



## ANZCA statement on personal protection equipment during the SARS-CoV-2 pandemic (15 May 2020)

*This statement is intended to provide advice on infection control precautions and personal protective equipment (PPE) for providers of anaesthesia and pain medicine.*

*We have prepared this statement on the advice of Australian and New Zealand health authorities, including, the Infection Control Expert Group (ICEG) as the peak infection control committee advising the Australian Health Protection Principal Committee (AHPPC) and Australia's chief medical officers. We have also consulted with colleges and societies representing perioperative surgical, nursing and procedural medical practice.*

*The character, magnitude and spread of SARS-CoV-2 varies from location to location. Health services and hospitals are encouraged to seek advice from local specialist infectious diseases and or public health authorities, where they are available.*

*We will update this guidance as new information becomes available.*

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## 1 Introduction

The recently discovered severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)<sup>1</sup> is highly infectious and can cause a range of symptoms from asymptomatic carriage to coronavirus disease (COVID-19). The epidemiology and pathophysiology of this disease is still emerging, however it is well established that patients, healthcare workers (HCWs) and indeed any people visiting or working within a health care setting are at a greatly elevated risk of contracting SARS-CoV-2, and of developing COVID-19 if appropriate transmission risk mitigation precautions are not taken when they are exposed to a person infected with SARS-CoV-2.

The Australian and New Zealand College of Anaesthetists (ANZCA) acknowledges that there is significant and justified concern from providers of anaesthesia and pain medicine across Australia and New Zealand regarding their safety what constitutes optimal precautions, including the use of personal protective equipment (PPE) during the current COVID-19 crisis<sup>2,3</sup>.

The College has previously published guidance to support standards for infection control in the ANZCA professional document *PS28 Guideline on Infection Control in Anaesthesia*<sup>4</sup>. This continues to provide relevant advice on 'standard' infection control precautions applicable to all patients, irrespective of their risk of communicable disease. The evolving COVID-19 pandemic has revealed a need for additional guidance on transmission-based precautions, specifically as these relate to prevention of transmission of SARS-CoV-2.

The college is aware that numerous PPE guidance documents currently exist, bi-nationally, between jurisdictions and regions, and internationally<sup>3-7</sup>. The recommendations for PPE in these guidelines are based on established principles of infection prevention and control, scientific evidence for modes of SARS-CoV-2 transmission and epidemiological risk factors. Uncertainty regarding the quality of evidence is well recognised and it is acknowledged that where evidence is inconclusive, guidelines are informed by expert opinion<sup>5</sup>. Some of these guidelines have undergone revision with emergence of new epidemiological data regarding, for example, asymptomatic and pre-symptomatic community transmission and regional case incidence.

These changing variables have influenced expert opinion on transmission risk.

The college understands that specific advice may need to be revised in future as new evidence emerges and if community transmission rates measurably change. The college also seeks to provide consistency in messaging regarding the principles that underpin decisions about optimal PPE.

## 2 Purpose

The intent of this document is to provide guidance on minimum requirements for PPE that afford protection for HCWs in the provision of anaesthesia and pain medicine care to patients noting that this protection when successfully achieved for the HCW, also protects their patients. By providing this advice, the college defers to established, endorsed infection control guidelines<sup>6,7</sup> and seeks to present these within the discipline-specific context of anaesthesia and pain medicine practice.

### 3 Key principles

The college recommends that anaesthetists and specialist pain medicine physicians apply the following underpinning principles when determining PPE requirements:

