

Tips and Advice on the Use of Personal Protection Equipment for Health Workers Coming into Direct Contact with COVID-19 patients

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Humanitarian Analysis, Guidance and Support for NHS Workers

Situation

“NHS workers are putting themselves at risk every time they treat patients with COVID-19. We owe it to them to provide the best guidance that exists. We are sharing our tips on PPE collated from expert advice, to protect our NHS staff.”

Najeeb Rahman, Founder, Frontline Collaboration Against COVID-19, Consultant in Emergency Medicine

Who is this advice for?

This tips and advice guidance is for frontline health workers using full PPE. Please note that it is important to have the right PPE for the situation you are in and we recommend referring to WHO guidance to understand the relevant PPE for the right context.

Please read the entire document, it firstly presents some general considerations, then it goes on to provide some advice regarding individual items of PPE.

As guidance changes frequently please check the National Guidance which can be found on the relevant Government and Public Health webpages. www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control

Background

Purpose of this brief:

This advice is complementary to, and does not replace, the protocol for Personal Protective Equipment (PPE) that your health facility is using. It outlines some key considerations and tips to consider in the use of PPE.

PPE is used to comply with Infection Prevention and Control (IPC) protocols to ensure that staff, patients and the community are not put at further risk. Basic PPE (such as gloves or aprons) protects wearers from exposure to blood, bodily fluid, secretions or excretions. Additional PPE and/or basic PPE worn at additional times depends on the type of disease transmission (e.g., contact, droplet, airborne) as well as anticipated exposure.

The type of PPE to be worn should follow a documented assessment of the risks of conducting any procedure which should inform local policies and practices. COVID-19 is transmitted by respiratory droplets and the aim is to reduce risk of transmission by contact with contaminated surfaces, bodily fluids or droplets dispersed by aerosol generating procedures. The PPE specific to the transmission of COVID-19 should protect the skin and mucosal surfaces (mouth, nose and eyes) of the wearer, prevent inspiration of contaminated material, and protect the wearer's clothing and undergarments from cross-contamination. It should also eliminate the risk of transmission of contaminated material between patients. It is therefore vital that at all times when donning, doffing and operating in PPE, precautions are taken that protect the wearer and patient from those risks.

All potential or actual failures of PPE should be reported in line with your organisation's policies on incident reporting.

Assessment

A. Setting-Up the Hot/Cold Zone:

- When deciding on a room or space to use, you should ideally aim for a location that has one way in (cold zone)¹ and another out (in hot² zone), so that you reduce cross infection.
- Hot and cold zones should ideally be clearly labelled to avoid any confusion and cross contamination.
- Provide pictorial laminated posters with instructions for putting on PPE - step by step – and of the dressing/donning procedure.
- Provide mirrors so that an individual can check their own PPE.
- Provide supply of anti-fogging spray particularly if you are going to be using goggles.
- It can be useful to use a whiteboard to note who is going in and out of the hot zone with a time, this is useful as you can start to track how long people are wearing PPE for so that if there are any issues later, can help you assess ideal shift length to maintain safety.
- Simulation practice can also be extremely helpful for staff to familiarise themselves with all aspects.
- Video guide examples can be useful for staff to have standardised donning and doffing protocol.

B. Organising your PPE:

- Follow the protocol for your department and health facility.
- Even in times of clinical emergency, ensure that your PPE is donned appropriately as your and your team's safety is paramount.

¹ Cold, Green or Low Risk Zone

² Hot, Red or High Risk Zone

- Check your work-space and remove any unnecessary objects or furniture that might snag, get caught on, or pull on your PPE, as this might dislodge or damage your PPE.
- Use a buddy system, so that you can check that each other's PPE is fitted correctly.
- If facilities are available in your department, it is highly advisable to get fit tested by trained fit testers (in quantitative or qualitative method)-particularly important for infection spread by respiratory droplets.
- If possible, ask fit testers to give you 2 options of good seal masks that suit your face, in case of manufacturing shortage of one of the masks during an epidemic.
- Masks - you should recheck the fit of your mask if there is significant weight change or other facial changes, as this can affect the seal.
- If you have an issue with your PPE while wearing it, change it and then report it as soon as possible.
- Train, Train, Train on the PPE you are going to use.
- Recommend that an accidental exposure protocol is put in place.

Considerations when using specific items of PPE:

Note: You should follow your health facility's guidance/local policy on the PPE you use.

The PPE items outlined below are likely to be wider than the PPE you will have access to and may vary according to local policy, therefore we have included advice on a range of PPE items.

