

Western Australian ENT Recommendations for PPE for Aerosol Generating Procedures during COVID-19 Pandemic

Current at 24 March 2020

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The international experience to date suggests that Otorhinolaryngology, Head and Neck Surgeons (OHNS) are among the most susceptible health professional group to COVID-19 disease, a stance supported by the Royal Australasian College of Surgeons (RACS). There have been reports of the dissemination of infection from a patient of unknown COVID-19 status to 14 members of an endoscopic skull-base surgical team in China. There have been recent reports of two ventilated members of the OHNS community in the United Kingdom. There are also reliable reports of multiple deaths in ENT surgeons in Italy, Iran and China. Our awareness of asymptomatic carriers is also evolving.

In line with ASOHNS, we support the PPE guidelines provided by the advanced experience of our colleagues overseas (ENT UK and AAO-HNS), who are managing the complications of insufficient PPE – these contemporary guidelines will follow later in document. This is the standard we should be striving for to protect ourselves, our colleagues, our health care system, and ultimately our patients.

Based on the above, we as a collective group in ENT Western Australia recommend that no aerosol generating procedure (AGP) be undertaken without appropriate PPE.

In all known or suspected cases of COVID-19 as well as for any asymptomatic patient undergoing an AGP - we will not proceed without the following. Higher risk AGPs will require more advanced PPE and should not be undertaken without it.

1. Hand hygiene practices
2. Disposable gown +/- plastic apron if required
3. Disposable N95 respirator mask
4. Hood-type theatre hat
5. Single use visor or goggles
6. Double glove ensuring cuff of gown covered

We strongly endorse the recommendation for COVID-19 testing pre-procedurally for all elective patients undergoing high-risk AGP. This will protect staff, and will ultimately reduce the unnecessary use of valuable PPE which in turn will be cost effective.

We recognise that the definition of 'suspect cases' will continue to evolve. You should monitor your institutional guidelines very regularly.

In the remainder of the document we will summarise the various levels of PPE available and the current international recommendations. We acknowledge that new information is emerging at a rapid rate and our access to resources will change. This advice, to the best of our knowledge, is current at the time this document has been written. We will endeavour to keep up to date and adjust our practices accordingly.

It is vital that we as a cohort protect ourselves in this challenging time so as we can maintain an effective workforce and continue to provide patient care.

Much of the following information comes from the UK guidelines. These can be accessed in full at <https://www.entuk.org/entuk-guidelines-changes-ent-during-covid-19-pandemic>

Priorities:

1. Educate staff regarding risk assessments for patient contact, examination and procedures.
2. Understand PPE requirements
3. Re-education of staff regarding
 - a. Fitting of masks
 - b. Putting on PPE
 - c. Hand hygiene
 - d. Correct technique for **aerosol generating procedures (AGP)**

The following procedures are considered to be AGPs:

PLEASE NOTE ALL IN DEPTH EXAMINATIONS and PROCEDURES INVOLVING THE MIDDLE EAR AND AERODIGESTIVE TRACT IN COVID+ or COVID unknown patients are potentially a risk

Head and neck surgery that does not involve the aerodigestive tract e.g thyroid surgery is not considered to be a high risk of AGP

- i. Tracheotomy/tracheostomy procedures;
- ii. Intubation, extubation and related procedures;
- iii. Open suctioning
- iv. Bronchoscopy
- v. Surgery in which high-speed devices are used
- vi. Manual ventilation
- vii. Non-invasive ventilation (NIV) e.g. Bi-level Positive Airway Pressure (BiPAP) and Continuous Positive Airway Pressure ventilation (CPAP);
- viii. High-frequency oscillating ventilation (HFOV)
- ix. High-flow Nasal Oxygen (HFNO)
- x. Induction of sputum
- xi. Any examination or procedure performed on the aerodigestive tract (middle ear/nose/nasopharynx/oral cavity/oropharynx/hypopharynx/larynx/oesophagus)

For patients with suspected/confirmed COVID-19, any of these potentially infectious AGPs should only be carried out when essential.

- Where possible, these procedures should be carried out in a single room with the doors shut.
- Where there is a significant COVID risk then these should be conducted in a negative pressure room or allocated area quarantined for this purpose until resource utilisation prevents this.

