



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive



Guidelines on the use of Personal Protective Equipment (PPE) when managing cases of suspected or confirmed Viral Haemorrhagic Fever

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Introduction and scope

The purpose of this document is to provide Healthcare workers with guidance on PPE selection, safe donning and doffing spaces and procedures for donning and doffing PPE when managing a case of suspected or confirmed Viral Haemorrhagic Fevers (VHF). Consistent application of standard precautions by every healthcare worker every time remains the most effective way to prevent transmission of VHF as well as other communicable diseases.

PPE is just one element in a series of preventative measures which need to be implemented as part of a local VHF preparedness plan. The efficacy of PPE is likely to be compromised if careful attention is not paid to all of the other preparedness elements such as administrative controls.

A point of care risk assessment (PCRA) should be conducted by every healthcare worker for every interaction with every patient, as this will enable the early identification of an individual with a VHF. Refer to guidance here: [A3 Poster Resist \(hpsc.ie\)](https://www.hpsc.ie/hpsc/infection_control/point_of_care_risk_assessment/) for details on how to conduct a Point of care risk assessment.

When undertaking a point of care risk assessment on a patient under investigation for a VHF the type of PPE required will primarily be determined by the clinical status of the patient in particular, whether a patient is in a dry phase or in a wet phase (the latter is a term used for patients who are vomiting, bleeding or having diarrhea).

It is very important to minimise the number of healthcare workers present during the initial assessment.

Selection of personal protective equipment

The PPE recommendations must ensure that different PPE options are available to HCWs considering the following:

- Compliance with technical specifications and legislative requirements (mandatory)
- Available sizes
- Available lengths (where applicable) and designs
- The wearer's bodily habitus
- Breathability of materials
- Comfort and flexibility
- Length of time to be spent with the patient
- Anticipated level of direct patient contact
- Availability on the market

Any healthcare worker who is managing a person who is a suspected or confirmed case of VHF must be trained in safe donning and doffing of VHF specific PPE. The wearer must receive documented training in the safe use of each item.

Appendix 1 Technical specifications for each PPE item provides technical specifications of each recommended PPE item.

Recommended levels of personal protective equipment

It is expected that every HCW will implement standard precautions, including compliance with the WHO 'five moments for hand hygiene' in the care of every patient every time, regardless of perceived infection risk.

In order to determine the appropriate PPE to be worn, in scenarios where direct physical contact with the patient is required, the HCW must first undertake a clinical risk assessment, to determine the patient's risk of VHF and current symptoms. Wherever possible, a personal protective distance (PPD) of a minimum of one meter should be maintained between the HCW and the patient to enable the clinical risk assessment to be completed remotely.

Two levels of PPE are recommended in this guidance document. Most healthcare workers will be familiar with Level 1 PPE which is similar to the PPE recommended when caring for patients with COVID-19.

The majority of staff will be less familiar with Level 2 PPE which is generally recommended for healthcare workers providing care to patients with confirmed VHFs particularly those working in High Level Isolation Units (HILUs) and Ambulance personnel involved in assessing and transporting suspected VHF cases.

Level 1 PPE will provide adequate protection in a variety of settings including primary care facilities, medical assessment units, community settings, emergency departments and airports when evaluating and caring for a Person Under Investigation for a VHF who is;

1. Not showing obvious signs of bleeding, vomiting, or diarrhea AND
2. Clinically stable and will not require invasive or aerosol generating procedures for example intubation, suctioning, active resuscitation
3. Not a Confirmed VHF

Level 2 PPE (involving total body coverage) is recommended when evaluating and caring for a Person Under Investigation for a VHF who is;

1. Showing obvious signs of bleeding, vomiting, or diarrhea (wet patient); OR
2. Clinically unstable and/or will require invasive or aerosol-generating procedures for example intubation, suctioning, active resuscitation).
3. A person with Confirmed VHF.

Important: A point of care risk assessment must always be conducted in order to support the appropriate assessment of PPE required from the outset and ongoing patient interactions

Table 1. Levels of PPE and clinical scenarios

| Level | Clinical scenarios | PPE |
|---|--|--|
| <p>Level 1 (Low risk of transmission),</p> | <p>Suspect case: e.g. dry case (non-fluid producer), cooperative patient</p> <p>Level of direct contact: low</p> | <p>Minimum level of PPE required:</p> <p>Fluid resistant long-sleeved gown/coverall, double gloves, visor, fluid resistant surgical mask (fluid resistant FFP2/FFP3)</p> |
| <p>Level 2 (High risk of transmission)</p> | <p>Suspect case: e.g. wet case: fluid-producer: unstable patient, vomiting diarrhoea or bleeding</p> <p>Level of direct contact is high (include examples from table from COVID)</p> <p>Confirmed case: Level 2</p> | <p>Full body coverage i.e. fluid resistant long-sleeved gown/coverall hood, visor (wrap around), fluid resistant face mask FFP2/3, double gloves. Staff should wear scrubs and shoe covers/ boots depending on type of coverall/ gown available.</p> |

Communication with the patient:

Staff (medical and nursing) must ensure the patient and their relatives are communicated with in a clear and sensitive manner informing them of the procedures that will be in place as precautionary measures and updating them at regular intervals. When undertaking the point of care risk assessment healthcare workers should consider language barriers or diminished level of consciousness.

It is important to limit the number of healthcare workers entering the room of a patient under investigation for VHF/confirmed patient, only essential healthcare personnel with designated roles should evaluate the patient and provide care to minimize the transmission risk.

Staff training in the use of personal protective equipment

Donning and doffing of PPE

All HCWs working in assessment areas (i.e. Emergency departments, GP settings, Primary care, Medical assessment units) should be familiar and trained in PPE donning and doffing procedures for Level 1.

Only staff who are trained in donning and doffing level 2 (full body coverage PPE) should care for persons with high risk of VHF (suspected or confirmed cases).

Training and refresher training on level 2 PPE should primarily focus on senior clinical and support staff working in areas where direct physical contact with a patient, patient specimens or contaminated physical environment may arise in scenarios of suspected or confirmed VHF:

- Ambulance service
- Emergency department
- Designated clinical area for accommodation of patient with suspected or confirmed VHF
- Hospital laboratory
- NVRL
- Infectious diseases clinic
- Critical care unit
- National Isolation Unit (NIU)
- Air corps personnel involved in the transfer of patients

Training

- As the majority of HCWs will be unfamiliar with Level 2 PPE, it is critically important that every HCW who may be likely to come into contact with a patient or specimens from a patient with suspected or confirmed VHF receives practical training.
- Records of PPE sizes selected by HCWs at training should be retained locally to monitor individual facility local PPE stock requirements and optimize stock management.

Consideration should also be given to providing each trained HCW with a wallet-sized card on which to record their preferred size for each item of PPE.

Selection of appropriate PPE

- As part of individual facilities preparedness plan, each healthcare setting should ensure that the optimal types and sizes of each item of PPE is available to healthcare workers who may be involved in caring for high risk/confirmed cases of VHF.
- Only HCWs who have been trained and are comfortable in donning and doffing level 2 PPE should be involved in the investigation and care of a patient with suspected or confirmed VHF.
- Instructions on the sequence of how to put on (don) and to take off (doff) each item should be available.
- Formal records of HCW training on level 2 PPE must be maintained locally.
- As the sequence of level 2 PPE donning and doffing is quite complex, it is critically important that these procedures are directly observed and guided by a trained observer using a checklist, which is completed and retained locally.
- All hospitals must ensure that they have nominated trained observers who have received specialized training in the safe donning and doffing of level 2 PPE (full body coverage). It is also important each HCW has the opportunity to practice the trained observer role as part of level 2 PPE training and that every HCW understands that safe donning and doffing of PPE cannot occur without supervision and direction. **The trained observer takes charge over and takes time on every donning and doffing procedure.**

HCWs must be provided with the opportunity to refresh their PPE training periodically and to participate in simulated exercises to test the local VHF preparedness plan. Training records must be current and accessible.