Before entering the Hot Zone check:

- **Overalls/coveralls** (if your organisations supplies you with PPE overalls) - Make sure you have the right size overalls. Sitting down makes it easier to put your legs through the holes of the overalls.
- **Gown** – make sure you are wearing the right size and one with long sleeves. Check loops not trailing, tie bows with small loops and big tails so that they are easier to undo. Hold cuffs of gown when you put your gloves on.
- **Surgical Mask** – Ensure the mask is covering the mouth and nose, and that there are no gaps between the face and the mask. Change the mask if it is damaged or damp. Check with manufacturer how frequently masks need to be changed once worn.
- **FFP3 Mask:**
 - This is the recommended device for confirmed COVID-19 patients or during aerosol generating procedures in any suspected or unknown case.
 - Place mask over nose, mouth and chin before securing straps at neck and middle of the head.
 - Make sure the mask is sitting properly and looks correct, make sure straps are in a stable place and check the fitting around the nose.
 - It's important that the mask fits well around the nose so that air does not go into the goggles/visor and make them fog. Check this by inhaling (mask should collapse) and exhaling (there should be no leakage of air around the face).
 - An FFP3 mask can normally be worn for up to 8 hours.
- **FFP2/N95 Mask** - FFP2 mask offers better protection than a surgical mask, but less than an FFP3 respirator mask. FFP2 masks may be issued in the event of a shortage of FFP3 masks, and can be worn for up to 8 hours.

- **Valve vs. no valve masks:** Masks with no valves such as the FSM18 provide no expiratory outlet and may feel more uncomfortable if worn for long time. However these protect both the wearer and patient. A valved respirator mask on the other hand only protects the wearer. (Eg 8833 respirator).
- There are ongoing studies on the best way to sterilise and re-use masks in order to manage supplies.
- **Disposable hood** (if your organisation supplies you with PPE hoods) - Confirm that all straps are freely hanging, position the eye area carefully so that the top is straight and just above the eye socket and the eyes are central in the gap. Make sure the material is smooth across the forehead. Tie bows with small loops and big tails so that they are easier to undo. Those with beards should wear a hood. Spending a little time to get this bit right will save time and effort later in the procedure and will mean that the hood is well positioned whilst you are working.
- **Apron** - Confirm on which side your buddy would prefer to start, tell the person getting dressed to try to grasp the trailing strap and confirm when (s)he has done so. They need to be able to reach it to get undressed later. If you are wearing an apron over your overalls or gown – make sure that you can reach the strap to untie the apron later. Tie bows with small loops and big tails so that they are easier to undo.
- **Visors/Face shield** — use a disposable visor when you can, for those wearing glasses an appropriate visor to fit your glasses underneath. Ensure the strap is firmly in place, so that visor won't move while you are on shift.
- **Goggles** (if your organisation supplies you with PPE goggles) - Hold the front of your goggles with one hand and hold the strap of the goggles with the other. Place the goggles over your eyes in the right position and pull the strap to the back of your head. Check that the strap at the back is even and in a secure position. Confirm that there are no gaps around the goggles.

C. Before entering the hot zone/donning PPE:

- Team: ideally, at least two staff (buddies) who can help each other dress.
- Before entering the PPE Dressing room/space put on your scrub suit, wash your hands or use hand rub, and put on one pair of examination gloves.
- Before starting to dress, ensure the following:
- Make sure you are feeling good, have had a drink and visited the toilet.
- Ensure that you have adequate personal hygiene management in case you are in the hot zone for a long period of time e.g. wear pads.
- Remove any jewellery. Remove any wigs. Remove pens, name badges, lanyards, stethoscopes unless needed to enter, but leave outside the patient area (hot zone).
- Before starting to dress up, discuss with your buddy which of you is likely to be faster at getting dressed — the faster person can start getting dressed later, so that you can be ready at the same time.
- If you break any of the PPE items while putting it on, throw it away and get a new one.
- If wearing goggles - adjust the goggles to make sure the strap is tight enough but not too tight. Wipe the goggles with anti-fogging spray.

Check your own and also your buddy's clothing:

Stand directly in front of your buddy and instruct them to:

- “Lean forwards”. Check the top
- “Slowly look to the left”. Check the side of the face shield/visor/goggles

- “Slowly look to the right”. Check the side of the face shield/visor/goggles
- “Look straight ahead”. Check the bottom
- “Look up” (to check there is no gap between the bridge of the nose and goggles if goggles are used)
- Help them to fix any problems.
- Ensure no risk of skin exposure between long sleeve gowns and gloves on movement. If concerns use tape to stick down gloves to gown sleeve and wear second (outer layer) gloves on top.
- Aim to fit “check” after full PPE is donned, which involves breathing in and holding breath for ten seconds. The mask should suck in and stay there without loosening. Clean shaven, tight edges, shaped nose clip will aid a tight seal.
- This should be done during every donning to ensure adequate protection.
- All the items of PPE are in place before going into the hot² zone.
- Have a last look at yourself in the mirror to check no skin shows (especially around your goggles if you are using them). If large gap between goggles/ try different shape or wear visor on top to protect droplet spray.
- Write your name on the outside of the PPE or use an appropriate sticker..

