



Senate Select Committee on COVID-19

Australian Society of Anaesthetists (ASA) Submission

28 May 2020

Australian Society of Anaesthetists

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28 May 2020

Committee Secretary
Department of the Senate
PO Box 6100
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Canberra ACT 2600

By online submission -

https://www.aph.gov.au/Parliamentary_Business/Committees/OnlineSubmission/Submit

Dear Senate Committee,

Australian Society of Anaesthetists (ASA) submission on Australian Government's response to COVID 19

The Australian Society of Anaesthetists (ASA) is the peak body and leading representative of the professional and economic interests of Australian anaesthetists. The ASA was established in 1934, and represents Australian anaesthetists who are highly trained medical doctors, working in both private and public hospitals in Australia.

As a speciality, we are known for our preparedness and ability to remain calm. As the spread of COVID-19 gathered pace around the world the ASA took steps to support frontline Australian anaesthetists by establishing an ASA COVID-19 Working Group (COVID Working Group). The role of the Working Group is to review information and develop guidance for anaesthetists in Australia regarding the peri-operative management of patients in order to minimise the spread of SARS-CoV-2 within the health system and broader community.

The first set of ASA COVID-19 guidelines were published on 13 March on topics such as staff protection and personal protective equipment (PPE), airway management and pandemic planning. These are publicly available and have been reviewed and updated on a regular basis.

Professional standards exist to protect patients and also to protect anaesthetists, and are fundamentally based on safety. Professional standards are generated through the application of safety principles and, where available, appropriate and contemporary best scientific evidence. The ASA ensures that professional standards are maintained through a governing Board and Council and key committee structures that ensure guidelines are produced to the highest quality.

All guidelines are available here <https://asa.org.au/covid-19-updates/>

Infection Control Expert Group (ICEG)

On 8 April, the Department of Health established the Infection Control Expert Group (ICEG) to advise the Government on specific PPE Guidelines. Medical specialty groups, such as the ASA were asked to seek input and endorsement of any guidelines on infection prevention control during COVID-19. The

experts on this panel consist of infection control individuals without frontline clinicians from anaesthesia, emergency medicine, intensive care or general practice. In addition, there has been a lack of consultation with professional representative bodies regarding the development of the ICEG guidelines or their implementation.

ASA Position Statement 20 Personal Protective Equipment (PPE)

The ASA submitted Position Statement 20 Personal Protective Equipment (PPE) for Aerosol Generating Procedures (AGP) in patients at high risk of COVID-19 (**Attachment A**).

The ASA made six recommendations of which three (**recommendations 3,4 and 5**) have been **rejected** by ICEG.

Summary of recommendations on PPE for managing of suspect / known COVID-19 patients by anaesthesia teams:

1. We encourage all health services to provide anaesthetists and anaesthetic assistants with PPE in accordance with the National Guidelines and Australian Standards, except where State guidance recommends a higher level of PPE.
2. We recommend the anaesthetic team should not undertake or be required to undertake tasks requiring PPE in situations where PPE is not available for use. Any such tasks should not proceed until required PPE is made available.
3. **In ensuring adequate PPE, we encourage fit-testing and a fit-check be performed and suggest that a fit-check alone is insufficient. We suggest fit-testing to be performed with a range of respirators and compulsory training as to their correct use is provided.**
4. **Where fit-testing is not available, we suggest Powered Air Purifying Respirators (PAPR) be considered.**
5. **As further evidence emerges regarding COVID-19 we recommend 'full PPE' including coverage of the head and feet also be considered.**
6. We recommend all anaesthetists undertake training until they are proficient in the donning and doffing of PPE and team-based simulation for protected intubation and extubation as a minimum.

We believe the ICEG advice to the Government missed the following important elements by omitting the following studies which further supports the ASA recommendations.