There is currently no evidence to support airborne transmission of Viral Haemorrhagic fevers. However, because splashes and/or droplets and aerosol generation can arise in certain clinical scenarios (e.g., coughing and vomiting) and aerosol generating procedures (AGP) may occur as part of patient care (e.g., intubation), as a precautionary measure, a fluid-resistant filtering face protection 3 (FFP3) respirator is recommended as part of level 2 PPE.

In certain scenarios (lengthy durations of anticipated direct patient contact, wearer's facial contours or facial hair interferes with proper respirator fit), the use of a powered air purifying respirator (PAPR) and its accompanying suit may be considered necessary and appropriate, with the PAPR to provide no

less filtration than an FFP3 respirator. Where a PAPR is used, there must also be documented training on donning, doffing and observing of donning and doffing, along with a local protocol on cleaning and disinfection of any reusable PAPR components, disposal of single use PAPR components and a PAPR maintenance schedule, all in keeping with the manufacturer's instructions. A description of a PAPR is provided in **Appendix 2**. Instructions for donning and doffing a PAPR and its accompanying suit are not provided in this guideline and are entirely dependent on the product selected and individual manufacturer's instructions.

The local PPE training programme should include HCW training on the safe donning, use and doffing of respiratory protection. This would include a programme for fit-testing, undertaking a seal check each time a respirator is worn and avoiding self-contamination during doffing.

The PPE donning and doffing sequences that follow are based on scenarios where direct contact with a patient or the patient's environment is anticipated in a clinical setting. The sequences may need minor adaptation for use in scenarios where patient specimens are being tested in the hospital laboratory setting.

Level 1 PPE

Level 1 PPE is the minimum PPE kit recommended for initial physical contact with a patient who has been to a country where VHFs are endemic or an outbreak of a VHF is ongoing (for example Ebola outbreak in Uganda) within 21 days prior to symptom onset and who presents with fever or history of fever and who does not have diarrhoea, vomiting or bleeding (the patient is not a fluid producer, also referred to as a dry patient). The items in the level 1 PPE kit are listed in **Table 2** and a recommended sequence for donning and doffing level 1 PPE is provided in **Appendix 3**.

Table 2. Level 1 PPE

| Item number | Item |
|-------------|------------------------------------|
| 1 | Fluid resistant long-sleeved gown |
| 2 | Fluid resistant surgical face mask |
| 3 | Goggles OR face shield |
| 4 | Gloves† |

†Gloves with extended cuffs (intermediate length or long) may be preferred if regular length gloves do not fit securely over the gown cuff

Level 2 PPE

Level 2 PPE is recommended to minimise the risk of exposure of the HCW's skin or mucous membranes to potentially infectious secretions and excretions, which may be encountered during physical assessment, investigation of specimens and ongoing clinical care of the patient with suspected or confirmed VHF.

Within level 2 PPE, there are three options, with each considered equally effective:

- **Option A** – Fluid resistant long-sleeved gown
- **Option B** – Fluid resistant coverall
- **Option C** –Powered air purifying respirator (PAPR) and its accompanying suit

The items in the level 2 PPE kit are listed in **Tables 3 (Option A), 4 (Option B) and 5 (Option C)**. A suggested sequence for donning and doffing level 2 PPE (Option A) is provided in **Appendix 4** and for level 2 PPE (Option B) in **Appendix 5**. A suggested VHF level 2 PPE training course structure is provided in **Appendix 6**.

Table 3. Level 2 PPE: Option A (Fluid resistant long-sleeved gown)

| Level 2 PPE: Option A (Fluid resistant long-sleeved gown) |
|---|
| Double gloves: intermediate length inner gloves and longer outer gloves |
| Fluid resistant long-sleeved gown |
| Plastic apron |
| FFP3 respirator |
| Face shield |
| Goggles (optional if face shield provides sufficient eye coverage) |
| Hood |
| Knee high rubber boots |

Table 4. Level 2 PPE: Option B (Coverall)

| Level 2 PPE: Option B (Coverall) |
|---|
| Double gloves: intermediate length inner gloves and longer outer gloves |
| Fluid resistant coverall with integrated hood |
| Plastic apron |
| FFP3 respirator |
| Face shield |
| Goggles (optional if face shield provides sufficient eye coverage) |
| Hood |
| Knee high rubber boots |

Table 5. Level 2 PPE: Option C (PAPR and its accompanying suit)

| Level 2 PPE: Option C: Powered air purifying respirator (PAPR) and its accompanying suit |
|---|
| Double gloves: intermediate length inner glove and longer outer glove |
| PAPR suit |
| PAPR apparatus |
| Plastic apron |
| Knee high rubber boots |

A description of a PAPR is provided in **Appendix 2**. Instructions for donning and doffing a PAPR and its accompanying suit are not provided in this guideline and are entirely dependent on the product selected and manufacturer's instructions. Additional PPE items might be required in the PAPR PPE kit.

PPE key points

- The use of both a face shield and goggles is recommended in this guideline. However, if the face shield design provides sufficient coverage of the HCW's eyes and meets the recommended specification (**Appendix 1**), goggles can be safely omitted from the PPE kit, unless the HCW's preference is to wear both
- The use of a plastic apron is recommended in this guideline. However, it could be considered an optional item, to be added based on risk assessment, with apron use preferred in scenarios where the patient is a fluid producer (also referred to as a wet patient).
- The PPE items recommended in this guideline should be single-use (disposed of after each use).
- Provided a PPE item is not legally designated as single-use only, decontamination could be considered in a scenario where ongoing care of the patient with VHF is required (e.g., NIU). For example, knee high rubber boots could be potentially reused. In that scenario, incorporation of fluid-resistant disposable boot covers into the local donning and doffing checklist, along with a local decontamination policy for the knee-high rubber boots would be required. Addition of boot covers over boots to the PPE kit will add to the complexity of the donning and doffing procedure
- As the sequence of level 2 PPE donning and doffing is quite complex, it is critically important that these procedures are directly observed and guided by a trained observer using a checklist. The HCW must understand that safe donning and doffing of PPE cannot occur without supervision and direction. The trained observer takes charge over and takes time on every donning and doffing procedure

PPE zones

Donning and doffing procedures must take place in separate designated areas/zones. It is useful to demarcate each zone using tape and to use consistent traffic light terminology when referring to each: **red zone** (patient area), **amber zone** (doffing area), **green zone** (donning area).

PPE storage and donning area (**Green Zone**)

- A designated area near the patient room where decontaminated equipment and new PPE are stored and where PPE is donned
- Potentially contaminated equipment, used PPE or waste from the patient area (red zone) must not be stored in the green zone. If waste is transported through this area, it must be contained in an appropriate waste container
- Placement of a mirror in the donning area should be considered, so the HCW can use the mirror to verify the integrity of their PPE and help to identify potential breaches in PPE
- PPE must be comfortable and secure before leaving the donning area (green zone), as it cannot be modified once the HCW enters the patient area (red zone)
- Signage highlighting key steps in the donning sequence should be displayed

Patient area (**Red Zone**)

- Single patient room with the door kept closed
- PPE must be worn by any HCW entering the red zone
- Items removed from the red zone should be considered potentially contaminated

PPE doffing area (**Amber Zone**)

- A designated area near the patient room where doffing of PPE takes place and discarded PPE is placed in appropriate waste containers.
- If space does not permit a separate donning and doffing area, a clearly designated area beside the door inside the patient room could be used for some of the doffing steps, as long as the following criteria are met:
 - The doffing steps can be seen and verified by the trained observer, (e.g., through a window)
 - The designated doffing area inside the patient room, is not used for any other purpose
 - The HCW has access to a stock of clean gloves and alcohol-based hand rub (ABHR) while in the patient room, which are not within the patient's reach

- The doffing area must have:
 - Surfaces that are easy to clean and disinfect
 - Adequate space for doffing, including space for a seat (which can be easily cleaned), to allow the HCW to sit down to remove the knee-high rubber boots
 - Adequate supplies of disinfectant (e.g., hypochlorite solution 1000 ppm) and/or wipes for disinfection of PPE
 - Adequate supplies of ABHR for performing hand hygiene, as indicated after doffing steps
 - Touch-free automatic ABHR dispensers
 - Waste containers appropriate for waste management processes
- Signage highlighting key steps in the doffing sequence should be displayed, with reminders for HCW to perform hand hygiene using ABHR between specified doffing steps and to avoid touching the face
- Placement of a mirror in the doffing area should be considered, so the HCW can use the mirror to verify the integrity of their PPE and help to identify potential breaches in PPE