- 3.1 Routine infection control precautions should be practised during all encounters with all patients irrespective of presumed risk of transmission for any infection according to established standards of practice (Appendix 1).**
- 3.2 The risk of transmission posed by any patient should be determined according to established case definition and risk stratification criteria (Appendix 2) following a careful risk assessment.** Components of the risk assessment, including virology testing, should comply with local health facility policy. Patients meeting criteria for having a “suspected”, “probable” or “confirmed” diagnosis of COVID-19 should be managed according to the relevant infection control transmission risk precautions in addition to routine precautions (Appendix 2).
- 3.3** The prevalence of SARS-CoV-2 is predicted to fluctuate over time as social distancing measures are relaxed and tightened. If community transmission is estimated to be low, it is considered safe to adhere to normally accepted approaches to PPE in patients assessed to be low risk on screening<sup>5</sup>. However, in the event of a rapid and sustained increase in rates of community transmission, where contacts are unknown, the increased likelihood of transmission from asymptomatic or pre-symptomatic infected patients may warrant the application of transmission-based precautions for patients who are deemed to be low risk, based on screening criteria<sup>8</sup>. This reasoning may also be applied in the context of known workplace or institutional clusters prior to their containment. Public health experts are best placed to provide advice about community-based risk and whether it would be prudent to upgrade facility-wide transmission precautions. **Continuous monitoring of community transmission expressed within a facility risk matrix is beneficial in guiding whether transmission-based precautions should be applied to low risk patients.** This is predicated on timely access to local prevalence data (See Recommendation 4.1).
- 3.4** Risk of transmission from patients assessed as having a “suspected”, “probable” or “confirmed” diagnosis of COVID-19 is influenced by proximity of contact and the subsequent likelihood of contamination with virus within fomites or droplets on contact surfaces, within respiratory droplets and or within long-range aerosolised particles. **PPE should be guided by likelihood of transmission via these routes whereby aerosol generating procedures (AGPs) (Appendix 3) require Airborne level PPE in high risk patients due to a low but not unforeseen risk of long range aerosolisation resulting from AGPs.**
- 3.5** Adequate supplies of PPE are necessary to ensure maintenance of standards of personal protection for patients and health care workers. Patient care should only be provided when minimum standards of PPE can be met. Health services should view this as a headline risk to be managed, particularly in relation to procurement of stock and monitoring of burn rate. However, overseas experience shows that stocks are not infinite, and **consideration should be given to ensuring that the PPE supply is utilised judiciously.** The determination of region or facility risk and conduct of non-urgent elective surgery should be managed, in order to conserve valuable supplies of PPE.
- 3.6** Healthcare workers clearly need to be protected from contracting SARS-CoV-2 and in turn avoid infecting patients and colleagues during the pre-symptomatic period if they themselves become infected. **This obliges clinicians to comply with screening advice**

**and practice social distancing measures. Where social distancing between HCWs is not possible, standard precautions should be considered, as relevant. The individualised needs of HCWs who identify as being vulnerable to COVID-19 disease should be respected, and measures put in place to ensure HCW protection is equitable.**

- 3.7** Anaesthesia and pain medicine are provided within the context of multidisciplinary practice in which safety of all members of the multidisciplinary team is of equal and paramount importance. **Optimal precautions for all team members can only be achieved if clinicians are familiar with the safety requirements of each other's respective roles.**
- 3.8** **Modifications to conventional provision of patient care, introduced to ensure HCW protection, should simultaneously ensure that patients receive safe, high quality care.** Patients who meet testing criteria should be tested and any delays or modifications to care should be in accordance with peer reviewed practice and local health service guidelines. Professional obligations to manage patient privacy, obtain informed consent and to practise ethically, are unchanged. Patient preferences should be sought and respected while upholding infection control requirements.

## 4 Recommendations

### 4.1 Contingencies for infection prevention precautions according to fluctuations in regional or facility risk status

#### 4.1.1 Patients at low risk for SARS-CoV-2

The college is of the view that planning should include contingencies for fluctuation in the risk of community transmission by pre-symptomatic and asymptomatic people. Correspondingly, contingency plans would modify recommended PPE for those patients who are otherwise defined as low risk according to case definition criteria based according to risk determined at a regional or facility level. This could be expressed in a graded risk model. Without wishing to pre-empt regional or facility level strategies, **flow charts** are provided that demonstrate this approach (**Appendix 4**). The flow charts take into account community transmission risk according to three grades of regional or facility risk.

The determination of regional or facility risk is likely to be qualitative and based on multiple factors including variable population prevalence of SARS-CoV-2 in geographically localised areas and or institutional clusters. Regional or facility risk assessment should be based on the advice of epidemiologists, infectious diseases specialists and or public health specialists.

