare workers should be required to demonstrate competency in the use of PPE, including donning and doffing while being observed by a trained observer, before working with Ebola patients. In addition, during practice, healthcare workers and their trainers should assess their proficiency and comfort with performing required duties while wearing PPE. Training should be available in formats accessible to individuals with disabilities or limited English proficiency. Target training to the educational level of the intended audience.

Use of a Trained Observer

Because the sequence and actions involved in each donning and doffing step are critical to avoiding exposure, a trained observer will read aloud to the healthcare worker each step in the procedure checklist and visually confirm and document that the step has been completed correctly. The trained observer is a dedicated individual with the sole responsibility of ensuring adherence to the entire donning and doffing process. The trained observer will be knowledgeable about all PPE recommended in the facility's protocol and the correct donning and doffing procedures, including disposal of used PPE, and will be qualified to provide guidance and technique recommendations to the healthcare worker. The trained observer will monitor and document successful donning and doffing procedures, providing immediate corrective instruction if the healthcare worker is not following the recommended steps. The trained observer should know the exposure management plan in the event of an unintentional break in procedure.

Designating Areas for PPE Donning and Doffing

Facilities should ensure that space and layout allow for clear separation between clean and potentially contaminated areas. It is critical that physical barriers (e.g., plastic enclosures) be used where necessary, along with visible signage, to separate distinct areas and ensure a one-way flow of care moving from clean areas (e.g., area where PPE is donned and unused equipment is stored) to the patient room and to the PPE removal area (area where PPE is removed and discarded).

Post signage to highlight key aspects of PPE donning and doffing, including

- Designating clean areas vs. potentially contaminated areas
- Reminding healthcare workers to wait for a trained observer before removing PPE
- Reinforcing need for slow and deliberate removal of PPE to prevent self-contamination
- Reminding healthcare workers to perform disinfection of gloved hands in between steps of the doffing procedure, as indicated below.

Designate the following areas with appropriate signage:

1. PPE Storage and Donning Area

This is an area outside the Ebola patient room (e.g., a nearby vacant patient room, a marked area in the hallway outside the patient room) where clean PPE is stored and where healthcare workers can don PPE before entering the patient's room. Do not store potentially contaminated equipment, used PPE, or waste removed from the patient's room in this area. If waste must pass through this area, it must be properly contained.

2. Patient Room

This is a single-patient room. The door is kept closed. Any item or healthcare worker exiting this room should be considered potentially contaminated.

3. PPE Removal Area

This is an area in proximity to the patient's room (e.g., anteroom or adjacent vacant patient room that is separate from the clean area) where healthcare workers leaving the patient's room can doff and discard their PPE. Alternatively, some steps of the PPE removal process may be performed in a clearly designated area of the patient's room near the door, provided these steps can be seen and supervised by a trained observer (e.g., through a window such that the healthcare worker doffing PPE can still hear the instructions of the trained observer). Do not use this clearly designated area within the patient room for any other purpose. Stock gloves in a clean section of the PPE removal area accessible to the healthcare worker while doffing.

In the PPE removal area, provide supplies for disinfection of PPE and for performing hand hygiene and space to remove PPE, including a place for sitting that can be easily cleaned and disinfected, where the healthcare workers can remove boot covers. Provide leak-proof infectious waste containers for discarding used PPE. Perform frequent environmental cleaning and disinfection of the PPE removal area, including upon completion of doffing procedure by healthcare workers.

If a facility must use the hallway outside the patient room as the PPE removal area, construct physical barriers to close the hallway to through traffic and thereby create an anteroom. In so doing, the facility should make sure that this hallway space complies with fire-codes. Restrict access to this hallway to essential personnel who are properly trained on recommended infection prevention practices for the care of Ebola patients.

Facilities should consider making showers available for use by healthcare workers after doffing of PPE.

Selection of PPE for Healthcare Workers during Management of Ebola patients

This section outlines several PPE combinations and how they should be correctly worn. The key to all PPE is consistent implementation through repeated training and practice. A facility should select and standardize the PPE to be used by all essential healthcare workers directly interacting with Ebola patients and provide a written protocol outlining procedures for donning and doffing of this PPE, which will be reviewed and monitored by the trained observer.

CDC recommends facilities use a powered air-purifying respirator (PAPR) or an N95 or higher respirator in the event of an unexpected aerosol-generating procedure.