Fit-Testing

The ASA maintains that fit-checking alone is insufficient. Fit-testing with a qualified fit-tester provides education about how to don a respirator correctly, what a correctly fitted respirator feels like and how to fit-check it correctly. Our experience has been that many healthcare workers are self-taught to fit-check or taught by others who lack expertise in this area. Thus, we maintain that a fit-check alone is

insufficient based on multiple research studies and expert opinion consistently indicating that fit-check (user-seal check) is unable to serve as an effective alternative to fit-testing because of its low accuracy and predictive value. In the current Australian context where fit-checking may be taught in an ad hoc manner by inexperienced trainers it could be anticipated that the reliability of fit-checking would be no better than in a research setting.

In light of the National Standards Guidelines (AS/NZS1715:2009) and the ICEG recommendation that fit-testing is “the gold-standard for use of P2/N95 respirators”, the ASA has amended our position on fit-testing. Our current position is that “**fit-testing is essential to ensure respirator masks will provide effective protection**”. Employers or workplaces must plan and provide or facilitate fit-testing and training expeditiously for all at-risk anaesthetists and associated staff as part of ensuring reasonable workplace protections.

Where fit-testing is not available or when fit-testing has failed to identify a single-use respirator that is able to fit, the following options are available to healthcare workers:

- Removing the worker from high-risk duties or
- Providing a powered air-purifying respirator (PAPR); or
- Providing a reusable respirator, however these require fit-testing whereas a loose-fitting PAPR with a full hood does not.

Therefore, we continue to maintain that **PAPR be considered where fit-testing is not available**. This aligns with the Communicable Diseases Network Australia (CDNA) National Guidelines for Public Health Units (v2.11) that if “a suitable P2/N95 respirator cannot be found and [sic] alternative respirator – e.g. PAPR – should be considered”.

With regard to the recommendation that ‘**as further evidence emerges regarding COVID-19 we recommend ‘full PPE’ including coverage of the head and feet also be considered**’: We wish to clarify that head and neck and foot coverage are not the “disposable caps and shoe covers” referred to in the ICEG response to ASA recommendations.

Experience from overseas demonstrates that the current level of airborne precautions is insufficient in preventing contamination for those involved with high-risk AGP’s. Recommendations from China, Italy and Canada describe a third level of precaution. The ASA has adopted the Canadian nomenclature “enhanced airborne precautions” for high-risk aerosol generating medical procedures.

In addition to the studies included in ASA PS 20, other studies recommend neck covering as well as a gown, two pairs of gloves and access to shower facilities after doffing PPE. The neck has been shown to be an area subject to a high degree of contamination in simulated studies. Due to the proximity to mucous membranes, contamination of the neck could provide a source of further contamination and infection during doffing and the removal of clothing.

The risk of self-contamination from disposable shoe covers during doffing is uncertain as the available evidence is only from small studies.

Due to the uncertainty regarding the exact level of PPE for high-risk aerosol generating medical procedures, we maintain this recommendation with the updated nomenclature **that 'as further evidence emerges regarding COVID-19 we recommend 'enhanced airborne precautions' including coverage of the head and feet also be considered'**.

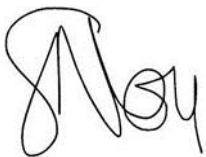
In summary, the ASA will not delete the three recommendations rejected by ICEG but allow for the following amendments based on the additional studies provided.

ASA summary of recommendations:

- We recommend the anaesthetic team should not undertake or be required to undertake tasks requiring PPE in situations where PPE is not available for use. Any such tasks should not proceed until required PPE is made available.
- In ensuring adequate PPE, we regard fit-testing as essential to ensure respirator masks will be effective protection. Fit-checking must be performed however a fit-check alone is insufficient. We suggest fit-testing to be performed with a range of respirators and compulsory training as to their correct use is provided.
- Where fit-testing is not available, we suggest PAPR be considered.
- As further evidence emerges regarding COVID-19 we recommend 'enhanced airborne precautions' including coverage of the head and feet also be considered.
- We recommend all anaesthetists undertake training until they are proficient in the donning and doffing of PPE and team-based simulation for protected intubation and extubation as a minimum.