Trained observer (PPE buddy)

- As the sequence of level 2 PPE donning and doffing is quite complex, it is critically important that these procedures are directly observed and guided by a trained observer using checklists and a visual guide (**Appendices 4 & 5**)
- Safe doffing of PPE is critical. Used PPE is potentially contaminated with Viral Haemorrhagic fever.
- The HCW must understand that safe donning and doffing of PPE cannot occur without supervision and direction. The trained observer takes charge over and takes time on every donning and doffing procedure.
- Every HCW who is trained on level 2 PPE must get the opportunity to undertake the role of trained observer, in addition to practicing both donning and doffing during the training session
- The trained observer:
 - Checks the HCW's PPE is correctly fitted, including seal check of FFP3 respirator
 - Ensures the HCW has performed hand hygiene at the correct moments, using a correct technique
 - Checks that used PPE is disposed of, as per the local VHF waste policy
 - Activates the PPE breach protocol if any exposures occur (**Appendix 7**)
 - Must be assertive

Trained Observer PPE

The recommended PPE for the trained observer will vary depending on the trained observer's location and the anticipated tasks to be undertaken by the trained observer:

PPE donning

- The trained observer is not required to wear PPE during PPE donning, which takes place in the green zone

PPE doffing

- During PPE doffing, if the HCW will not require physical assistance with doffing and the trained observer can supervise doffing while remaining in the green zone, the trained observer is not required to wear additional PPE

During PPE doffing, if the HCW will require physical assistance with doffing, the trained observer should be wearing PPE, which is appropriate to the level of anticipated contact with the HCW who is doffing. The level of PPE required by the trained observer should be decided locally and incorporated into the local PPE training module.

- If the trained observer will be moving into the red zone at any stage, the trained observer must be wearing the appropriate level of PPE indicated by clinical risk assessment before entering the red zone.

- If the trained observer has been wearing PPE, that PPE must be doffed safely and disposed of, followed by hand hygiene with ABHR before the trained observer resumes supervision of a new donning or doffing sequence.

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Appendices


Appendix 1 Technical specifications for each PPE item



| PPE item | Technical description | Relevant standards | |
|--|--|---|--|
| <p>Inner gloves</p> <p>Level 1 & level 2 PPE</p> | <p>Nitrile</p> <p>Non-sterile</p> <p>Single use</p> <p>Latex free</p> <p>Disposable</p> <p>Extended cuff</p> <p>Beaded cuff</p> <p>Ambidextrous</p> <p>Powder free</p> <p>Intermediate length (approximately 12 inches)</p> <p>Different sizes – Small, medium, large, extra-large</p> <p>Darker colour to differentiate from outer gloves in level 2 PPE</p> <p>Textured fingertips</p> <p>CE Marked</p> | <p>EU standard Medical Device Directive 2017/745 Class 1, EN 455 - EN 455-1:2000; EN 455-2:2015; EN 455-3:2015; EN 455-4:2009</p> <p>EU standard Personal Protective Equipment ((EU) 2016/425) Directive Category 111, EN 374</p> <p>EN 374 - EN ISO 374-1:2016+A1:2018; EN 374-2:2014; EN374-4:2013; EN ISO 374-5:2016</p> |  |
| <p>Outer gloves</p> <p>Level 2 PPE</p> | <p>Nitrile</p> <p>Non-sterile</p> <p>Single use</p> <p>Latex free</p> <p>Disposable</p> <p>Extended cuff</p> <p>Beaded cuff</p> <p>Ambidextrous</p> <p>Powder free</p> <p>Intermediate length (approximately 16 inches)</p> <p>Different sizes – Small, medium, large, extra-large</p> <p>Lighter colour to differentiate from inner gloves in level 2 PPE</p> <p>Textured fingertips</p> <p>CE Marked</p> | <p>EU standard Medical Device Directive 2017/745 Class 1, EN455 455 - EN 455-1:2000; EN 455-2:2015; EN 455-3:2015; EN 455-4:2009</p> <p>EU standard Personal Protective Equipment ((EU) 2016/425) Directive Category 111 EN 374 - EN ISO 374-1:2016+A1:2018; EN 374-2:2014; EN374-4:2013; EN ISO 374-5:2016</p> |  |

| PPE item | Technical description | Relevant standards | |
|--|--|--|--|
| <p>Long-sleeved gown which is suitable for level 1 PPE only</p> | <p>Disposable Single use Latex free Fluid resistant Provides full impervious cover Cuffs (preferably waterproof) Different sizes available Different lengths available – chosen length should reach to wearer’s mid calf Light colour's preferable to better detect possible contamination Fasteners/ties at neck and waist Preferably secured with Velcro at neck for easy doffing Antistatic Low linting Welded seams Made of non woven material Must wrap completely around the body; the wearer's back must not be left exposed/ uncovered CE Marked</p> | <p>Quality compliant with this standard: Tested for resistance to fluid penetration</p> <p>EN 13795 high performance level or AAMI level 3 performance (minimum level required) or Equivalent</p> |  |


| | | | |
|--|---|---|--|
| <p>Long-sleeved gown which is suitable for both level 1 & level 2 PPE</p> | <p>Disposable Single use Latex free Fluid resistant Provides full impervious cover (360 degrees) Cuffs (preferably waterproof) Different sizes available Different lengths available – chosen length should reach to wearer’s mid calf and cover top of knee high rubber boots Light colours preferable to detect possible contamination Fasteners/ties at neck and waist Preferably secured with Velcro at neck for easy doffing Antistatic Low linting Welded seams Made of non- woven material Must wrap completely around the body; the wearer's back must not be left exposed/ uncovered CE Marked</p> | <p>Quality compliant with this standard: Tested for resistance to blood-borne pathogen penetration</p> <p>AAMI PB70 Level 4 performance or Equivalent</p> | |
|--|---|---|--|


| PPE item | Technical description | Relevant standards | |
|--|--|---|---|
| <p>Hood</p> <p>Level 2 PPE</p> | <p>Disposable Single use Latex free</p> <p>Soft and breathable Covers neck and shoulders reaching upper part of gown/coverall Facial opening constructed without elastic (ideally) Different sizes preferable Preferably fluid resistant Preferably sealed/protected seams CE Marked</p> | <p>EU standard Personal Protective Equipment Directive EU 2016/425 category III</p> <p>Quality compliant with one of the following options, depending on resistance of materials:</p> <p>Option 1: tested for resistance to blood and body fluid penetration: meets or exceeds ISO 16603 class 3 exposure pressure</p> <p>OR</p> <p>Option 2: tested for resistance to blood borne pathogen penetration: meets or exceeds ISO 16604 class 2 exposure pressure</p> <p>OR</p> <p>Option 3: Compliant with EN 14126 highest performance test (EN Class)</p> <ul style="list-style-type: none"> ▪ ISO 16603 - Resistance to penetration by blood/fluids under pressure ▪ ISO16604 - Resistance to penetration by blood borne pathogens ▪ ISO22610 - Resistance to wet bacterial penetration (mechanical contact) ▪ ISO/DIS 22611 - Resistance to biologically contaminated aerosols ▪ ISO 22612 - Resistance to dry microbial penetration |  |