#### 4.1.2 Patients with confirmed or suspected SARS-CoV-2

The following precautions should be adopted where, after risk assessment, patients are identified as high risk (suspected, probable or confirmed) for SARS-CoV-2:

**Droplet precautions are recommended for situations not involving AGPs**

**Airborne precautions are recommended for situations involving AGPs**

Examples of clinical practice related to anaesthesia and or pain medicine that would not be expected to involve AGPs include:

- Regional anaesthesia and local infiltration.
- Conscious sedation.
- Vascular access (Peripheral intravenous, central venous catheter, arterial).
- During recovery from an AGP after an appropriate period of time has elapsed.
- Consultations including pre-operative assessments, pain management consultations and other consultations when located less than 1.5 metres from the patient.

The generally accepted requirement to don airborne PPE within 20-30 minutes of an AGP (according to local room ventilation conditions) applies to situations in which unintended conversion to general anaesthesia occurs. In anticipation of this, consideration should be given to using **airborne precautions** in preparation for time critical situations, such as emergency caesarean section, irrespective of the primary mode of anaesthesia.

## 4.2 Safe use of PPE

Epidemiological evidence regarding HCW infections strongly links transmission risk to training and compliance with behaviours that achieve maximum benefit from PPE<sup>3</sup>.

- 4.2.1 Established categories of PPE (contact, droplet or airborne) should be adhered to rather than novel classifications.
- 4.2.2 When PPE is used, particular attention should be paid to maintaining vigilance to avoid unintended self-contamination during wearing, donning, and doffing.
- 4.2.3 N95/P2 respirators require formal **fit-testing** to comply with the Australian and New Zealand standard AS/NZS 1715:2009 and the Australian Government infection prevention and control guidelines<sup>7,9</sup>. While this may not be attainable in the short-term, the college recommends that organisations commit to providing fit testing for HCWs within an ongoing program of testing and HCW education. As the minimum standard, in the first instance, HCWs should be **fit-checked** by a suitably trained person. Thereafter, clinicians should ensure they perform a fit-check on every occasion in which they don a N95/P2 mask<sup>7</sup>.
- 4.2.4 Clinicians should be aware of the level of protection offered by N95/P2 respirators, of which there are two types: “standard” and “surgical”. Only surgical N95 respirators are fluid resistant and are the only suitable masks for effective protection in the clinical workplace where fluid resistance is also required<sup>10</sup>.
- 4.2.5 Many organisations are exploring ways to “re-process” N95 respirators, if supply becomes critical<sup>11</sup>. Advice on suitable decontamination arrangements should be obtained from the manufacturer, supplier or local infection control unit, prior to entertaining this practice<sup>7</sup>.

- 4.2.6 Following the completion of any AGP the operating theatre should remain vacant for the time required for the ventilation system to remove 99 per cent of the air. The recommendation is to wait for 10-12 room air changes with the theatre doors closed<sup>12,13</sup>. Aerosol clearing times should be determined according to the capacity of local facility ventilation system.
- 4.2.7 Patients who, after risk assessment, are considered to be high risk should be counselled to follow risk mitigation strategies including hand hygiene, cough etiquette, social distancing and wearing of surgical face mask in the presence of HCWs. It is recognised that these measures may be difficult to reliably achieve due to circumstances of illness and or presentation<sup>7</sup>.

### **4.3 Training and preparation**

It is well recognised that donning and in particular doffing of PPE carry risks of transmission of infection from patients to healthcare workers. It is essential that all anaesthesia and pain medicine providers have received expert training on the use of PPE and the management of anaesthesia related AGPs. This may take the form of watching videos and/or simulation training. There are a number of resource links for this on the college [Library Guide pages](#).

### **4.4 Wellbeing and workforce**

During the pandemic it is highly important that clinicians actively manage their own wellbeing and contribute to the wellbeing of others. Buddy systems, mental health advice access and virtual social events, among other initiatives, may assist everyone to recognise signs of stress and support colleagues to develop coping strategies. There are a number of resource links for this on the college [Library Guide pages](#).