If you require any further information or would like to discuss further, please do not hesitate to contact Ms Jacintha Victor John, Policy Manager on (02) 8556 9720 or via email jvictorjohn@asa.org.au in the first instance.

Yours sincerely,



Dr Suzi Nou
President
Australian Society of Anaesthetists

Attachment A

Australian Society of Anaesthetists – ASA-PS20
Position Statement (PS) on Personal Protective Equipment (PPE)
for Aerosol Generating Procedures (AGP) in patients at high risk of
COVID-19

Position statement

ASA Position Statement on Personal Protective Equipment (PPE) for Aerosol Generating Procedures (AGP) in patients at high risk of COVID-19

Purpose

This Position Statement has been prepared by the ASA to provide evidence-based guidance on personal protective equipment (PPE) for anaesthetists and anaesthesia assistants in Australia performing aerosol generating procedures (AGPS) in patients who are at high risk of COVID-19. It is hoped that within a health setting there is collaboration so that any differences in PPE are minimised or that staff are aware of why these differences have been agreed upon. This Position Statement does not consider the PPE requirements for managing patients at low-risk of COVID-19.

Background

In the hierarchy of hazard control, PPE is regarded as the last line of defence and least effective to minimise exposure to hazards. The other components, in order of importance are: elimination, substitution, engineering controls and administrative controls.

Some examples in the setting of managing COVID-19 by anaesthetists are:

1. Elimination – Keeping COVID-19 patients from having unnecessary surgery and managing patient flows in a hospital, or cohorting high, intermediate or low risk patients between different facilities.
2. Substitution – Performing regional anaesthesia instead of a general anaesthetic which would involve an aerosol generating procedure (AGP).
3. Engineering controls – Converting positive pressure rooms to negative pressure or enabling only swipe card access.
4. Administrative controls – Introduce training, proper rostering to minimise fatigue, provide extra staff so that there is an 'inside' and 'outside' team sign posting for 'hot', 'warm' and 'cool' zones.

Even with all these controls in place, anaesthetists and anaesthetic assistants will find themselves performing high risk procedures on high risk patients and will be reliant on effective PPE to prevent health care worker (HCW) exposure to the SARS-CoV-2 virus and infection leading to COVID-19 infections.

Anaesthetists are regarded as the 'airway experts' and will increasingly be called upon to intubate COVID-19 patients, as well as performing AGPs in their usual practice. It has previously been reported that "healthcare worker involvement with tracheal intubation conferred a 13-fold higher relative risk ratio for acquiring SARS infection when compared to healthcare workers not participating in tracheal intubation."¹

This hierarchy of hazard control has been evident with the rates of HCW infection from SARS-CoV-2 in Wuhan, China.

From Dec 2019 to Jan 22, there was a high HCW infection rate ranging from 3.5-29%. This was due to the poor awareness of the highly contagious nature of SARS-CoV-2 and inadequate protection of HCWs.

On 23 January 2020, when authorities recognised COVID-19 as a disease, a lockdown was imposed on Wuhan. During this second stage, the lockdown impacted the production and supply of PPE, thereby, increasing the number of HCWs infected during this period.

Due to the lack of preparedness by February 11, there were 1,716 HCWs infected, including 5 deaths. During the third stage where the severity of the disease was fully acknowledged all HCWs were fully protected. There was increased hazard control, with cohorting of patients to COVID-19 dedicated hospitals, increased population measures such as social distancing and the wearing of face masks in public and institution of 'full PPE'.² Wuhan maintained these precautionary measures in the face of potential disaster and during this phase there were no HCW infections. Similar accounts have emerged in Italy, another country greatly impacted by COVID-19 and where more than 5000 HCWs have been infected. In previous settings, HCWs are over-represented in the number of cases, for example, 22% of SARS cases occurred in HCWs.