For healthcare workers who may spend extended periods of time in PPE while caring for Ebola patients, safety and comfort are critical. Standardizing attire under PPE (e.g., surgical scrubs or disposable garments and dedicated washable footwear) facilitates the donning and doffing process and eliminates concerns of contamination of personal clothing.

If facilities elect to use different PPE from what is outlined below (e.g., coveralls with either an integrated hood or a surgical hood with integrated full face shield), they must train healthcare workers in this use and ensure that donning and doffing procedures are adjusted and practiced accordingly.

Recommended Personal Protective Equipment

- **PAPR or N95 Respirator.** If a NIOSH-certified PAPR and a NIOSH-certified fit-tested disposable N95 respirator is used in facility protocols, ensure compliance with all elements of the [OSHA Respiratory Protection Standard, 29 CFR 1910.134](#), including fit testing, medical evaluation, and training of the healthcare worker.
 - **PAPR:** A PAPR with a full face shield, helmet, or headpiece. Any reusable helmet or headpiece must be covered with a single-use (disposable) hood that extends to the shoulders and fully covers the neck and is compatible with the selected PAPR. The facility should follow manufacturer's instructions for decontamination of all reusable components and, based upon those instructions, develop facility protocols that include the designation of responsible personnel who assure that the equipment is appropriately reprocessed and that batteries are fully charged before reuse.
 - A PAPR with a self-contained filter and blower unit integrated inside the helmet is preferred.
 - A PAPR with external belt-mounted blower unit requires adjustment of the sequence for donning and doffing, as described below.
 - **N95 Respirator:** Single-use (disposable) N95 respirator in combination with single-use (disposable) surgical hood extending to shoulders and single-use (disposable) full face shield.** If N95 respirators are used instead of PAPRs, careful observation is required to ensure healthcare workers are not inadvertently touching their faces under the face shield during patient care.
- Single-use (disposable) fluid-resistant or impermeable gown that extends to at least mid-calf or coverall without integrated hood. Coveralls with or without integrated socks are acceptable. Consideration should be given to selecting gowns or coveralls with thumb hooks to secure sleeves over inner glove. If gowns or coveralls with thumb hooks are not available, personnel may consider taping the sleeve of the gown or coverall over the inner glove to prevent potential skin exposure from separation between sleeve and inner glove during activity. However, if taping is used, care must be taken to remove tape gently. Experience in some facilities suggests that taping may increase risk by making the doffing process more difficult and cumbersome.
- Single-use (disposable) nitrile examination gloves with extended cuffs. Two pairs of gloves should be worn. At a minimum, outer gloves should have extended cuffs.
- Single-use (disposable), fluid-resistant or impermeable boot covers that extend to at least mid-calf or single-use (disposable) shoe covers. Boot and shoe covers should allow for ease of movement and not present a slip hazard to the worker.
 - Single-use (disposable) fluid-resistant or impermeable shoe covers are acceptable only if they will be used in combination with a coverall with integrated socks.
- Single-use (disposable), fluid-resistant or impermeable apron that covers the torso to the level of the mid-calf should be used if Ebola patients have vomiting or diarrhea. An apron provides additional protection against exposure of the front of the body to body fluids or excrement. If a PAPR will be worn, consider selecting an apron that ties behind the neck to facilitate easier removal during the doffing procedure.

Recommended PPE for Trained Observer during Observations of PPE Doffing

The trained observer should not enter the room of a patient with Ebola, but will be in the PPE removal area to observe and assist with removal of specific components of PPE, as outlined below. The observer should not participate in any Ebola patient care activities while conducting observations. The following PPE are recommended for trained observers:

- Single-use (disposable) fluid-resistant or impermeable gown that extends to at least mid-calf or coverall without integrated hood.
- Single-use (disposable) full face shield.
- Single-use (disposable) nitrile examination gloves with extended cuffs. Two pairs of gloves should be worn. At a minimum, outer gloves should have extended cuffs.
- Single-use (disposable) fluid-resistant or impermeable shoe covers. Shoe covers should allow for ease of movement and not present a slip hazard to the worker.

Trained observers should don and doff selected PPE according to same procedures outlined below. Of note, if the trained observer assists with PPE doffing, then the trained observer should disinfect outer-gloved hands with an *EPA-registered disinfectant wipe or ABHR immediately after contact with healthcare worker's PPE.

Donning PPE, PAPR Option – This donning procedure assumes the facility has elected to use PAPRs. An established protocol facilitates training and compliance. Use a trained observer to verify successful compliance with the protocol.