| PPE item | Technical description | Relevant standards | |
|--|---|---|--|
| <p>Coverall</p> <p>Level 2 PPE</p> | <p>Disposable</p> <p>Single use</p> <p>Latex free</p> <p>Fluid resistant</p> <p>Sealed/protected seams</p> <p>Zipper covered by adhesive flaps</p> <p>Large ring pull zipper preferable for easy doffing</p> <p>Thumb/finger loops to anchor sleeves in place</p> <p>Different sizes available</p> <p>Light colours preferable to detect possible contamination</p> <p>Elasticated wrists</p> <p>Non-elasticated ankles preferable for easy doffing over rubber boots</p> <p>Coveralls/protective suits must be designed to cover the whole body except for the hands, feet and face area, providing a barrier to air borne and fluid borne contaminants and pathogens preventing infective agents from reaching the (possibly injured) skin</p> <p>Antistatic</p> <p>CE Marked</p> | <p>EU standard Personal Protective Equipment Directive EU 2016/425 category III</p> <p>Quality compliant with one of the following options, depending on resistance of materials:</p> <p>Option 1: tested for resistance to blood and body fluid penetration: meets or exceeds ISO 16603 class 3 exposure pressure</p> <p>OR</p> <p>Option 2: tested for resistance to blood borne pathogen penetration: meets or exceeds ISO 16604 class 2 exposure pressure</p> <p>OR</p> <p>Option 3: Compliant with EN 14126 highest performance test (EN Class)</p> <ul style="list-style-type: none"> ▪ ISO 16603 - Resistance to penetration by blood/fluids under pressure ▪ ISO16604 - Resistance to penetration by blood borne pathogens ▪ ISO22610 - Resistance to wet bacterial penetration (mechanical contact) ▪ ISO/DIS 22611 - Resistance to biologically contaminated aerosols ▪ ISO 22612 - Resistance to dry microbial penetration |  |

| PPE item | Technical description | Relevant standards | |
|--|--|--|--|
| <p>Surgical mask</p> <p>Level 1 PPE</p> | <p>Disposable Single use Fluid resistant 120 mm Hg Latex free</p> <p>Good breathability Easy to differentiate between internal and external surface</p> <p>BFE (%) age at 3.0 microns (>98%) PFE (%) age at 0.1 microns (>98%) Differential pressure (Pa/cm²) < 60 Splash resistance pressure (kPa) ≥16,0 Microbial cleanliness(cfu/g) ≤ 30 3 Ply Ear Loops or tie strings or double headstrap elasticated CE Marked</p> | <p>Quality compliant with standards:</p> <ul style="list-style-type: none"> Medical Device 2017/745 class I - non-sterile EN 14683:2019 Type IIR |  |
| <p>FFP3 respirator mask</p> <p>Level 2 PPE</p> | <p>Shape that will not collapse easily Latex free Adjustable straps to facilitate good fit High filtration efficiency- filter performance ≥99% Total inward leakage (max) <2% Fluid resistant Splash resistance pressure (kPa) ≥16,0 or Synthetic Blood Penetration test for FFP3 with fluid resistance (ISO 22609) to 120mmHg Good breathability Non-irritating Non-valved Medical Respirator or</p> | <p>EU standard Personal Protective Equipment Directive EU 2016/425, category III</p> <p>Quality compliant with:</p> <ul style="list-style-type: none"> EN 149:2001 + A1:2009 (refers to filter efficiency) and which also confirms that the mask meets the requirements for splash resistance performance according to the Splash proof requirement as set out under EN14683:2019 (Splash Resistance Pressure (kPa) >16.0 or Synthetic Blood Penetration test for FFP2 with fluid resistance (ISO 22609) to 120mmHg. |  |

| | | | |
|--|--|--|--|
| | <p>shrouded expiration valve, where both mask and valve are fluid resistant (i.e., valve is shrouded/covered by fluid resistant material)</p> <p>Double Head Straps adjustable/elasticated</p> <p>Due to concerns about adequacy of face fit and comfort, the head harness as specified in clause 7.13 (EN 149:2001+A1:2009) must not be of a design that holds the mask in place by the ears alone (aka ear loop).</p> <p>Nose band must deform when pressed to mould over the nose and cheeks and must maintain its shape over time</p> <p>CE Marked</p> | | |
|--|--|--|--|

| PPE item | Technical description | Relevant standards | |
|---|---|---|---|
| <p>Goggles</p> <p>Level 1 & level 2 PPE</p> | <p>Disposable Single use Latex free</p> <p>Good seal with the skin of the face Adjustable and elasticated band to secure firmly so as not to become loose during clinical activity Flexible frame to easily fit all face contours without too much pressure Covers the eyes and surrounding areas and accommodates for prescription glasses Indirect venting to reduce fogging No or covered ventilation openings preferred Clear plastic lens with fog and scratch resistant treatments Anti-mist spray may be applied prior to donning the goggles</p> <p>Goggles are not required if the face shield provides complete coverage of sides and length of the face</p> <p>CE Marked</p> | <p>Quality compliant with standards:</p> <ul style="list-style-type: none"> Personal Protective Equipment (PPE) Category III EN 166/2002 Personal Eye Protection |  |

| PPE item | Technical description | Relevant standards | |
|---|---|--|--|
| <p>Face shield</p> <p>Level 1 & level 2 PPE</p> | <p>Disposable Single use Latex free Made of clear plastic Provides good visibility to wearer and patient Minimise glare Fog resistant Adjustable straps/harness to facilitate good fit. Fit snugly against the forehead with integral foam protection strip Does not require assembly by the user For level 2 PPE, complete coverage of sides and length of the face preferable and if this can be achieved, then goggles are not required CE Marked</p> | <p>Quality compliant with standards: Personal Protective Equipment (PPE) Category II</p> <ul style="list-style-type: none"> ▪ Face shield visor with chin guard to conform to EN 166:2002 Personal Eye Protection |  |

| PPE item | Technical description | |
|--|---|--|
| <p>Apron</p> <p>Level 2 PPE</p> | <p>Disposable Single use Latex free Fluid resistant Made of polyester with PVC coating, or other waterproof material Straight with bib Halter Neckline Pull over head, but not smock style Waist ties which should be long enough to fit an XL person Minimum basic weight: 250g/m² or 60 microns +/- 10% Covering size: approximately 70-90cm width x 120-150cm height, or standard adult size Neck strap allows for tear off with waist ties</p> <p>Personal Protective Equipment Directive EU 2016/425 Category 1 EN13432:2000 Packaging standards if tendered product is Biodegradable</p> |  |
| <p>Rubber boots</p> <p>Level 2 PPE</p> | <p>Generally single use for EVD level 2 PPE Latex free (preferable) Fluid resistant Knee high, in order to be higher than the bottom edge of the gown Different sizes available Nonslip, have a PVC sole that is completely sealed Light colour preferable to detect possible contamination Heel lip for ease of doffing Antistatic</p> |  |

Appendix 2 Description of powered air purifying respirator (PAPR)

What is a PAPR?

| |
|---|
| The equipment is battery operated, consists of a half or full face piece, breathing tube, battery operated blower and particulate filters (HEPA only) |
| A PAPR uses a blower to pass contaminated air through a HEPA filter, which removes the contaminant and supplies purified air to a face piece |
| A PAPR is not a true positive-pressure device because it can be over-breathed when inhaling |
| A face shield may also be used in conjunction with a half-mask PAPR for protection against body fluids |
| A PAPR should be worn for high-risk aerosol-generating procedures |

Choosing a PAPR

A PAPR may be selected for use if:

- The FFP3 respirator mask does not fit
- Employee has facial hair or facial contours that would interfere with mask-to-face seal
- The FFP3 respirator mask is unavailable
- High-risk aerosol-generating procedure being undertaken
- PAPRs can be used by persons who are [medically certified](#), but who cannot wear FFP3 respirator mask

Choosing the correct filter type is a critical aspect in the RPE (Respiratory Protection Equipment) selection process. Use of the incorrect filter such as a particulate filter for protection against vapours would result in no protection being given and the equipment will be completely ineffective [8].

Filters

There are three main filter types:

1. Particle filter (P sign and filtration efficiency number 1, 2 or 3) subdivided into three classes:
 - a. P1=low efficiency filters
 - b. P2=medium efficiency filters
 - c. P3=high efficiency filters
2. Gas/vapour filter
3. Combined filters (for particles, gases & vapours)

Assigned protection factor

Each RPD (Respiratory Protection Device) has a protection factor (PF) assigned to it, which is the ratio of the airborne concentration of the substance outside the device to that inside the device. PF's have a wide range, from low protection factors to high (e.g., from 4 to 2000).