When implementing recommendations all healthcare facilities need to consider the high-risk transmission of COVID-19 to HCWs and encourage to implement measures according to their specific facility setting and circumstances.

PPE for managing patients with known or suspected COVID-19

PPE

Summary of recommendations

We encourage all health services to provide anaesthetists and anaesthetic assistants with PPE in accordance with the National Guidelines and Australian Standards, except where State guidance recommends a higher level of PPE. The anaesthetic team is not to undertake or be required to undertake tasks requiring PPE if the PPE is not available for use. Any such tasks are not to proceed until required PPE is available.

In ensuring adequate PPE, we request fit-testing and a fit-check (user-seal check) to be considered and suggest that a fit-check alone is insufficient. We encourage fit-testing to be performed with a range of respirators and that training as to their correct use is provided. Where fit-testing is not available, we suggest that powered air-purifying respirator (PAPR) be considered. As further evidence emerges regarding COVID-19 we recommend 'full PPE' including coverage of the head and feet also be considered.

We acknowledge that ideally, fit-testing, training and fit-checking be part of a risk management program that is best implemented prior to a pandemic. We commend the many health services that have undertaken fit-testing and all other endeavours in the initial phase of this pandemic to reduce transmission of SARS-CoV-2 to HCWs.

Fit-testing

Fit-testing is not equivalent to fit-checking. It can be performed quantitatively or qualitatively by a qualified fit-tester. Quantitative assessment is performed using a particulate counter and qualitative assessment involves being able to smell or taste a test agent.

We recommend anaesthetists and anaesthetic assistants wear a fit-tested as well as fit checked N95/P2 respirator or higher level of protection for airway management, where fit-testing is able to be attained. This recommendation is in accordance with the Australian Standard AS/NZS 1715:2009³ that "it is essential that an adequate face seal is achieved i.e. to be properly fitted to the wearer. The program administrator *shall* (emphasis added) ensure a suitable fit test is carried out for all users of respiratory protective equipment (RPE) with a close fitting facepiece". We note that AS/NZS 1715:2009 does not mandate fit testing but that it should be made available and recommends it to be performed on an annual basis.

Fit-testing is also recommended in the *Australian Guidelines for the Prevention and Control of Infection in Healthcare*.⁴ The guidelines identify proper size and style of respirator suitable for an individual. The NHMRC recommends that a “*risk-management approach should be applied to ensure that staff working in high-risk areas are trained in appropriate fit of the P2 respirator and how to perform a fit check at the point of use*” and that this may also include fit-testing. While fit testing may be complex and resource intensive, it is a valuable practice which provides an opportunity to educate healthcare professionals.

The World Health Organization “Infection Prevention and Control guidance for Long-Term Care Facilities in the context of COVID-19 – interim guidance 21 March 2020 also states “use N95 mask only if the LTCF (long-term care facility) has a programme to regularly fit-test employees for the use of N95 respirators”.

Despite these recommendations in the Australian Standards, NHMRC and WHO, there is little evidence that demonstrates that fit-testing results in less transmission of respiratory viruses. In an under-powered cluster study of 1441 HCWs in Beijing that compared medical masks, fit-tested N95 and non-fit tested respirators against a convenience group of 481 HCWs who didn’t wear masks, N95s were associated with lower rates of infection, although this result was not statistically significant. Those in the fit-test N95 cluster reported less hand hygiene than the medical mask and non-fit tested N95 groups.⁵

Fit-testing of a range of respirators be undertaken with training

If fit testing is to be undertaken, workplaces should offer respirators of different sizes in order to increase the number of HCWs who adequately pass fit-testing.⁶

The US CDC recommends that fit-testing is a ‘critical component’ to a respiratory protection program” and that it be performed on an annual basis with the initial test to be performed to determine the right model, style and size.⁷ Therefore it is recommended that fit-testing is performed on an annual basis and that fit-checking be performed every time a respirator is worn.