This is a stressful time and clinicians need to stay well to be able to lead their departments and hospitals through this crisis. Workforce constraints will undoubtedly limit the provision of services in places. A range of organisational strategies are considered beneficial in minimising HCW infection<sup>2,14</sup> including case load management, environmental controls and surge planning.

### **4.5 PPE Supplies**

The college is also aware that the PPE supply may be variable in certain areas at times. While the college cannot control that process, it categorically supports the need for healthcare workers to be protected from the risk of transmission and is actively consulting with fellows and government to ensure that government strategies are informed by up to date information and in the best interests of anaesthesia and pain medicine providers across all regions and sectors. Provision of timely and accurate information about local patterns of disease will improve clinician / institution engagement and help to embed agreed PPE guidelines.

## **5 Further Resources**

The college has created a COVID-19 section in [Library Guide pages](#) on the college website. This has a wide range of guidelines and advice documents, classified under tabbed categories for ease of searching. It includes advice and guidance on well-being, curated by the [Wellbeing Special Interest Group](#) and the resources on the site are actively curated to ensure they are up-to date.

## 6 Acknowledgements

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## 7 Disclaimer

The Australian and New Zealand College of Anaesthetists (“The College”) has issued this statement as guidance for its members and for the wider clinical community and is based on the best evidence at the time of publication. The College accepts no liability for any harm or adverse outcomes resulting from actions taken on the basis of this statement.

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## Appendix 1: Classification of infection control precautions

Personal Protective Equipment (PPE) refers to any device, garment or appliance designed to be worn or held by an individual for protection against one or more health and safety hazards. In the setting of healthcare, PPE refers to protective clothing, helmets, gloves, face shields, goggles, facemasks and/or respirators or other equipment designed to protect the wearer from injury or the spread of infection or illness<sup>15</sup>. The term “precautions” can be used synonymously with “protection”, however, it also refers to the broader suite of measures (behavioural, environmental and organisational) required to protect patients and healthcare workers.

PPE is one component of a hierarchy of protective measures (precautions) for healthcare workers. The broad classification of these measures is specified as follows<sup>7</sup>:

- a. **Standard precautions** provide a basic level of protection and should be used for all patients regardless of risk stratification. Standard precautions are outlined in ANZCA professional document *PS28 Guideline on Infection Control in Anaesthesia*<sup>4</sup>.

Standard precautions include a range of behavioural, environmental and equipment related measures, including hand hygiene, cough etiquette, environmental cleaning and aseptic precautions. Specific items of PPE should be fit for purpose and relevant to the situation and may include: sterile or non-sterile gloves, protective eyewear or face shields and surgical masks<sup>7,16</sup>. Gloves, mask and eye protection are generally employed as the minimum measures and PPE for procedures undertaken in the course of anaesthesia and pain medicine where there is the likelihood for splashing, splattering or spraying of blood or body fluids.

The use of sterile or non-sterile **gowns** or plastic aprons should be guided by the likelihood of splashing, splattering or spraying of blood or body fluids<sup>2</sup>.

- b. **Transmission-based precautions are used in addition to standard precautions** where the suspected or confirmed presence of infectious agents represents an increased risk of transmission
  - I. **Contact precautions** comprise the use of gloves, a theatre scrub suit or protective gown and / or apron.
  - II. **Droplet precautions** comprise a surgical mask (minimum level 2 barrier)<sup>17</sup>, eye shield or goggle protection, an impervious apron or long sleeve gown and gloves.
  - III. **Airborne precautions** for the primary airway proceduralist and team include N95/P2 respirator, eye shield/goggle protection, long-sleeved fluid impervious gowns, gloves +/- double gloves. The use of powered air purifying respirators (PAPRs) may also be considered but it is acknowledged that their use requires specific training in donning and doffing and supply may be limited. It is imperative that disposable headwear be worn in operating theatres and if required by local infection control policy and discarded safely after any case. Local guidelines on treatment of footwear should be followed, as these vary considerably.