APF-Assigned Protection Factor, which best reflects the workplace conditions, is the value to use when selecting RPE. Some APFs for specific types and classes of device are published in IS EN 529:2005 (Annex C). For example, an APF of 4 gives a lower level of protection than an APF of 20.

| CE marked Particulate Filter Type | APF (likely to be obtained in practice) |
|-----------------------------------|---|
| P1 | 4 |
| P2 | 10 |
| P3 | 20 |

European Standard

Full face masks are frequently components of other RPDs, such as power assisted respirators or self-contained/airline supplied breathing apparatus. These systems are generally approved as a complete set against the relevant standard- e.g. EN12942, EN137, and EN139.

EN143 - Particulate filters

Particulate filters which are effective against all dusts and fibers. Most are also effective against metal (e.g., welding) fume, liquid mists, bacteria and virus, although this should always be checked with the supplier of any individual filter. This standard describes only those filters to be fitted to EN140 half face pieces and EN136 full face pieces.

There are three classes of particulate filter: P1 (low efficiency), P2 (medium efficiency) and P3 (high efficiency). It is very important that the correct filter class is chosen for any given application.

Use of PAPRs

Employees must be instructed how to put on, position, adjust, and remove respirators.

Cleaning and disinfection

- Recommendations on cleaning and disinfection differ between individual manufacturers.
- PAPRs should be cleaned according to manufacturer's recommendations

Inspection, maintenance and repairs

- Follow manufacturer's recommendations on inspection, maintenance, including battery recharging and repairs

Appendix 3 Donning and doffing level 1 PPE

| Item number | Item |
|-------------|------------------------------------|
| 1 | Fluid resistant long-sleeved gown |
| 2 | Fluid resistant surgical face mask |
| 3 | Goggles OR face shield |
| 4 | Gloves† |

†Gloves with extended cuffs (intermediate length) may be preferred if regular length gloves do not fit securely over the gown cuff

Donning level 1 PPE

First steps

- Gather the items required for level 1 PPE
- Check PPE is the correct size
- Remove wrist and hand jewellery
- Ensure you are “bare below the elbow”

| STEP NUMBER | LEVEL 1 DONNING STEPS | COMMENT | TICK BOX |
|-------------|--|--|----------|
| 1 | Perform hand hygiene and allow hands to dry | Soap and water if hands physically dirty ABHR if hands are physically clean | |
| 2 | Put on fluid resistant long-sleeved gown | Secure waist and neck ties | |
| 3 | Put on surgical mask | Secure upper ties with a bow knot at middle of head Fit flexible upper band to the bridge of the nose Fit snug to face and below chin Secure lower ties with a bow knot behind neck | |
| 4 | Put on goggles or face shield | Adjust elastic strap to fit securely If goggles fog up, the surgical mask is not fitted correctly, adjust mask seal and retry | |
| 5 | Put on gloves | Grasp gown cuff while donning each glove and ensure the gloves extend to cover the gown cuff† | |
| 6 | Check PPE is secure and comfortable before approaching a patient Do not adjust PPE during patient care activity | | |

†Gloves with extended cuffs (intermediate length) may be preferred if regular length gloves do not fit securely over the gown cuff

Doffing level 1 PPE

| STEP NUMBER | LEVEL 1 DOFFING STEPS | COMMENTS | TICK BOX |
|-------------|--|---|----------|
| 1 | Perform hand hygiene on gloved hands and allow to dry | Use ABHR Ask a colleague to dispense ABHR directly onto your outstretched palms OR use an automated dispenser <u>If you self-dispensed ABHR, remember you will now need to dispose of the container in the waste bin before removing your gown and gloves</u> | |
| 2 | THE GOWN OR GLOVES COULD BE CONTAMINATED WITH virus | Break gown ties at waist With gloved hands, grasp front of the gown at shoulder level and pull gown forward gently, breaking gown neck ties Ideally, remove the gown and the gloves in the same manoeuvre. The gown should be removed pulling slowly from inside out, until the wrists are reached Each glove is removed slowly, with the discarded glove left inside the gown bundle The ungloved hands should only touch the inside of the gown bundle Discard the bundle containing gown and gloves into waste container If the gown comes off first without the inner gloves leaving them on the hands, discard the gown bundle and proceed to remove each glove slowly inside out and discard gloves into waste container | |
| 3 | Perform hand hygiene on bare hands and allow to dry | Use ABHR Ask colleague to dispense ABHR onto your outstretched palms OR use an automated dispenser If you're self-dispensing ABHR, a new container should be used for this step and onwards | |
| 4 | THE GOGGLES OR FACE SHIELD COULD BE CONTAMINATED WITH virus Slowly remove goggles or face shield | Do not touch the front of the goggles or face shield Tilt the head forward, grasp the elastic strap at the back of the head, close the eyes and gently lift the strap from behind and forward away from the face Discard the goggles or face shield into waste container | |
| 5 | Perform hand hygiene on bare hands and allow to dry | Use ABHR | |
| 6 | THE MASK COULD BE CONTAMINATED WITH virus Slowly remove the mask | Do not touch the front of the mask Break the lower ties first Next, break the upper ties, close the eyes and gently lift the mask from behind and forward away from the face Discard the mask into waste container | |
| 7 | Perform hand hygiene on bare hands and allow to dry | Use ABHR | |

Don a new pair of gloves. Seal the healthcare risk waste container. Quarantine the container. The next steps in waste disposal will be determined by laboratory test results.

Appendix 4 Donning and doffing level 2 PPE: Option A (gown)

Level 2 PPE: Option A (Fluid resistant long-sleeved gown)

Double gloves: intermediate length inner gloves and longer outer gloves

Fluid resistant long-sleeved gown

Plastic apron

FFP3 respirator

Face shield

Goggles (optional if face shield provides sufficient eye coverage)

Hood

Knee high rubber boots

The following provides a suggested sequence for donning and doffing level 2 PPE using the fluid resistant long-sleeved gown. A local donning and doffing sequence can be developed based on local PPE items and suited to local infrastructure and zone layout. The rationale for each step in the local sequence must be clear and the sequence followed consistently.

Donning level 2 PPE – Green zone

First steps

- Use the toilet
- Hydrate
- Remove all jewellery, including watches
- No personal items in clothing – mobile phones, pagers, pens, notebooks
- Change into scrubs:
 - Option 1: Surgical scrubs. Will either dispose of these after each use or develop a local protocol to ensure safe laundering of each item after use
 - Option 2: Disposable scrubs – single use only
- Put on waterproof or washable footwear
- Hair secured back. Fringe tucked under hair band or theatre cap may be worn to secure hair
- Any minor skin breaks covered by waterproof dressing
- Eyewear comfortable and glasses clean
- Gather the items on the PPE list in the preferred sizes and review the donning sequence with trained observer
- Access to a mirror is recommended

| STEP NUMBER | LEVEL 2 DONNING STEPS | COMMENTS | TICK BOX |
|-------------|---|--|----------|
| 1 | Consumed adequate fluids and been to bathroom | | |
| 2 | All jewellery, pens, phones removed | | |
| 3 | Long hair secured back | | |
| 4 | Remove footwear and put on knee high rubber boots | | |
| 5 | Perform hand hygiene on bare hands and allow to dry | <ul style="list-style-type: none"> ▪ Soap and water if hands physically dirty ▪ ABHR if hands are physically clean | |
| 6 | Put on first pair of inner gloves, which should be of intermediate length | Check size and dexterity are suitable | |
| 7 | Put on fluid resistant long-sleeved gown | <ul style="list-style-type: none"> ▪ Secure waist and neck ties ▪ Trained observer can assist with neck ties and confirms that the HCW's back is completely covered ▪ Ensure cuffs of inner gloves are tucked inside underneath the gown sleeve | |
| 8 | Put on FFP3 respirator, as per manufacturer's instructions | Put on FFP3 respirator and then perform seal check, as per manufacturer's instructions | |
| 9 | Put on hood | <ul style="list-style-type: none"> ▪ Ensure hood covers ears, neck and shoulders and adjust to ensure minimal skin exposure and best fit ▪ Trained observer may assist | |
| 10 | Put on plastic apron | Consider sticking an adhesive label with HCW's name on front of apron for ease of HCW identification | |
| 11 | Put on goggles | <ul style="list-style-type: none"> ▪ Adjust elastic strap to fit securely ▪ If goggles fog up, the respirator mask is not fitted correctly, adjust mask seal and retry ▪ Check visibility | |
| 12 | Put on the face shield | <ul style="list-style-type: none"> ▪ Adjust elastic strap to fit securely ▪ Check visibility | |
| 13 | Put on the second pair of outer gloves, which should be of longer length to inner gloves | <ul style="list-style-type: none"> ▪ Outer gloves are pulled over gown cuff extending up over the gown sleeves ▪ Take care that inner gloves and cuff do not become displaced as outer gloves are donned | |
| 14 | Check PPE is secure and comfortable – extend arms, bend at waist, turn and walk up and down & check PPE skin cover is optimal – use the mirror to self-check and trained observer to confirm | | |
| 15 | <p>REMINDE THE HCW PRIOR TO ENTERING THE PATIENT ROOM (RED ZONE)</p> <ul style="list-style-type: none"> ▪ Don't adjust or remove your PPE in the patient room (red zone) ▪ Don't touch your face whilst wearing PPE ▪ Use ABHR on your gloved hands during patient care whilst in the patient room (red zone) | | |