The efficacy of a respirator is dependent on the maintenance of a tight face seal to prevent contaminated air from bypassing the filter and prior fit-testing does not assure success in attaining and maintaining a tight face seal.⁸ In a simulated patient model, an inappropriately worn N95 respirator functioned less effectively than a poorly fitted N95 respirator. The authors concluded that for PPE “to provide the needed protection to workers, they must be part of a respiratory protection program that includes training and fit testing of workers for the PPE they will use”.⁹ As fit-testing only indicates the degree of fit at the time of testing, it should occur in the workplace or a simulated workplace test should be included.¹⁰

Annual training and fit-testing may be insufficient in maintaining proper use. In a study of 43 untrained fit-tested HCWs followed for 14 months, 44% successfully passed fit-testing without specific instruction. This increased to 74% after initial training. The remainder passed fit testing with other types of respirators.¹¹ This supports the recommendation that workplaces should offer respirators of different sizes and types in order to increase the number of HCWs who adequately pass fit-testing.¹² Failure rates of fit-testing were high at 3 and 14 months follow up but pass rates remained high amongst regular users and wearing an N95 in daily work improves the success of maintaining a face seal. During the current pandemic, it could be anticipated that there is a high motivation to ensure correct use and that use will become regular by anaesthetic teams.

In the absence of formal fit-testing, it can be expected that approximately 75% of HCWs will achieve an adequate fit. Correct strapping and adjusting of the nose-bridge piece appeared to be the most important actions in predicting an adequate seal.¹³

Fit-checking alone may be insufficient

Fit-checking (user-seal check) is a self-determined test performed according to the manufacturer's recommendations and usually just prior to entering a hazardous environment. It can involve a negative and/or positive pressure check as well as checking that the respirator and straps are seated correctly. The positive pressure fit check confirms that no air escapes from around the mask during exhalation. The negative pressure fit check confirms a vacuum is created causing the mask to be drawn in slightly during inspiration.

Fit-checking without fit-testing has been shown to be inadequate. In a Canadian study of 784 participants, less than 1% of those who had never previously been fit-tested identified an inadequate seal during user seal check. Of these, half went on to pass both qualitative and quantitative fit-testing and half failed both. Of the remaining subjects who considered they had an adequate seal, 25% failed quantitative fit-testing and 14% failed qualitative fit-testing.¹⁴ Of note, 137 of these subjects had previously been fit-tested and indicated they had an adequate fit-check. However, 30% and 25% failed the quantitative and qualitative fit tests respectively. Failure of fit checking in these subjects who had previously been fit-tested may indicate inadequate implementation of the fit-testing, such as provision of training and regular use, as well as that of the fit-testing itself. It may also indicate why Chinese and Italian health professionals recommend the use of hoods that cover the head and all facial skin.

Similarly, in a Hong Kong study, fit checking incorrectly identified whether a respirator passed quantitative fit-testing on 18-31% of occasions. Fit checking also incorrectly identified that the respirator did not fit on 21-40% of occasions, with the authors concluding that the user "fit check should not be used as a surrogate fit test".¹⁵

Consideration of PAPR if fit-testing is not available

Where fit-tested (not checked) N95/P2 respirators are not available we suggest the use of a PAPR be considered. This is based on AS/NZS 1715:2009: "risk group 4 (the highest) requires PAPR-P3 filter with full facepiece of head covering and blouse or full body air-supplied positive pressure suit". We consider COVID-19 to fit within risk group 4 (High individual and community risk, without effective and preventative treatment measures available).¹⁶

PAPR provides a 100-fold higher level of protection than an N95,¹⁷ however this may not be translated to clinical practice. A 2019 Cochrane review found the "use of PAPR may protect better than a simple ensemble of PPE (RR 0.27, 95% CI 0.17–0.43) based on low quality studies."¹⁸