- Only those healthcare staff who are needed to undertake the procedure should be present, and number of examinations minimised to reduce risk of exposure to staff.
- Ideally a disposable, fluid repellent surgical gown, gloves, eye protection and a FFP3/N100 respirator should be worn by those undertaking the procedure and those in the room.
- Minimal standard would be appropriately fitted N95 mask if FFP3/N100 is not available. NB: **Surgical masks are insufficient protection.**
- For prolonged and high risk procedures in COVID + patients we will aim to use Powered Air Purifying Respirators (PAPR).
- If appropriate respirators / masks are not available then the examination or procedure should not be performed regardless of the acuity of the patient to protect staff and maintain the effective workforce capacity.

Masks and Respirators

- Surgical masks differ from respirators
- Surgical masks protect the wearer from their environment, essentially droplet precautions
- **They do not protect against airborne infectious pathogens**
- A respirator is PPE that protects the wearer against inhaling aerosols, dust or gas that are hazardous to health
- They can be insulating and filtering
- The mask recommended to protect healthcare workers and others against COVID-19 infection must be a respirator
- FFP1, FFP2 and FFP3 refer to European Standards for classes of disposable respirators
 - NB Standard surgical masks are not included in these standards because they **DO NOT** filter particles
- Within the united states the respirators must meet NIOSH standards.
 - N: No oil resistance
 - R: 8 hours oil resistance
 - P: Completely oil resistant
 - Come in 95 99 and 100 depending on the percentage of particle 0.3 microns or larger that is filtered
 - Put simply 100 is better than 95
- For the purposes of protection against COVID we must wear at least an N95 but ideally and N100 mask according to risk classification as stipulated below.
- For prolonged and high risk procedures in COVID + patients current evidence suggests that we should aim to use Powered Air Purifying Respirators (PAPR).
 - E.g. Head and Neck surgery with open aerodigestive tract is particularly high risk given length of procedure, area involved and frequent use of powered machinery
 - These procedures are often conducted with surgical loupes and headlights so ideally PPE should allow for this
- At the moment there is a shortage of these devices within Australia but with time we hope they will become more widely available.

- An example can be seen here (note we are not currently endorsing the use of any particular product) https://www.3m.com.au/3M/en_AU/worker-health-safety-au/personal-protective-equipment/papr-system/

Mask	Equivalent	Image
Surgical Mask	NA	
FFP2	N95	
FFP 3	N100	
PAPR	NA	

Gowns:

- American National Standards Institute/Association of the Advancement of Medical Instrumentation (ANSI/AAMI) are used to classify gowns since 2004:
 - Level 1: *Minimal risk*, to be used, for example, during basic care, standard isolation, cover gown for visitors, or in a standard medical unit
 - Level 2: *Low risk*, to be used, for example, during blood draw, suturing, in the Intensive Care Unit (ICU), or a pathology lab
 - Level 3: *Moderate risk*, to be used, for example, during arterial blood draw, inserting an Intravenous (IV) line, in the Emergency Room, or for trauma cases
 - Level 4: *High risk*, to be used, for example, during long, fluid intense procedures, surgery, when pathogen resistance is needed or infectious diseases are suspected (non-airborne)
- **The key thing with gowns is that they are fluid resistant. If you are unsure about whether your gown is fluid resistant please wear a plastic surgical apron underneath.**

The most important thing to remember is that we are in a pandemic. Doctors are a precious resource. Therefore it is vital that we remain safe and well to continue to treat our patients and maintain an effective workforce. **If appropriate PPE is not available then examination is not performed irrespective of the acuity of the situation.** The reality is that the more unwell the patient, the higher the viral load, the more likely that the doctor will become infected themselves and become seriously unwell. We have witnessed the effects of this on our colleagues overseas.

This is the summary table from the ENT UK Guidelines:

AIIR= Air-borne Infection Isolation Room

7. Recommended PPE in different settings

	AIIR for suspected/ confirmed COVID-19	Triage station/ fever room	Surveillance ward/ cubicle/ side room	Aerosol generating procedures (AGP)	Other wards	Other patient areas (outpatients/ radiology etc)	Other areas with no direct patient contact
Hand hygiene	Yes	Yes	Yes	Yes	Yes		Yes
Type of mask	FFP3	FFP3	FFP3	FFP3	FFP2		FFP2
Isolation gown	AAMI level 1 or AAMI level 3 if splashing anticipated. Or AAMI Level 1 + waterproof apron				Standard precautions +/- transmission based precautions		N
Disposable gloves	Yes	Risk assessment	Risk assessment	Yes			N
Eye protection	Goggles/ face shield	Eye visor/ goggles/ face shield	Eye visor/ goggles/ face shield	Goggles/ face shield			N
Hair cover	optional	optional	optional	optional			N

Shoe covers not recommended

8. Recommended PPE during different procedures in ENT

- Make sure endoscopy is absolutely necessary for management of the patient. Endoscopy should be carried out by video monitoring if possible, rather than direct viewing through eyepiece.
- Consider Avoid the use of topical decongestant and local anaesthetic in spray form and consider soaked cotton wool if needed to reduce chance of droplet spread from sneezing or coughing.