1. **Engage Trained Observer:** The donning process is conducted under the guidance and supervision of a trained observer, who confirms visually that all PPE is serviceable and has been donned successfully. The trained observer uses a written checklist to confirm each step in donning PPE and can assist with ensuring and verifying the integrity of the ensemble. No exposed skin or hair of the healthcare worker should be visible at the conclusion of the donning process.
2. **Remove Personal Clothing and Items:** Change into surgical scrubs (or disposable garments) and dedicated washable (plastic or rubber) footwear in a suitable clean area. No personal items (e.g., jewelry, watches, cell phones, pagers, pens) should be brought into patient room.
3. **Inspect PPE Prior to Donning:** Visually inspect the PPE ensemble to be worn to ensure that it is in serviceable condition, that all required PPE and supplies are available, and that the sizes selected are correct for the healthcare worker. The trained observer reviews the donning sequence with the healthcare worker before the healthcare worker begins the donning process and reads it to the healthcare worker in a step-by-step fashion.
4. **Perform Hand Hygiene:** Perform hand hygiene with ABHR. When using ABHR, allow hands to dry before moving to next step.
5. **Put on Inner Gloves:** Put on first pair of gloves.
6. **Put on Boot or Shoe Covers.**
7. **Put on Gown or Coverall:** Put on gown *or* coverall. Ensure gown or coverall is large enough to allow unrestricted freedom of movement. Ensure cuffs of inner gloves are tucked under the sleeve of the gown *or* coverall
 - a. If a PAPR with a self-contained filter and blower unit that is integrated inside the helmet is used, then the belt and battery unit must be put on prior to donning the impermeable gown *or* coverall so that the belt and battery unit are contained under the gown *or* coverall.

- b. If a PAPR with external belt-mounted blower is used, then the blower and tubing must be on the outside of gown *or* coverall to ensure proper airflow.
8. **Put on Outer Gloves:** Put on second pair of gloves (with extended cuffs). Ensure the cuffs are pulled over the sleeves of the gown *or* coverall
9. **Put on Respirator:** Put on PAPR with a full face-shield, helmet, or headpiece
 - a. If a PAPR with a self-contained filter and blower unit integrated inside the helmet is used, then a single-use (disposable) hood that extends to the shoulders and fully covers the neck must also be used. Be sure that the hood covers all of the hair and the ears, and that it extends past the neck to the shoulders.
 - b. If a PAPR with external belt-mounted blower unit and attached reusable headpiece is used, then a single-use (disposable) hood that extends to the shoulders and fully covers the neck must also be used. Be sure that the hood covers all of the hair and the ears, and that it extends past the neck to the shoulders.
10. **Put on Outer Apron (if used):** Put on full-body apron to provide additional protection to the front of the body against exposure to body fluids or excrement from the patient.
11. **Verify:** After completing the donning process, the integrity of the ensemble is verified by the trained observer. The healthcare worker should be comfortable and able to extend the arms, bend at the waist, and go through a range of motions to ensure there is sufficient range of movement while all areas of the body remain covered. A mirror in the room can be useful for the healthcare worker while donning PPE.
12. **Disinfect Outer Gloves:** Disinfect outer-gloved hands with ABHR. Allow to dry prior to patient contact.

Donning PPE, N95 Respirator Option – This donning procedure assumes the facility has elected to use N95 respirators. An established protocol facilitates training and compliance. Use a trained observer to verify successful compliance with the protocol.

1. **Engage Trained Observer:** The donning process is conducted under the guidance and supervision of a trained observer who confirms visually that all PPE is serviceable and has been donned successfully. The trained observer will use a written checklist to confirm each step in donning PPE and can assist with ensuring and verifying the integrity of the ensemble. No exposed skin or hair of the healthcare worker should be visible at the conclusion of the donning process.
2. **Remove Personal Clothing and Items:** Change into surgical scrubs (or disposable garments) and dedicated washable (plastic or rubber) footwear in a suitable, clean area. No personal items (e.g., jewelry, watches, cell phones, pagers, pens) should be brought into patient room.
3. **Inspect PPE Prior to Donning:** Visually inspect the PPE ensemble to be worn to ensure it is in serviceable condition, all required PPE and supplies are available, and that the sizes selected are correct for the healthcare worker. The trained observer reviews the donning sequence with the healthcare worker before the healthcare worker begins and reads it to the healthcare worker in a step-by-step fashion.
4. **Perform Hand Hygiene:** Perform hand hygiene with ABHR. When using ABHR, allow hands to dry before moving to next step.
5. **Put on Inner Gloves:** Put on first pair of gloves.
6. **Put on Boot *or* Shoe Covers.**
7. **Put on Gown *or* Coverall:** Put on gown *or* coverall. Ensure gown *or* coverall is large enough to allow unrestricted freedom of movement. Ensure cuffs of inner gloves are tucked under the sleeve of the gown *or* coverall.
8. **Put on N95 Respirator:** Put on N95 respirator. Complete a user seal check.