One of these studies considered infection of 33 Canadian health care workers involved with tracheal intubation during two epochs of the 2003 SARS epidemic. All three of the SARS infections occurred during SARS 1, with 23 HCWs involved in SARS1 and 10 in SARS2, performing 39 tracheal intubations across the epidemic. The use of PAPR, N95 respirators, face shields and gloves increased but the use of surgical masks decreased during SARS 2.¹⁹

Another study reviewed 43 nurses who worked at least one shift in a critical care environment where there was a patient with SARS. Of the 43, eight were infected. They found a near 80% reduction of risk for infection in nurses who consistently wore either a surgical mask or N95 respirator (RR 0.23, 95%CI 0.07–0.078, $p < 0.02$). Two of 16 nurses who consistently wore an N95 mask acquired SARS.²⁰

In a human model where 58 healthy subjects were exposed to live attenuated influenza vaccine, influenza virus was detected in three of 29 subjects wearing a qualitative fit-tested N95 compared to no virus found in the 29 subjects wearing PAPR vs N95, although the difference in rates was not statistically significant (10% difference, $P=0.24$, 95% CI -17% -37%).²¹

A cross-over study compared 50 subjects in enhanced PPE (hair cover, goggles, face shield, N95, two pairs of gloves and impervious surgical gown) versus PAPR with a Tyvek hood, coveralls and boot covers contaminated with a fluorescein solution. It found that wearing of PAPR resulted in less contamination, particularly to the neck and wrists. PAPR use took more time (>6 mins vs <2 mins for enhanced PPE) and there were more donning and doffing violations; however only 33 had received any prior PAPR training.²² Despite the protocol violations, there was less contamination when wearing PAPR.

We note that use of a PAPR suit requires extra training in donning, doffing, decontamination, maintenance and checking and that extra personnel may be required for these processes. PAPR impedes performance of manual procedures, communication between team members can also be more challenging due to noise from the power unit and may trigger claustrophobia. Due to the positive outward airflow, PAPR may be contraindicated for use during surgery.

‘Full PPE’

The exact combination of PPE to prevent transmission of the SARS-CoV-2 virus to HCWs is still not established at this time. The Joint Task Force of the Chinese Society of Anesthesiology and the Chinese Association of Anesthesiologists, following their experience with 81,747 confirmed cases of COVID-19 of which 1716 were HCWs (including 5 deaths) recommend a “disposable surgical cap, *test-fit* N95 respirators, gloves, goggles or face shield, gown and fluid resistant shoe-covers” (emphasis added).

The Joint Task Force made the distinction that the “key element... is complete coverage of the head and facial skin, which does not necessary mean a conjoined hood or even a PAPR”.²³ The suggestion of complete coverage of the head is plausible given that fit-tested N95 respirators performance may be reduced with movements such as head nodding and bending at the waist.²⁴ Similarly, the Italian recommendation for airborne PPE is a helmet, cover or hood, P2 respirator or higher, goggles or a face shield (if no helmets); hazmat suits or long-sleeved fluid resistant gowns, double gloves and overshoes.²⁵ They do not, however, mention fit-testing or PAPR. The highest level of protection in the Chinese COVID-19 handbook²⁶ includes surgical cap, N95 respirator, work uniform, disposable protective uniform, gloves and a full-face respiratory protective device or PAPR. In a case series of 202 intubations performed in Wuhan with no HCW infections, PPE comprised of N95 respirator and surgical mask, goggles, protective cover-all with hood and foot covers as in inner layer with a water-resistant gown, face shield and a full hood with or without a PAPR and two pairs of gloves.²⁷

A Canadian centre, following simulation testing have modified their PPE from a microfibre gown, N95 respirator, visor and gloves, which is similar to the current Australian recommendations, to disposable surgical gown with knee high boots or coveralls with booties, neck protection and high cuff gloves as part of double gloving.²⁸ This study and the Chinese COVID-19 Handbook also recommend showering after doffing PPE.