Recommendations regarding specific items of PPE for the three levels of transmission-based precautions are generally consistent across infection prevention and control guidelines.

**Infographics** may be useful as a guide to the minimum PPE required however clinicians should be aware of specific PPE requirements relevant to their national and jurisdictional health departments.

## Appendix 2: Risk stratification and case definitions

Risk stratification of patients is a key component of strategies aiming to minimise transmission of infection between patients and HCWs. Early identification of high risk patients is essential. In this document, patients are empirically classified into high or low risk using established case definition and risk stratification criteria.

### a. High risk patients

High risk patients are those meeting case definition criteria for: **suspected, probable, under investigation (NZ only) or confirmed case**. As risk stratified case definitions and criteria vary slightly between agencies, it is important to be familiar with relevant guidelines as outlined in the [Australian Government COVID-19 National Guidelines for Public Health Units](#)<sup>18</sup> and the [New Zealand Ministry of Health guidelines](#) jurisdictional guidelines<sup>19</sup>.

Consultation with local infectious disease clinicians will guide risk stratification and management of patients whose risk of community-acquired transmission is uncertain and who may warrant consideration within the *suspect case* definition. Taking the most precautionary position, these would currently include a patient with at least one of the following respiratory symptoms: cough, sore throat, shortness of breath, coryza, anosmia or fever<sup>19</sup>.

It is acknowledged that the risk screening advice is changing in both countries, especially with regard to asymptomatic patients located in settings where clusters of community-acquired infection are identified. Clinicians are advised to base their risk stratification decisions on the most recent case definitions and local specialist infectious diseases advice, as available. It is acknowledged that access to infectious diseases advice is limited in some areas, specifically some rural/regional communities. In these circumstances, decisions need to be made utilising the most appropriate information available, including public health data on geographical clusters.

### b. Low risk patients

In the context of this document, patients who do not meet any of the above criteria are considered low risk.

### Appendix 3: Aerosol generating procedures (AGPs)

There is broad consensus that SARS-CoV-2, like most respiratory viral infections, is transmitted by droplets or viral fomites the latter being transmitted via hands to respiratory or conjunctival mucosa following their contact with contaminated surfaces<sup>7,20-25</sup>. Some investigations have examined the possibility that SARS-CoV-2 also forms airborne particles less than 5 micrometres (um) in size, which can remain suspended in the air and may cause infection, if inhaled. Peak infectious diseases advisory groups conclude that transmission from the latter is unlikely on the weight of evidence however consider the risk for this is higher when AGPs are performed<sup>13, 16, 22-24</sup>.

Some debate surrounds the designation of procedures as AGPs due to scant evidence and varying degrees of convergence of expert opinion.

Based to an extent on evidence presented in a systematic review by Tran et al<sup>26</sup> there is consensus<sup>12, 16, 27, 28</sup> that the following procedures are AGPs:

- a. Bag and mask ventilation
- b. Tracheal intubation and extubation
- c. Ventilation via supraglottic airways (including insertion and removal)
- d. Non-invasive ventilation including CPAP and BiPAP

The college also believes there is sufficient convergence of expert opinion across agencies to categorically support the following procedures as being AGPs, on theoretical grounds<sup>12, 14, 16, 27, 29</sup>:

- e. High flow nasal oxygen therapy
- f. Use of nebulisers
- g. Suctioning of ETTs via open circuits
- h. Intentional or inadvertent disconnection/reconnection of closed ventilator circuit
- i. Upper and lower gastro-intestinal endoscopy (29)
- j. Diagnostic and therapeutic instrumentation of the airway including bronchoscopy and tracheostomy
- k. Surgical procedures or procedures involving high speed drilling within the upper respiratory tract.

#### Other potential AGPs

Experts taking a precautionary approach<sup>12</sup> might also consider the following to be AGPs: collection of induced sputum; chest physiotherapy; transoesophageal echocardiography; thoracic surgery in which the lung is entered; and insertion of intercostal catheters.