	History taking	Procedures/ examination	
		• Flexible laryngoscopy/ nasendoscopy • Oral, nasal & ear open suction • Change of tracheostomy tube	• Endoscopic guided insertion of feeding tube • Change of tracheoesophageal prosthesis • Deep throat examinations (e.g. checking of tonsil mass, ulcer at retromolar trigone region)
Hand hygiene	Yes		
Type of mask/ respirator	FFP2	FFP3	
Isolation gown	No	AAMI level 1	
Disposable gloves	Yes. Use separate pair of gloves for each patient. The same applies to accompanying nurse. Gloves have to be appropriate to allow palpation, use of switches and fine controls (some of the polythene gloves are not suitable).		
Eye protection The eye is an important point of entry for viral infection.	Visor/ Face shield*	Face shield	
Hair cover	Optional		

FSFHG Dept of Anaesthesia – Personal Protective Equipment Guide

ASSESS RISK	Routine patient care e.g. Consultation, ward round or routine nursing care	DROPLET PRECAUTIONS		Surgical mask with face shield	
	Increased risk of aerosol exposure e.g. Airway management, intubation / extubation, post-operative care in PACU	AIRBORNE PRECAUTIONS		P2/N95 mask	

DONNING

Get READY for PPE

- A ASSESS** Aerosol Risk
- B Find a BUDDY** (PPE Competent)
- C CHECK** Procedural & PPE Equipment

1. **HH** Hand Hygiene to protect yourself

2. Gown: Tie it to your side

3. Mask: For P2/N95 mask

Pull both cords using your index finger and thumb to don mask.



You must do a 'Fit Check' with your mask

- a. Place hands around mask edge
- b. Breathe in and out 3 times
- c. Check for air leaks

DO NOT ENTER ROOM if you are unable to attain a seal

4. Hood: Hood-type theatre hat

5. Visor: Single use visor or goggles, or reusable goggles for eye protection

6. Gloves: **DOUBLEGLOVE** for intubation → Inner set – surgical gloves. → Outer set – non-sterile gloves. All gloves should cover the gown's cuff.

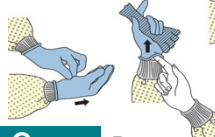


7. **BUDDY CHECK** before starting procedure

DOFFING

1. Gloves: Remove gloves and perform Hand Hygiene

- With right hand, grasp the outside of the cuff of the left glove
- Carefully pull left glove down towards fingertips, balling glove into the palm of the right hand.
- Using left thumb, carefully grasp the inside edge of the right cuff and remove, pulling it over the discarded left glove



2. Gown: Remove gown and perform Hand Hygiene



CHECK with Buddy & SLOW DOWN for Steps 3-5

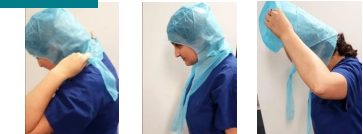
3. Visor: Remove single use visor or disposable goggles and perform Hand Hygiene

If using reusable goggles – remove these **AFTER** leaving patient area, don gloves, clean with Oxivir wipe, remove gloves and perform hand hygiene.

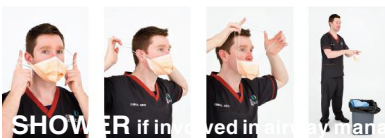


EXIT PATIENT SPACE into Anteroom

4. Hood: Remove hood and perform Hand Hygiene



5. Mask: Remove mask and perform Hand Hygiene



SHOWER if involved in intubation

DO NOT leave Patient Space (Room / Area / Theatre) without a FULL PPE Doff + Hand Hygiene

Donning and Doffing PPE for COVID+ patients

RPH Hospital Education video is attached below. As time goes on each hospital/region will have it's own resources. Please refer to your local hospital if available as PPE differs from site to site.

