

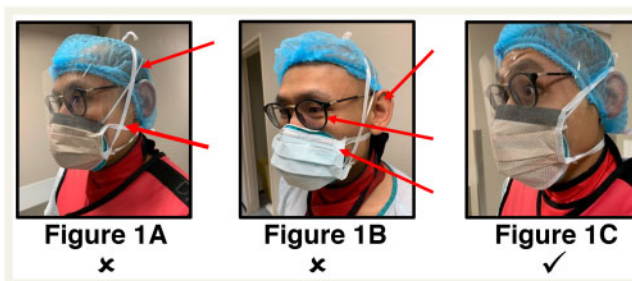
Donning and doffing of personal protective equipment (PPE) for angiography during the COVID-19 crisis



This protocol for PPE, from Tygerberg Hospital & Stellenbosch University, Cape Town, South Africa is recommended for the first operator and the individual who will be managing the airway. These are institutional recommendations as there are no official position statements regarding the above.

Donning of PPE

- i. **Surgical scrubs** to be worn. These will need to be changed with each case if a COVID-positive case is treated or there is any concern about soiling.
 - a. No jewellery to be worn
 - b. Scrub top to be tucked into scrub pants.
- ii. Thorough washing of hands for at least 20 seconds prior to initiating the donning process.
- iii. **Shoe covers** to be initially donned. Thereafter, prior to scrubbing, don the **N95 respirator** mask with the surgical **scrub cap** over the N95 mask (red arrows in Figure 1A where the mask strap is over the cap and mask strings are criss-crossed will complicate correct removal). A second method for eye protection should be used and worn over the respirator and scrub cap. We recommend a surgical mask with a **visor** be used for eye protection (Figure 1C). Disposable face shields may also be used. Surgical safety goggles can be used as an alternative but will need to be sterilized after each case.



- a. Healthcare workers should ideally have N95 respirator masks fit-tested and the correct size respirator mask should be used
- b. The scrub cap should cover both ears
- c. Prescription glasses/lead glasses on their own are not enough for protection
- d. The visor should adequately cover both eyes and provide some protection to the side of the face
- e. See red arrows in *Figure 1B* where the wrong mask is used, ears are not covered, and sufficient eye protection is not used.
- iv. Put on usual **radiation protection** equipment as used.
- v. Thoroughly scrub hands to the level of the elbows using an anti-bacterial surgical scrub and warm water and prepare to gown (*Figure 2*).
- vi. Disposable **surgical gown** to be worn
 - a. Take care to ensure that gown sleeves do not go beyond wrists as it is put on
 - b. Ensure that the top of the gown covers as much of the exposed neck area as possible
- vii. We recommend a **two-glove** technique. Put on two pairs of gloves ensuring that both gloves fit snugly and cover the sleeves of the gown. Final complete donning is depicted in *Figure 3*.
- viii. Perform angiography. In unstable patients, the person responsible for potential airway problems should wear full PPE from the outset.



Doffing of PPE

There is a very high risk of contamination and therefore another individual should watch you doffing the PPE and alert you to any possibility of contamination.

- i. Wash/clean the **outer pair of gloves** in water and thereafter remove the outer pair without touching the outside surface of the inner pair of gloves, and discard into a medical waste bin (Figure 4).
- ii. Remove **shoe-covers** and discard (performed more easily if sitting on a chair).
- iii. There is contention as to whether one should wash hands/gloves with alcohol during each step of doffing. Our institution recommends cleaning hands between every step of the procedure.
- iv. Clean internal pair of gloves with alcohol.
- v. Remove the **visor** without touching the front/exposed surface of the visor and dispose directly into medical waste bin (Figure 5).
- vi. Clean internal pair of gloves with alcohol.
- vii. Remove the **disposable gown** by grasping the inside surface of the gown at the collar and rolling the gown away from you without touching the exposed surface of the gown (Figure 6).
- viii. Clean internal pair of gloves with alcohol.
- ix. Remove **scrub cap**.
- x. Clean **internal pair of gloves** with alcohol and then remove.
- xi. Remove **radiation protection**.
- xii. Clean hands with alcohol.
- xiii. Remove **N95 respirator mask** by pulling the elastics over one's head and discard the mask without touching the exposed surface of the mask. The respirator is removed last to reduce the likelihood of exposure to aerosolized droplets during doffing.
- xiv. Wash hands with soap and warm water.
- xv. Radiation protection should be cleaned with an alcohol scrub, surgical scrubs should be washed, and the chair used during doffing of over-shoes should be cleaned with an alcohol scrub (Figure 7).
- xvi. There is a recommendation that you then take a shower, but we aim to shower only before leaving the hospital.

Conflict of interest: none declared.



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