D. PPE etiquette when in the hot zone:

- **Never adjust your PPE once you are inside the High Risk Zone**
- Speak slowly and clearly as your voice will be muffled.
- Erasable white boards can be placed inside hot zones to aid communication.
- Ensure ‘closed loop’ communications
- Wear an apron over your gown for close patient care, which can then be removed while still remaining in PPE for the duration of your work session in the Hot zone.
- Ensure wearing eye protection during aerosol generating procedures (AGPs) or if at risk of bodily fluid splashes.
- Avoid touching items/surfaces that you don’t need to, if possible.
- If touching a surface, remove outer gloves and replace.
- Work with your buddy to alert each other to the risk of touching contaminated surfaces and then your face.
- **Everything brought into the hot zone, stays in the hot zone.** Don’t remove items from the Hot zone, e.g., notes and equipment. Using electronic patient records where-ever possible.

E. Leaving the hot zone/doffing:

- Doffing is one of the other most high risk times, take care when doffing.
- It is important to remove your PPE items in the order set out by your health facilities protocol.
- Do not reuse “one use only” items
- Careful to remove outer layers first and gel hands in between if needed.
- Remember to wash hands after(as well as cleaning own glasses if worn underneath goggles)

It is important to remove your PPE items in the order set out by your health facilities protocol. Following your guidance for removal however there are some key points to consider:

- **Visor/Face Shield/Goggles** – Do not touch your eyes when removing.
- **Gown** - Please pull your gown from the front, when removing it.
- **Masks or visors** not to be reused unless manufacturer instructions.
- **Chlorhexidine/chlorine** cleaning solutions should be provided.

Recommendations

- We recommend that the PPE you use is in line with the latest Government and WHO guidance.
- Put an accidental exposure protocol in place.
- Ensure that you keep up to date, with latest developments.
- Know the contacts of your PPE lead in case of any concerns
- Estimate your PPE requirements for different case scenarios. This table from the European Centre for Disease Prevention and Control, shows the minimum number of sets for the different case scenarios.

	Suspected case	Confirmed case <i>Mild symptoms</i>	Confirmed case <i>Severe symptoms</i>
Healthcare staff	Number of sets per case	Number of sets per day per patient	
Nursing	1–2	6	6–12
Medical	1	2–3	3–6
Cleaning	1	3	3
Assistant nursing and other services	0–2	3	3
Total	3–6	14–15	15–24

- The above table can be found at <https://www.ecdc.europa.eu/sites/default/files/documents/novel-coronavirus-personal-protective-equipment-needs-healthcare-settings.pdf>
- Monitor your PPE stock usage. An example of a usage calculator can be found here: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/burn-calculator.html>

For further information please see the following:

1. Putting on (donning) personal protective equipment (PPE) for aerosol generating procedures (AGPs) COVID 19, Public Health England (PHE)
2. Quick Guide, Putting on (donning) personal protective equipment (PPE) for aerosol generating procedures (AGPs) COVID 19, Public Health England (PHE)
3. Removal of (doffing) personal protective equipment (PPE) for aerosol generating procedures (AGPs), COVID 19; Public Health England (PHE)
4. Quick Guide, Removal of (doffing) personal protective equipment (PPE) for aerosol generating procedures (AGPs) COVID 19, Public Health England (PHE) PPE burn calculator (CDC): <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/burn-calculator.html>

www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/burn-calculator.html?deliveryName=USCDC_2067-DM23796

5. Advice on the use of masks in the community, during home care, and in health care settings in the context of COVID-19, Interim guidance, WHO, 19 March 2020
6. Q&A on infection prevention and control for health care workers caring for patients with suspected or confirmed 2019-nCoV, <https://www.who.int/news-room/q-a-detail/q-a-on-infection-prevention-and-control-for-health-care-workers-caring-for-patients-with-suspected-or-confirmed-2019-ncov>, accessed 30/03/2020
7. Rational use of personal protective equipment (PPE) for coronavirus disease (COVID-19) Interim guidance, WHO, 19 March 2020
8. Evaluating the protection afforded by surgical masks against influenza bioaerosols: Gross protection of surgical masks compared to filtering facepiece respirators Health and Safety Executive, 2008. <https://www.hse.gov.uk/research/rrpdf/rr619.pdf>
9. Guidance on respiratory protective equipment (RPE) fit testing, Health and Safety Executive (HSE), 2019, <https://www.hse.gov.uk/pubns/indg479.htm>

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About Us:

Frontline Collaboration Against COVID-19 is a group of leading healthcare practitioners and humanitarian experts with frontline experience in the UK and around the world.

We are plugged-in to the problems being faced by NHS workers responding to the COVID-19 pandemic. We respond to those problems rapidly, creating practical guidance and tools that draw on international humanitarian response experience. The guidance complements and supports the formal NHS system.

Our vision is that NHS practitioners have access to the best guidance possible based on their needs, when they need it.

Feedback

We welcome your feedback and suggestions. Please contact us at info@beckhealthcare.co.uk

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