A precautionary position might also be adopted for patients such as highly symptomatic patients who have severe coughing<sup>24</sup>, screaming children<sup>14</sup> or distressed and vigorously exhaling patients<sup>30</sup>. The college notes that previous advice by the Infection Control Expert Group, the peak committee advising the Australian Health Protection Principle Committee, to use airborne precautions for care of patients with severe coughing has been withdrawn due to lack of supporting evidence and an assumption that surgical masks worn by patients and healthcare workers should provide adequate protection.

#### Aerosolisation risk posed by labour

There is broad consensus that anaesthesia procedures for women during normal labour are predominantly associated with surface contact and droplet exposure and are not aerosol-generating processes<sup>12,30-33</sup>. Adopting the abovementioned reasoning, it is the college's view that

any highly symptomatic and or distressed woman may present an exception to this, particularly if she is unable to wear a surgical mask.

There is no scientific evidence to support a position that administration of nitrous oxide (N<sub>2</sub>O) is an AGP. However, the college supports a theoretical argument that vigorous exhalation around the mouthpiece, rather than through it, has the potential to generate aerosols. Consequently, the college advises against the use of N<sub>2</sub>O as a first line mode of analgesia in patients at high risk for SARS-CoV-2 infection<sup>30, 32</sup>.

The college recommends early epidural analgesia, where appropriate, to assist with pain relief and to mitigate the risk of general anaesthesia in the event an operative delivery is required. However, it is acknowledged that epidural analgesia may not be feasible for all women.

In this event, N<sub>2</sub>O may represent one of few beneficial options for labour analgesia. Where N<sub>2</sub>O is administered to a patient at high risk for SARS-CoV-2 infection, it should be used in the presence of a face mask attachment, scavenging system and antiviral filter<sup>32</sup> and the woman should be coached to use the system in a controlled manner in which circuit leakage is minimal. Specific advice on circuits is available elsewhere<sup>34</sup>.

Women should also be counselled to comply with infection transmission mitigation strategies, such as social distancing, hand hygiene, cough etiquette and the wearing of a surgical mask, if the latter is tolerated<sup>32</sup>.

### **Cardiopulmonary resuscitation (CPR)**

Considerable debate exists regarding the transmission risk posed by chest compressions during CPR<sup>8,14,16,27</sup>. Defibrillation is not considered to be an AGP, however other procedures including bag and mask ventilation and endotracheal intubation are considered to be AGPs in this context. Cardiopulmonary resuscitation is generally provided according to advice in local health service protocols. Consequently, the college abstains from having a position on PPE for chest compressions and advises clinicians to comply with local protocols.

**Appendix 4:** Recommendations for PPE according to SARS-CoV-2 case definitions and community transmission risk\*

**1. Low community transmission risk**



**2. Moderate community transmission risk**



**3. High community transmission risk**



\* Determination of 'Low risk of SARS-CoV-2' and High risk of SARS-CoV-2' ['Suspected/probable or confirmed] should be based on **national case definitions** and guided by local infectious diseases and public health advice.

Community transmission risk should be determined qualitatively by public health authorities as low, moderate or high or according to locally derived organisational risk matrices. This categorisation informs decisions to upgrade PPE from 'business as usual' as the risk of transmission from pre-symptomatic or asymptomatic people infected with SARS-CoV-2 within the community increases in those patients otherwise defined as low risk according to case definition criteria. This determination is based on multiple factors including changing population prevalence in geographically localised areas, and should be based on the advice of epidemiologists, infectious diseases specialists and public health specialists.

\*\* AGPs: a. *Bag and mask ventilation*; b. *Tracheal intubation*; c. *Tracheal extubation*; d. *Ventilation via supraglottic airways (including insertion and removal)*; e. *Non-invasive ventilation including CPAP and BiPAP*; f. *High flow nasal oxygen therapy*; g. *the use of nebulisers*; j. *Non-anaesthesia instrumentation of the airway including bronchoscopy and tracheostomy*; surgical or other procedure where there is close and or prolonged exposure to secretions from the airway; and *anaesthetic procedures on highly symptomatic and or distressed symptomatic women during labour, particularly procedures provided for patients who are unable to wear a surgical mask*.