<https://youtu.be/uPI08mFuyZQ>

Proposed Flow Chart for Theatre Case in COVID + Patient

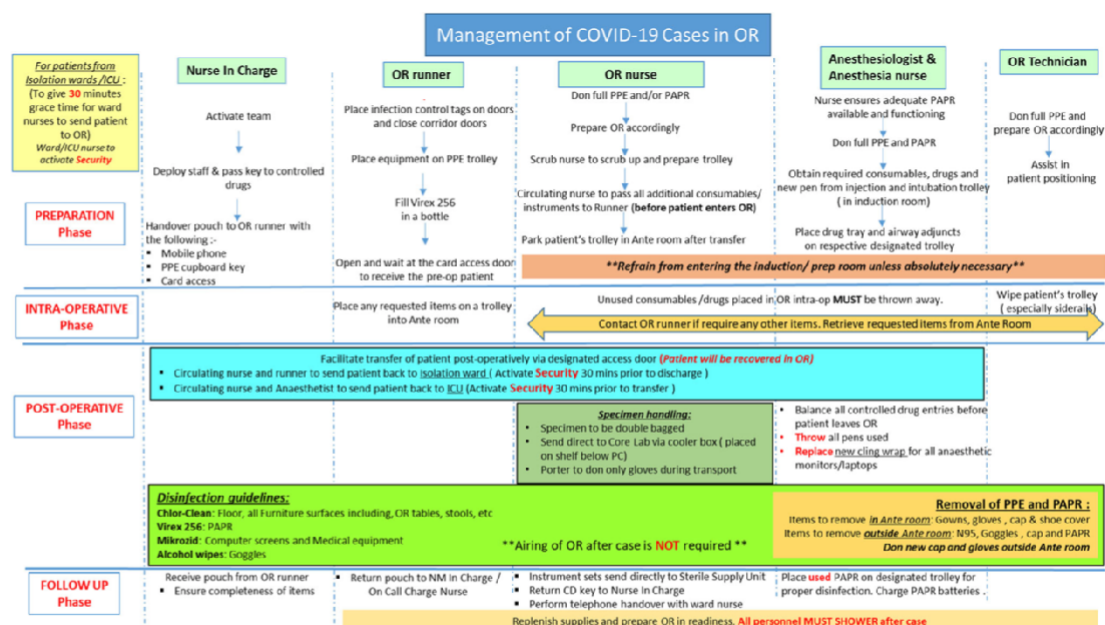


Figure Complete operating room workflow for a coronavirus disease 2019 (COVID-19) case. CD = controlled drugs; ICU = intensive care unit; NM = nurse manager; OR = operating room; PAPR = powered

air-purifying respirator; PC = personal computer; PPE = personal protection equipment; pre-op = preoperative

The above flowchart has been suggested for management of a COVID case in theatre. The main issue presently is availability of higher level PPE (e.g. PAPR) but it has been included here for completeness.

Image taken from TiLK, AngLS, Foong TW, NgBSW. What we do when a COVID-19 patient needs an operation: operating room preparation and guidance. Can J Anaesth. 2020.

<https://doi.org/10.1007/s12630-020-01617-4>

References:

- <http://www.asohns.org.au/about-us/news-and-announcements/latest-news?article=80>
- <https://www.surgeons.org/news/news/latest-coronavirus-update>
- <https://www.entuk.org/entuk-guidelines-changes-ent-during-covid-19-pandemic>
- <https://www.entnet.org/content/otolaryngologists-and-covid-19-pandemic>
- https://www.entnet.org/sites/default/files/uploads/AboutUs/files/covid-19_endosb_lettertoeditor_neurosurgery.pdf
- [\(COVID-19: Guidance for infection prevention and control in healthcare settings. Version 1.0.\)](#)
- https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/874316/Infection_prevention_and_control_guidance_for_pandemic_coronavirus.pdf
- [Integrated infection control strategy to minimize nosocomial infection of coronavirus disease 2019 among ENT healthcare workers](#) by Dan Lu, Haiyang Wang, Rong Yu, et al. Department of Otorhinolaryngology, Head and Neck Surgery, West China Hospital, Sichuan University, China. Published by the Healthcare Infection Society's Journal of Hospital Infection, February 2020.
- [Anaesthesia and SARS](#) by Damon Kamming, Michael Gardam and Frances Chung. British Journal of Anaesthesia, Volume 90, Issue 6, June 2003. Of particular interest are the sections on 'Intubating a SARS patient' and 'Operating rooms' towards the end of the article.
- https://apps.who.int/iris/bitstream/handle/10665/331498/WHO-2019-nCoV-IPCPPE_use-2020.2-eng.pdf
- <https://www.fda.gov/medical-devices/personal-protective-equipment-infection-control/medical-gowns>
- <https://tools.niehs.nih.gov/wetp/covid19worker/>
- TiLK, Ang LS, Foong TW, Ng BSW. What we do when a COVID-19 patient needs an operation: operating room preparation and guidance. Can J Anaesth. 2020. <https://doi.org/10.1007/s12630-020-01617-4>