9. **Put on Surgical Hood:** Over the N95 respirator, place a surgical hood that covers all of the hair and the ears, and ensure that it extends past the neck to the shoulders. Be certain that hood completely covers the ears and neck.
10. **Put on Outer Apron (if used):** Put on full-body apron to provide additional protection to the front of the body against exposure to body fluids or excrement from the patient.
11. **Put on Outer Gloves:** Put on second pair of gloves (with extended cuffs). Ensure the cuffs are pulled over the sleeves of the gown *or* coverall.
12. **Put on Face Shield:** Put on full face shield over the N95 respirator and surgical hood to provide additional protection to the front and sides of the face, including skin and eyes.
13. **Verify:** After completing the donning process, the integrity of the ensemble is verified by the trained observer. The healthcare worker should be comfortable and able to extend the arms, bend at the waist and go through a range of motions to ensure there is sufficient range of movement while all areas of the body remain covered. A mirror in the room can be useful for the healthcare worker while donning PPE.
14. **Disinfect Outer Gloves:** Disinfect outer-gloved hands with ABHR. Allow to dry prior to patient contact.

Preparing for Doffing

The purpose of this step is to prepare for the removal of PPE. Before entering the PPE removal area, inspect and disinfect (using an *EPA-registered disinfectant wipe) any visible contamination on the PPE. As a final step, disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR, and allow to dry. Verify that the trained observer is available in the PPE removal area before entering and beginning the PPE removal process.

Doffing PPE, PAPR Option – PPE doffing should be performed in the designated PPE removal area. Place all PPE waste in a [leak-proof infectious waste container](#).

1. **Engage Trained Observer:** The doffing process is conducted under the supervision of a trained observer, who reads aloud each step of the procedure and confirms visually that the PPE is removed properly. Prior to doffing PPE, the trained observer must remind the healthcare worker to avoid reflexive actions that may put them at risk, such as touching their face. Post this instruction and repeat it verbally during doffing. Although the trained observer should minimize touching the healthcare worker or the healthcare worker's PPE during the doffing process, the trained observer may assist with removal of specific components of PPE, as outlined below. The trained observer disinfects the outer-gloved hands immediately after handling any healthcare worker PPE.
2. **Inspect:** Inspect the PPE to assess for visible contamination, cuts, or tears before starting to remove. If any PPE is potentially contaminated, then disinfect using an *EPA-registered disinfectant wipe. If the facility conditions permit and appropriate regulations are followed, an *EPA-registered disinfectant spray can be used, particularly on contaminated areas.
3. **Disinfect Outer Gloves:** Disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR, and allow to dry.
4. **Remove Apron (if used):** Remove and discard apron taking care to avoid contaminating gloves by rolling the apron from inside to outside.
5. **Inspect:** Following apron removal, inspect the PPE ensemble to assess for visible contamination or cuts or tears. If visibly contaminated, then disinfect affected PPE using an *EPA-registered disinfectant wipe.
6. **Disinfect Outer Gloves:** Disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR.