Study	Cap	N95/P2	Gloves	Goggles or face shield	Gown	Shoe covers	Head and face
CSA and CAA Joint Taskforce ²⁹	X	Fit tested	X	X	X	X	Conjoined hood or PAPR
Sorbello, Italy ³⁰		X	Double	X	Or Hazmat suit	X	Helmet, cover or hood
COVID handbook (China) ³¹	X	X	Double	X	Disposable coverall and outer gown	X	Full face respirator or PAPR
Yao, 202 intubations (China) ³²		X AND surgical mask	Double	X	Inner coverall AND outer water-resistant gown	X	Face shield with full hood +/- PAPR
Shannon (simulation, Canada) ³³		X AND Surgical mask with visor	Double, one pair high-cuffed	(Visor on surgical mask)	Surgical gown or coverall	Knee high booties or coverall with booties	Surgical hood with ties
Australian CDNA ³⁴		Fit checked	X	X	X		

Training

Training in infection control before patient contact has been shown to be protective during SARS in Hong Kong³⁵ and Beijing.³⁶ SARS infection control training of less than 2 hours was associated with increased risk of acquiring SARS (adjusted OR = 13.6, 95% CI 1.24 to 27.50, P = 0.002). Sorbello (2020) recommends “team briefing and co-ordination, task assignment and briefings, team training and the use of checklists and cognitive aids” as all being crucial to reduce physical and cognitive work-loads.³⁷

We recommend

All anaesthetists undertake training until they are proficient in the donning and doffing of PPE and team-based simulation for protected tracheal intubation and extubation as a minimum.

Staffing

Where procedures at high risk of generating aerosols (AGPs) are performed, we recommend an additional staff member be allocated whose sole role is to supervise for PPE breaches (PPE spotter, buddy or guardian). This includes overseeing donning and doffing of PPE. Having a PPE supervisor is advantageous. To minimise the number of people at risk, the supervisor should only observe and instruct and not physically assist the person in removing their PPE.³⁸

PPE for non-COVID-19 patients

Current standard precautions include the use of a surgical mask and gloves for patient interactions. There has been no Australian Government recommendation to use masks in non-patient contact or the community although this has been recommended in some countries during previous epidemics and with this current COVID-19 pandemic.

There have been case reports of COVID-19 patients diagnosed with acute haemorrhagic colitis³⁹ and acute viral hepatitis⁴⁰ and in both cases were afebrile and without respiratory symptoms at the time of presentation. In a case series of 138 patients from Wuhan, 10% of hospitalised patients presented with gastrointestinal symptoms which preceded fever and dyspnoea by 1-2 days.⁴¹

Exposure to unsuspected SARS patients in Beijing was associated with SARS infection⁴² and is characteristic of the first stage of COVID-19 in Wuhan and Italy, contributing to large numbers of early HCW infections.

Guidance on interventions appropriate for a continuous outbreak involving large numbers of hospitalised patients are not immediately relevant to areas where outbreaks are not occurring.⁴³ On March 29, New York City recommended that anyone presenting to New York City, regardless of symptoms be considered as positive for SARS-CoV-2. This recommendation has not yet been made throughout the United States. Thus, guidance to change standard precautions would depend on estimates of local prevalence (taking into account replication rates, testing rates, natural history of the infection) and infection control infrastructure such as surveillance, contact tracing and reporting of infections to local health services to facilitate a timely and coordinated response. This would likely require advice from infectious diseases and infection control and prevention professionals.