Doffing level 2 PPE

- Before leaving the patient's room (red zone) and entering the PPE removal area (amber zone), the HCW wearing level 2 PPE should:
 - Inspect the PPE for signs of visible contamination/soiling
 - If heavy soiling, first use absorbent wipes, **then** disinfect with disinfectant wipe or sponge solution (e.g., hypochlorite/chlorine-based disinfectant 1000 ppm)
 - Perform hand hygiene on outer gloved hands using ABHR and allow to dry
 - Verify that a trained observer is ready to supervise doffing of PPE before exiting the patient room (red zone)
- Next, move to PPE doffing area (amber zone)
- There must be sufficient supply of ABHR via an automated dispenser and non-sterile gloves in the doffing area (amber zone)
- Hand hygiene on gloved hands is recommended throughout the doffing sequence. Alternatively, gloves may be changed between each doffing step. If gloves are being changed, hand hygiene must be performed on bare hands prior to donning a new pair of gloves. Glove changes might be a preferred option in clinical scenarios where the patient is a fluid producer
- A designated waste container of sufficient size to accommodate the PPE waste generated should be available inside the amber zone, within arm's reach of the boundary with the green zone
- A chair which is easy to clean and disinfect should be provided inside the amber zone, just at the boundary of the amber and green zones. The chair should be positioned so the HCW can sit down to remove the rubber boots, easing each boot off slowly using the other boot and then swivel on the chair to step into the green zone in sock feet
- Access to a mirror is recommended

| STEP NUMBER | LEVEL 2 DOFFING STEPS | COMMENTS | TICK BOX |
|-------------|---|---|----------|
| 1 | <p>REMIND HCW UPON EXIT FROM PATIENT ROOM (RED ZONE)</p> <ul style="list-style-type: none"> ▪ Not to touch the face whilst wearing PPE ▪ Keep hands in front of the body ▪ Wait for further instruction between steps | | |
| 2 | Perform hand hygiene on outer gloved hands and allow to dry | ABHR | |
| 3 | <p>THE APRON COULD BE CONTAMINATED WITH virus</p> <p>Slowly remove the plastic apron</p> | <ul style="list-style-type: none"> ▪ Gently pull forward on the front of the apron, breaking neck strap and waist ties ▪ Roll apron away from the body inside out and discard apron into waste container | |
| 4 | Perform hand hygiene on outer gloved hands and allow to dry | ABHR | |
| 5 | <p>THE OUTER GLOVES COULD BE CONTAMINATED WITH virus Slowly remove the outer gloves</p> | <ul style="list-style-type: none"> ▪ Take care not to contaminate the inner gloves ▪ Remove one outer glove at a time, peeling slowly from inside out ▪ Hold first hand's outer glove in palm of second hand. once it is removed and then peel off second hand's outer glove slowly from inside out ▪ Discard outer gloves into waste container | |
| 6 | Carefully inspect the inner gloves for holes or tears | <p>If defect in inner glove – remove inner glove, perform hand hygiene with ABHR and put on a new pair of gloves</p> <p>If no defect in inner glove – perform hand hygiene with ABHR on inner gloved hands and allow to dry</p> | |
| 7 | <p>THE FACE SHIELD COULD BE CONTAMINATED WITH virus</p> <p>Slowly remove the face shield</p> | <ul style="list-style-type: none"> ▪ Do not touch the front of the face shield ▪ Tilt the head forward, grasp the elastic strap at the back of the head and gently lift the strap from behind and forward away from the face ▪ Discard the face shield into waste container | |
| 8 | Perform hand hygiene on gloved hands and allow to dry | ABHR | |
| 9 | <p>THE GOGGLES COULD BE CONTAMINATED WITH virus</p> <p>Slowly remove the goggles</p> | <ul style="list-style-type: none"> ▪ Do not touch the front of the goggles ▪ Tilt the head forward, grasp the elastic strap at the back of the head, close the eyes and gently lift the strap from behind and forward away from the face ▪ Open the eyes and discard the goggles into waste container | |

| STEP NUMBER | LEVEL 2 DOFFING STEPS | COMMENTS | TICK BOX |
|-------------|---|--|----------|
| 10 | Perform hand hygiene on gloved hands and allow to dry | ABHR | |
| 11 | THE HOOD COULD BE CONTAMINATED WITH virus Slowly remove the hood | <ul style="list-style-type: none"> ▪ Do not touch the front of the hood ▪ Tilt the head forward and gently grasp the top of the hood, close the eyes and pull the hood up and away from the head ▪ Open the eyes and discard the hood into waste container | |
| 12 | Perform hand hygiene on gloved hands and allow to dry | ABHR | |
| 13 | THE GOWN COULD BE CONTAMINATED WITH virus Slowly remove the gown Inspect the scrubs for any signs of visible contamination | <ul style="list-style-type: none"> ▪ Avoid touching the front of the gown ▪ Break gown ties at waist ▪ With gloved hands, grasp front of the gown at shoulder level and pull gown forward gently, breaking gown neck ties <p>OR</p> <p>trained observer can assist with neck ties and pushing the rear edge of the gown forward from inside (must wear an appropriate level of PPE to assist)</p> <ul style="list-style-type: none"> ▪ The gown should be removed pulling slowly from inside out, until the wrists are reached ▪ Discard the gown into waste container | |
| 14 | THE INNER GLOVES COULD BE CONTAMINATED WITH virus Slowly remove the inner gloves | <ul style="list-style-type: none"> ▪ Remove one glove at a time peeling slowly from inside out ▪ Hold first hand's glove in palm of second hand, once it is removed and then peel off second hand's glove slowly from inside out ▪ Discard the gloves into waste container | |
| 15 | Perform hand hygiene on bare hands and allow to dry | ABHR | |
| 16 | Put on a new pair of gloves | | |
| 17 | THE FFP3 MASK COULD BE CONTAMINATED WITH virus Slowly remove the FFP3 mask | <ul style="list-style-type: none"> ▪ Avoid touching front of mask ▪ Tilt head forward, grasp bottom elastic strap and pull up until top strap is reached, then grasp both straps, close the eyes and pull mask away from face ▪ Open the eyes and discard FFP3 mask into waste container | |

| STEP NUMBER | LEVEL 2 DOFFING STEPS | COMMENTS | TICK BOX |
|-------------|--|---|----------|
| 18 | Perform hand hygiene on gloved hands and allow to dry | ABHR | |
| 19 | While standing up or while sitting on the chair, slowly take off the rubber boots and step into the green zone | <ul style="list-style-type: none"> ▪ Try to ease off each boot slowly using the boot of the other foot and try to avoid touching the boots if possible ▪ Discard rubber boots into the waste container inside the boundary of the amber zone | |
| 20 | Slowly remove the gloves | <ul style="list-style-type: none"> ▪ Remove one glove at a time peeling slowly from inside out ▪ Hold first hand's glove in palm of second hand, once it is removed and then peel off second hand's glove slowly from inside out ▪ Discard the gloves into waste container inside the boundary of the amber zone | |
| 21 | Perform hand hygiene on bare hands and allow to dry | ABHR | |
| 22 | Trained observer signs off that the PPE doffing checklist has been completed and files the completed checklist for local records | | |
| 23 | If there has been a PPE breach, refer to Appendix 7 | | |
| 24 | <p>HCW may exit the green zone wearing scrubs and his/her own footwear</p> <p>The scrubs should be managed according to local policy – disposed of after use or placed in a designated laundry bag for decontamination</p> | | |

The next HCW to enter the amber zone wearing newly-donned PPE is responsible for cleaning and decontamination of the chair in the amber zone and for sealing the healthcare risk waste container, decontaminating its external surface, handing the sealed, labelled and decontaminated container out for immediate transport to the designated waste quarantine area. Then the HCW in PPE can enter the red zone to deliver ongoing patient care. The next steps in waste disposal will be determined by the laboratory test results and in consultation with the local Department of Public Health.