7. **Remove Boot or Shoe Covers:** While sitting down, remove and discard boot or shoe covers.
8. **Disinfect and Remove Outer Gloves:** Disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR. Remove and discard outer gloves, taking care not to contaminate inner glove during removal process.
9. **Inspect and Disinfect Inner Gloves:** Inspect the inner gloves' outer surfaces for visible contamination, cuts, or tears. If an inner glove is visibly soiled, cut, or torn, then disinfect the glove with either an *EPA-registered disinfectant wipe or ABHR. Then remove the inner gloves, perform hand hygiene with ABHR on bare hands, and don a clean pair of gloves. If no visible contamination, cuts, or tears are identified on the inner gloves, then disinfect the inner-gloved hands with either an *EPA-registered disinfectant wipe or ABHR.
10. **Remove Respirator (PAPR)***:**
 - a. If a PAPR with a self-contained filter and blower unit integrated inside the helmet is used, then wait until Step 15 for removal and go to Step 11.
 - b. If a PAPR with an external belt-mounted blower unit is used, then all components must be removed at this step.
 - i. Remove and discard disposable hood.
 - ii. Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR.
 - iii. Remove headpiece, blower, tubing, and the belt and battery unit. This step might require assistance from the trained observer.
 - iv. Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR.
 - v. Place all reusable PAPR components in an area or container designated for the collection of PAPR components for disinfection.
11. **Remove Gown or Coverall:** Remove and discard.
 - a. Depending on gown design and location of fasteners, the healthcare worker can either untie fasteners, receive assistance by the trained observer to unfasten the gown, or gently break fasteners. Avoid contact of scrubs or disposable garments with outer surface of gown during removal. Pull gown away from body, rolling inside out and touching only the inside of the gown.
 - b. To remove coverall, tilt head back and reach under the PAPR hood to reach zipper or fasteners. Use a mirror to help avoid touching the skin. Unzip or unfasten coverall completely before rolling down and turning inside out. Avoid contact of scrubs with outer surface of coverall during removal, touching only the inside of the coverall.
12. **Disinfect Inner Gloves:** Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR
13. **Disinfect Washable Shoes:** Sitting on a new clean surface (e.g., second clean chair, clean side of a bench) use an *EPA-registered disinfectant wipe to wipe down every external surface of the washable shoes.
14. **Disinfect Inner Gloves:** Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR.
15. **Remove Respirator (if not already removed):** If a PAPR with a self-contained filter and blower unit that is integrated inside helmet is used, then remove all components.
 - a. Remove and discard disposable hood
 - b. Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR
 - c. Remove and discard inner gloves taking care not to contaminate bare hands during removal process
 - d. Perform hand hygiene with ABHR
 - e. Don a new pair of inner gloves

- f. Remove helmet and the belt and battery unit. This step might require assistance from the trained observer.
16. **Disinfect and Remove Inner Gloves:** Disinfect inner-gloved hands with either an *EPA-registered disinfectant wipe or ABHR. Remove and discard gloves taking care not to contaminate bare hands during removal process.
17. **Perform Hand Hygiene:** Perform hand hygiene with ABHR.
18. **Inspect:** Perform a final inspection of healthcare worker for any indication of contamination of the surgical scrubs or disposable garments. If contamination is identified, immediately inform infection preventionist or occupational safety and health coordinator or their designee before exiting PPE removal area.
19. **Scrubs:** Healthcare worker can leave PPE removal area wearing dedicated washable footwear and surgical scrubs or disposable garments.
20. **Shower:** Showers are recommended at each shift's end for healthcare workers performing high-risk patient care (e.g., exposed to large quantities of blood, body fluids, or excreta). Showers are also suggested for healthcare workers spending extended periods of time in the Ebola patient room.
21. **Protocol Evaluation/Medical Assessment:** Either the infection preventionist or occupational safety and health coordinator or their designee on the unit at the time should meet with the healthcare worker to review the patient care activities performed to identify any concerns about care protocols and to record healthcare worker's level of fatigue.

Doffing PPE, N95 Respirator Option – PPE doffing is performed in the designated PPE removal area. Place all PPE waste in a [leak-proof infectious waste container](#).

1. **Engage Trained Observer:** The doffing process is conducted under the supervision of a trained observer, who reads aloud each step of the procedure and confirms visually that the PPE has been removed properly. Prior to doffing PPE, the trained observer must remind healthcare workers to avoid reflexive actions that may put them at risk, such as touching their face. Post this instruction and repeat it verbally during doffing. Although the trained observer should minimize touching healthcare workers or their PPE during the doffing process, the trained observer may assist with removal of specific components of PPE as outlined below. The trained observer disinfects the outer-gloved hands immediately after handling any healthcare worker PPE.
2. **Inspect:** Inspect the PPE to assess for visible contamination, cuts, or tears before starting to remove. If any PPE is visibly contaminated, then disinfect using an *EPA-registered disinfectant wipe. If the facility conditions permit and appropriate regulations are followed, an *EPA-registered disinfectant spray can be used, particularly on contaminated areas.
3. **Disinfect Outer Gloves:** Disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR.
4. **Remove Apron (if used):** Remove and discard apron taking care to avoid contaminating gloves by rolling the apron from inside to outside.
5. **Inspect:** Following apron removal, inspect the PPE ensemble to assess for visible contamination or cuts or tears. If visibly contaminated, then disinfect affected PPE using an *EPA-registered disinfectant wipe.
6. **Disinfect Outer Gloves:** Disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR.
7. **Remove Boot or Shoe Covers:** While sitting down, remove and discard boot or shoe covers.

