



Essentials of donning, doffing, and changes in endoscopy practice to reduce the risk of spreading COVID-19 during endoscopy

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The COVID-19 pandemic has resulted in a significant disruption to normal endoscopy practice in the United Kingdom and around the world.¹ Clinical manifestations of this infection are broad spectrum and can be very subtle; thus, a high degree of clinical suspicion and risk stratification are essential.²

Endoscopy is an aerosol-generating procedure.³ Aerosol generated during upper GI endoscopy is likely to be more infective than that generated during colonoscopy. Transmission in the endoscopy setting can also occur through inhalation of droplets and direct contact with contaminated body secretions.⁴ During the pandemic, it is best to restrict endoscopy to emergency and selective urgent indications.¹ Several national and local guidelines are in place and should be followed.

The spread of COVID-19 during endoscopy can be minimized by adopting correct personal protective equipment (PPE) measures (Figs. 1 and 2).⁵ PPE can only be effective if worn correctly.^{5,6} The process of putting on the PPE is called “donning” and consists of 4 steps, as illustrated in Figure 6 and demonstrated in Video 1 (available online at www.VideoGIE.org). The process of taking off the PPE is called “doffing” and consists of 5 steps, as illustrated in Figure 6 and demonstrated in Video 1.

A lot of thought has to go into the placement of donning and doffing areas in relation to the endoscopy suite to avoid cross-contamination (Figs. 4 and 5). The endoscopy suites have to be completely stripped down, and only the most essential equipment required for that



Figure 1. Donning (putting on personal protective equipment) station. Red arrow indicates the endoscopy room location in relation to the donning area.

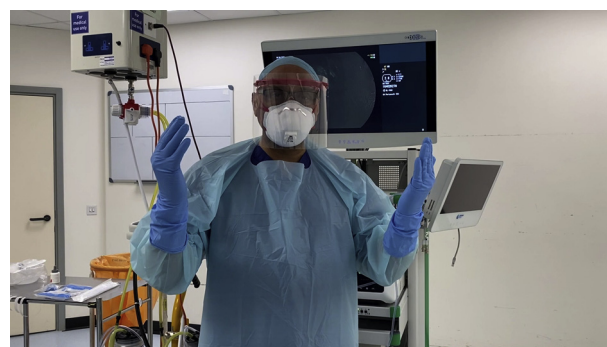


Figure 2. Endoscopist wearing full personal protective equipment, including head cover, face shield (visor), filtering face piece mask respirator, full gown, and 2 sets of gloves.

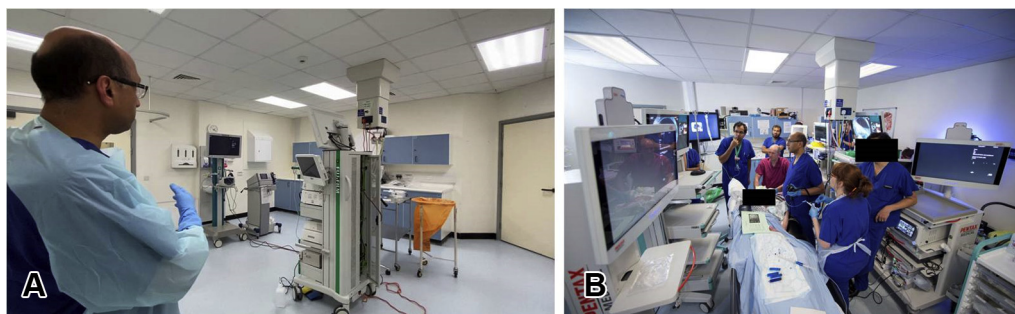


Figure 3. Endoscopy room environment (A) after COVID-19 pandemic and (B) before COVID-19.



Figure 4. Entrance from endoscopy room to the doffing area (red arrow).



Figure 5. Doffing area, with 8 stations to facilitate proper methods for removing personal protective equipment after endoscopy. Red arrow indicates exit door to the clean area.

Public Health England **Quick guide** COVID-19
Putting on (donning) personal protective equipment (PPE) for aerosol generating procedures (AGPs)

This is undertaken outside the patient's room.

Pre-donning instructions

- ensure healthcare worker hydrated
- tie hair back
- remove jewellery
- check PPE in the correct size is available

1 Put on the long-sleeved fluid repellent disposable gown

2 Respirator
Perform a fit check.

3 Eye protection

4 Gloves

Perform hand hygiene before putting on PPE

Public Health England **Quick guide** COVID-19
Removal of (doffing) personal protective equipment (PPE) for aerosol generating procedures (AGPs)

PPE should be removed in an order that minimises the potential for cross contamination.

The order of removal of PPE is as follows:

1 Gloves – the outsides of the gloves are contaminated

2 Gown – the front of the gown and sleeves will be contaminated

3 Eye protection – the outside will be contaminated

4 Respirator
Clean hands with alcohol hand rub. Do not touch the front of the respirator as it will be contaminated

5 Wash hands with soap and water

Figure 6. Public Health England (PHE) guidance on putting on and removing personal protective equipment for aerosol-generating procedures.⁵

particular procedure should be kept inside (Fig. 3). We demonstrate the principles of this in our video.

The way endoscopes are held during the procedure can also be altered to minimize accidental splashing of fluid and release of air from the endoscope. The ports of the en-

doscopes can be covered by a plastic sleeve to contain any accidental leakage.

Finally, aerosol is generated during endoscopy for a variety of reasons, but a major contributing factor is air/CO₂ insufflation during endoscopy. This leads to a buildup of

positive pressure in the gut, resulting in intermittent release of aerosol. We have adapted our technique and replaced air/CO₂ insufflation with water to minimize risk of aerosol generation. Underwater colonoscopy is widely practiced, so most clinicians can acquire these skills.⁷ Special precautions need to be taken when doing underwater gastroscopy because of the risk of aspiration, and endotracheal intubation should be considered.

We acknowledge that the exact measures adopted by each unit will depend on a range of factors, including availability of PPE, logistics, and local protocols. However, our video should provide broad principles that can be adapted to suit local circumstances.

DISCLOSURE

All authors disclosed no financial relationships.

Abbreviation: PPE, personal protective equipment.

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