Appendix 5 Donning and doffing level 2 PPE: Option B (coverall)

Level 2 PPE: Option B (Coverall)

Double gloves: intermediate length inner gloves and longer outer gloves

Fluid resistant coverall with integrated hood

Plastic apron

FFP3 respirator

Face shield

Goggles (optional if face shield provides sufficient eye coverage)

Hood

Knee high rubber boots

The following provides a suggested sequence for donning and doffing level 2 PPE using the fluid resistant coverall with integrated hood. A local donning and doffing sequence can be developed based on local PPE items and suited to local infrastructure and zone layout. The rationale for each step in the local sequence must be clear and the sequence followed consistently.

Donning level 2 PPE – Green zone

First steps

- Use the toilet
- Hydrate
- Remove all jewellery, including watches
- No personal items in clothing – mobile phones, pagers, pens, notebooks
- Change into scrubs:
 - Option 1: Surgical scrubs. Will either dispose of these after each use or develop a local protocol to ensure safe laundering of each item after use
 - Option 2: Disposable scrubs – single use only
- Put on waterproof or washable footwear
- Hair secured back. Fringe tucked under hair band or theatre cap may be worn to secure hair
- Any minor skin breaks covered by waterproof dressing
- Eyewear comfortable and glasses clean
- Gather the items on the PPE list in the preferred sizes and review the donning sequence with trained observer
- Access to a mirror is recommended

| STEP NUMBER | LEVEL 2 DONNING STEPS | COMMENTS | TICK BOX |
|-------------|--|--|----------|
| 1 | Consumed adequate fluids and been to bathroom | | |
| 2 | All jewellery, pens, phones removed | | |
| 3 | Long hair secured back | | |
| 4 | Remove footwear and put on knee high rubber boots | | |
| 5 | Perform hand hygiene on bare hands and allow to dry | <ul style="list-style-type: none"> ▪ Soap and water if hands physically dirty ▪ ABHR if hands are physically clean | |
| 6 | Put on first pair of inner gloves, which should be of intermediate length | Check size and dexterity are suitable | |
| 7 | Put on fluid-resistant coverall with integrated hood but leave the hood off the head for the moment | <ul style="list-style-type: none"> ▪ Secure zip and cover zip with adhesive flap firmly fixed to coverall ▪ Trained observer can assist and confirms that the HCW is completely covered ▪ Ensure cuffs of inner gloves reach underneath the cuffs of the coverall and the thumb/finger loop of the coverall is secured over the inner glove | |
| 8 | Put on FFP3 respirator, as per manufacturer's instructions | Put on FFP3 respirator and then perform seal check, as per manufacturer's instructions | |
| 9 | Now put up the hood of the coverall | <ul style="list-style-type: none"> ▪ Ensure all hair is tucked underneath the hood of the coverall ▪ Trained observer can assist | |
| 10 | Next put on the separate outer hood | <ul style="list-style-type: none"> ▪ Ensure hood covers ears, neck and shoulders and adjust to ensure minimal skin exposure and best fit ▪ Trained observer may assist | |
| 11 | Put on plastic apron | Consider sticking an adhesive label with HCW's name on front of apron for ease of HCW identification | |
| 12 | Put on goggles | <ul style="list-style-type: none"> ▪ Adjust elastic strap to fit securely ▪ If goggles fog up, the respirator mask is not fitted correctly, adjust mask seal and retry ▪ Check visibility | |
| 13 | Put on the face shield | <ul style="list-style-type: none"> ▪ Adjust elastic strap to fit securely ▪ Check visibility | |
| 14 | Put on the second pair of outer gloves, which should be of longer length than inner gloves | <ul style="list-style-type: none"> ▪ Outer gloves are pulled over coverall cuff extending up over the coverall sleeves ▪ Take care that inner gloves and coverall cuff do not become displaced as outer gloves are donned | |
| 15 | Check PPE is secure and comfortable – extend arms, bend at waist, turn and walk up and down & check PPE skin cover is optimal – use the mirror to self-check and trained observer to confirm | | |

| STEP NUMBER | LEVEL 2 DONNING STEPS | COMMENTS | TICK BOX |
|-------------|---|----------|----------|
| 16 | <p>REMINDE THE HCW PRIOR TO ENTERING THE PATIENT ROOM (RED ZONE)</p> <ul style="list-style-type: none"> ▪ Don't adjust or remove your PPE in the patient room (red zone) ▪ Don't touch your face whilst wearing PPE ▪ Use ABHR on your gloved hands during patient care whilst in the patient room (red zone) | | |

Doffing level 2 PPE

- Before leaving the patient's room (red zone) and entering the PPE removal area (amber zone), the HCW wearing level 2 PPE should:
 - Inspect the PPE for signs of visible contamination/soiling
 - If heavy soiling, first use absorbent wipes, **then** disinfect with disinfectant wipe or sponge solution (e.g., hypochlorite/chlorine-based disinfectant 1000 ppm)
 - Perform hand hygiene on outer gloved hands using ABHR and allow to dry
 - Verify that a trained observer is ready to supervise doffing of PPE before exiting the patient room (red zone)
- Next, move to PPE doffing area (amber zone)
- There must be sufficient supply of ABHR via an automated dispenser and non-sterile gloves in the doffing area (amber zone)
- Hand hygiene on gloved hands is recommended throughout the doffing sequence. Alternatively, gloves may be changed between each doffing step. If gloves are being changed, hand hygiene must be performed on bare hands prior to donning a new pair of gloves. Glove changes might be a preferred option in clinical scenarios where the patient is a fluid producer
- A designated waste container of sufficient size to accommodate the PPE waste generated should be available inside the amber zone, within arm's reach of the boundary with the green zone
- A chair which is easy to clean and disinfect should be provided inside the amber zone, just at the boundary of the amber and green zones. The chair should be positioned so the HCW can sit down to remove the rubber boots, easing each boot off slowly using the other boot and then swivel on the chair to step into the green zone in sock feet
- Access to a mirror is recommended