8. **Disinfect and Remove Outer Gloves:** Disinfect outer-gloved hands with either an *EPA-registered disinfectant wipe or ABHR. Remove and discard outer gloves taking care not to contaminate inner gloves during removal process.
9. **Inspect and Disinfect Inner Gloves:** Inspect the inner gloves' outer surfaces for visible contamination, cuts, or tears. If an inner glove is visibly soiled, cut, or torn, then disinfect the glove with either an *EPA-registered disinfectant wipe or ABHR. Then remove the inner gloves, perform hand hygiene with ABHR on bare hands, and don a clean pair of gloves. If no visible contamination, cuts, or tears are identified on the inner gloves, then disinfect the inner-gloved hands with either an *EPA-registered disinfectant wipe or ABHR.
10. **Remove Face Shield:** Remove the full face shield by tilting the head slightly forward, grabbing the rear strap and pulling it over the head, gently allowing the face shield to fall forward and discard. Avoid touching the front surface of the face shield.
11. **Disinfect Inner Gloves:** Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR.
12. **Remove Surgical Hood:** Unfasten (if applicable) surgical hood, gently remove, and discard. The trained observer may assist with unfastening hood.
13. **Disinfect Inner Gloves:** Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR.
14. **Remove Gown or Coverall:** Remove and discard.
 - a. Depending on gown design and location of fasteners, the healthcare worker can either untie fasteners, receive assistance by the trained observer to unfasten to gown, or gently break fasteners. Avoid contact of scrubs or disposable garments with outer surface of gown during removal. Pull gown away from body, rolling inside out and touching only the inside of the gown.
 - b. To remove coverall, tilt head back to reach zipper or fasteners. Unzip or unfasten coverall completely before rolling down and turning inside out. Avoid contact of scrubs with outer surface of coverall during removal, touching only the inside of the coverall.
15. **Disinfect and Change Inner Gloves:** Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR. Remove and discard gloves taking care not to contaminate bare hands during removal process. Perform hand hygiene with ABHR. Don a new pair of inner gloves.
16. **Remove N95 Respirator:** Remove the N95 respirator by tilting the head slightly forward, grasping first the bottom tie or elastic strap, then the top tie or elastic strap, and remove without touching the front of the N95 respirator. Discard N95 respirator.
17. **Disinfect Inner Gloves:** Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR
18. **Disinfect Washable Shoes:** Sitting on a new clean surface (e.g., second clean chair, clean side of a bench) use an *EPA-registered disinfectant wipe to wipe down every external surface of the washable shoes.
19. **Disinfect and Remove Inner Gloves:** Disinfect inner-gloved hands with either an *EPA-registered disinfectant wipe or ABHR. Remove and discard gloves taking care not to contaminate bare hands during removal process.
20. **Perform Hand Hygiene:** Perform hand hygiene with ABHR.
21. **Inspect:** Perform a final inspection of healthcare worker for any indication of contamination of the surgical scrubs or disposable garments. If contamination is identified, immediately inform infection preventionist or occupational safety and health coordinator or their designee before exiting PPE removal area.

22. **Scrubs:** Healthcare worker can leave PPE removal area wearing dedicated washable footwear and surgical scrubs or disposable garments.
23. **Shower:** Showers are recommended at each shift's end for healthcare workers performing high risk patient care (e.g., exposed to large quantities of blood, body fluids, or excreta). Showers are also suggested for healthcare workers spending extended periods of time in the Ebola patient room.
24. **Protocol Evaluation/Medical Assessment:** Either the infection preventionist or occupational health safety and health coordinator or their designee on the unit at the time should meet with the healthcare worker to review the patient care activities performed to identify any concerns about care protocols and to record healthcare worker's level of fatigue.

Footnotes

*EPA-registered disinfectant wipe: Use a disposable wipe impregnated with a U.S. Environmental Protection Agency (EPA)-registered hospital disinfectant with a label claim of potency at least equivalent to that for a non-enveloped virus (e.g., norovirus, rotavirus, adenovirus, poliovirus).

** Note: A full face shield may not provide full face protection in the setting of significant splashing.

***All facilities should have a protocol for removing their particular PAPR and preparing equipment for reprocessing (e.g., bagging for temporary storage before reprocessing, immediate reprocessing in the doffing area)