| STEP NUMBER | LEVEL 2 DOFFING STEPS | COMMENTS | TICK BOX |
|-------------|---|---|----------|
| 1 | <p>REMIND HCW UPON EXIT FROM PATIENT ROOM (RED ZONE)</p> <ul style="list-style-type: none"> ▪ Not to touch the face whilst wearing PPE ▪ Keep hands in front of the body ▪ Wait for further instruction between steps | | |
| 2 | Perform hand hygiene on outer gloved hands. Allow to dry | ABHR | |
| 3 | <p>THE APRON COULD BE CONTAMINATED WITH virus</p> <p>Slowly remove the plastic apron</p> | <ul style="list-style-type: none"> ▪ Gently pull forward on the front of the apron, first breaking neck strap, followed by waist ties ▪ Roll apron away from the body inside out and discard apron into waste container | |
| 4 | Perform hand hygiene on outer gloved hands. Allow to dry | ABHR | |
| 5 | <p>THE OUTER GLOVES COULD BE CONTAMINATED WITH virus</p> <p>Slowly remove the outer gloves</p> | <ul style="list-style-type: none"> ▪ Take care not to contaminate the inner gloves ▪ Remove one outer glove at a time, peeling slowly from inside out ▪ Hold first hand's outer glove in palm of second hand, once it is removed and then peel off second hand's outer glove slowly from inside out ▪ Discard outer gloves into waste container | |
| 6 | <p>Carefully inspect the inner gloves for holes or tears</p> <p>Perform hand hygiene on inner gloved hands and allow to dry</p> | <p>If no defect in inner glove – perform hand hygiene with ABHR on inner gloved hands and allow to dry</p> <p>If defect in inner glove identified, perform hand hygiene with ABHR and put on a new pair of long outer gloves over the defective inner gloves</p> | |
| 7 | <p>THE FACE SHIELD COULD BE CONTAMINATED WITH virus</p> <p>Slowly remove the face shield</p> | <ul style="list-style-type: none"> ▪ Do not touch the front of the face shield ▪ Tilt the head forward, grasp the elastic strap at the back of the head and gently lift the strap from behind and forward away from the face ▪ Discard the face shield into waste container | |
| 8 | Perform hand hygiene on gloved hands. Allow to dry | ABHR | |
| 9 | <p>THE GOGGLES COULD BE CONTAMINATED WITH virus</p> <p>Slowly remove the goggles</p> | <ul style="list-style-type: none"> ▪ Do not touch the front of the goggles ▪ Tilt the head forward, grasp the elastic strap at the back of the head, close the eyes and gently lift the strap from behind and forward away from the face ▪ Open the eyes and discard the goggles into waste container | |

| STEP NUMBER | LEVEL 2 DOFFING STEPS | COMMENTS | TICK BOX |
|-------------|--|---|----------|
| 10 | Perform hand hygiene on gloved hands. Allow to dry | ABHR | |
| 11 | <p>THE OUTER HOOD COULD BE CONTAMINATED WITH virus</p> <p>Slowly remove the outer hood</p> | <ul style="list-style-type: none"> ▪ Do not touch the front of the hood ▪ Tilt the head forward, close the eyes and gently grasp the top of the hood at the crown of the head ▪ Pull the hood up and away from the head ▪ Open the eyes and discard the hood into waste container | |
| 12 | Perform hand hygiene on gloved hands. Allow to dry | ABHR | |
| 13 | <p>THE COVERALL COULD BE CONTAMINATED WITH virus</p> <p>Tilt head back and release the adhesive flap which covers the zip Unzip the coverall Reaching from the crown of the head, pull back the hood of the coverall Slowly remove the coverall to the level of the top of the boots Take care not to flex the neck forward in a way that the FFP3 mask could touch the scrubs</p> <p>In the event there had been a breach of inner gloves, necessitating donning a new pair of long outer gloves (Step 6), the outer gloves should now be removed in the same manoeuvre as the coverall, leaving just the inner gloves</p> <p>Inspect the scrubs for any signs of visible contamination</p> | <ul style="list-style-type: none"> ▪ Avoid touching the front of the coverall ▪ With gloved hands, grasp the inside of the coverall at shoulder level and push the coverall from inside to out off the shoulders gently OR trained observer can assist with removal of the coverall peeling off from inside out down the torso (must wear an appropriate level of PPE to assist) ▪ The coverall should be removed from inside to out rolling slowly downwards from inside out, until the top of the boots are reached | |
| 14 | <p>THE INNER GLOVES COULD BE CONTAMINATED WITH virus</p> <p>Slowly remove the inner gloves</p> | <ul style="list-style-type: none"> ▪ Remove one glove at a time peeling slowly from inside out ▪ Hold first hand's glove in palm of second hand, once it is removed and then peel off second hand's glove slowly from inside out ▪ Discard the gloves into waste container | |
| 15 | Perform hand hygiene on bare hands. Allow to dry | ABHR | |
| 16 | Put on a new pair of gloves | | |
| 17 | <p>THE FFP3 MASK COULD BE CONTAMINATED WITH virus</p> <p>Slowly remove the FFP3 mask</p> | <ul style="list-style-type: none"> ▪ Avoid touching the front of the FFP3 mask ▪ Tilt head forward, grasp bottom elastic strap and pull up until top strap is reached, then grasp both straps, close the eyes and pull mask away from face ▪ Open the eyes and discard FFP3 mask into waste container | |

| STEP NUMBER | LEVEL 2 DOFFING STEPS | COMMENTS | TICK BOX |
|-------------|--|---|----------|
| 18 | Perform hand hygiene on gloved hands and allow to dry | ABHR | |
| 19 | While sitting on the chair, slowly take off the rubber boots with the coverall in one manoeuvre and swivel or step into the green zone | <ul style="list-style-type: none"> ▪ Try to ease off each boot slowly using the boot of the other foot and try to avoid touching the boots if possible ▪ Discard rubber boots and coverall into the waste container inside the boundary of the amber zone | |
| 20 | Perform hand hygiene on gloved hands and allow to dry | ABHR | |
| 21 | Slowly remove the gloves | <ul style="list-style-type: none"> ▪ Remove one glove at a time peeling slowly from inside out ▪ Hold first hand's glove in palm of second hand once, it is removed and then peel off second hand's glove slowly from inside out ▪ Discard the gloves into waste container inside the boundary of the amber zone | |
| 22 | Perform hand hygiene on bare hands and allow to dry | ABHR | |
| 23 | Trained observer signs off that the PPE doffing checklist has been completed and files the completed checklist for local records | | |
| 24 | If there has been a PPE breach, refer to Appendix 7 | | |
| 25 | <p>HCW may exit the green zone wearing scrubs and his/her own footwear</p> <p>The scrubs should be managed according to local policy – disposed of after use or placed in a designated laundry bag for decontamination</p> | | |

The next HCW to enter the amber zone wearing newly-donned PPE is responsible for cleaning and decontamination of the chair in the amber zone and for sealing the healthcare risk waste container, decontaminating its external surface, handing the sealed, labelled and decontaminated container out for immediate transport to the designated waste quarantine area. Then the HCW in PPE can enter the red zone to deliver ongoing patient care.

Appendix 6 PPE training

Target audience

Training and refresher training on level 2 PPE should primarily focus on senior clinical and support staff working in areas where direct physical contact with a patient, patient specimens or contaminated physical environment may arise in scenarios of suspected or confirmed VHF:

- Ambulance service
- Emergency department
- Designated clinical area for accommodation of patient with suspected or confirmed VHF
- Hospital laboratory
- NVRL
- Infectious diseases clinic
- Critical care unit
- National Isolation Unit (NIU)
- AIR Corps

A refresher course is advised at intervals after the initial training session and to ensure succession planning.

The VHF PPE video is designed to complement the VHF PPE training course it is NOT meant to replace practical training and each HCW MUST get an opportunity to practice PPE donning, doffing and supervision.

Formal records of HCW training on level 2 PPE **must** be maintained locally. Only HCWs who have been trained and are comfortable in donning and doffing level 2 PPE should be permitted to have involvement in the investigation and care of a patient with suspected or confirmed VHF. Local records of PPE sizes selected by HCW at training should be retained to monitor local PPE stock requirements and optimise stock management. Consideration should also be given to providing each trained HCW with a wallet-sized card on which to record their preferred size for each item of PPE (staff should maintain this record and bring with them on transfer to other healthcare facilities).

Appendix 7 PPE breach protocol

In the event that a percutaneous injury (needlestick or sharps injury, blood or body fluid splash or bite injury) occurs during the care of a patient with suspected or confirmed VHF, the HCW should exit the patient room (red zone) and alert the trained observer.

The steps for [emergency management of injuries](#) (EMI) should be followed immediately and the possibility of transmission of any blood borne virus (BBV), including VHF be considered.

If a PPE breach is identified (tear or hole in PPE or inadvertent touching of mucous membranes) without injury the HCW should exit the patient room (red zone) and alert the trained observer.

The trained observer must also inform the following of the injury or PPE breach:

- Occupational health department
- Infection prevention and control team
- Public health department

In addition to the emergency and subsequent management of the percutaneous injury, the HCW will require assessment and follow-up in accordance with [emergency management of injuries](#) (EMI) toolkit.