As such in Australia at this time any recommendation to encourage the widespread use of airborne precautions for all HCWs involved with any aerosol generating procedure needs to be balanced with the impact on supplies, particularly as COVID-19 impacts global supply chains and stockpiles. Although it may be regarded as more protective in the short term, any perceived or actual future lack of PPE could increase HCW infection, as occurred in Hong Kong during SARS.⁴⁴

Summary of recommendations on PPE for managing of suspect/known COVID-19 patients by anaesthesia teams

- We encourage all health services to provide anaesthetists and anaesthetic assistants with PPE in accordance with the National Guidelines and Australian Standards, except where State guidance recommends a higher level of PPE.
- We recommend the anaesthetic team should not undertake or be required to undertake tasks requiring PPE in situations where PPE is not available for use. Any such tasks should not proceed until required PPE is made available.
- In ensuring adequate PPE, we encourage fit-testing and a fit-check be performed and suggest that a fit-check alone is insufficient. We suggest fit-testing to be performed with a range of respirators and compulsory training as to their correct use is provided.
- Where fit-testing is not available, we suggest PAPR be considered.
- As further evidence emerges regarding COVID-19 we recommend 'full PPE' including coverage of the head and feet also be considered.
- We recommend all anaesthetists undertake training until they are proficient in the donning and doffing of PPE and team-based simulation for protected intubation and extubation as a minimum.

References

1. Bowdle A, Munoz-Price SL (2020). 'Preventing infection of patients and healthcare workers should be the new normal in the era of Novel Coronavirus epidemics', *Anesthesiology*. No pagination specified. doi: <https://doi.org/10.1097/ALN.0000000000003295>.
2. Chen W et al (2020). 'To protect healthcare workers better, to save more lives anesthesia and analgesia', *Anaesthesia and Analgesia*. Publish ahead of print, doi: 10.1213/ANE.0000000000004834.
3. Australian Standard AS/NZS 1715:2009, 'Selection, use and maintenance of respiratory protective equipment', Australian/New Zealand Standard.
4. 'Australian Guidelines for the Prevention and Control of Infection in Healthcare', Canberra: National Health and Medical Research Council (2019). <https://www.nhmrc.gov.au/about-us/publications/australian-guidelines-prevention-and-control-infection-healthcare-2019#block-views-block-file-attachments-content-block-1>. Accessed 2 April 2020.
5. MacIntyre et al (2011). 'A cluster randomized clinical trial comparing fit-tested and non-fit-tested N95 respirators to medical masks to prevent respiratory virus infection in health care workers', *Influenza and other respiratory viruses* 5(3), 170-179.
6. Kim H et al (2015). 'Assessing real-time performances of N95 respirators for health care workers by simulated workplace protection factors', *Industrial Health* 53(6), 553-561, doi: 10.2486/indhealth.2014-0259.
7. D'Alessandro M, Cichwicz JK (2020). 'Proper N95 respirator use for respiratory protection preparedness', Centres for Disease Control and Prevention. <https://blogs.cdc.gov/niosh-science-blog/2020/03/16/n95-preparedness/>. Accessed 2 April 2020
8. Tompkins et al. Personal protective equipment for care of pandemic influenza patients: a training workshop for the powered air purifying respirator, *Anesthesia and Analgesia*, October 2010, Volume 111, Number 4.
9. Noti JD et al (2012). 'Detection of infectious influenza virus in cough aerosols generated in a simulated patient examination room', *Clinical infectious diseases* 54(11):1569–1577, doi: 10.1093/cid/cis237
10. Kim H et al *op cit*.
11. Lee MC et al (2008). 'Respirator-fit testing: does it ensure the protection of healthcare workers against respirable particles carrying pathogens?' *Infect Control Hosp Epidemiol* 29(12):1149-1156, doi: 10.1086/591860
12. Kim H et al *op cit*.
13. Lee MC et al *op cit*.
14. Danyluk Q et al (2011). 'Health care workers and respiratory protection: is the user seal check a surrogate for respirator fit-testing?' *J Occup Environ Hyg*, 8(5):267-270, doi: 10.1080/15459624.2011.566016.
15. Derrick JL. 'Predictive value of the user seal check in determining half-face respirator fit', *Journal of Hospital Infection* (2005) 59, 152-155.
16. Australian Standard AS/NZS 1715:2009, 'Selection, use and maintenance of respiratory protective equipment', Australian/New Zealand Standard, p27.
17. Tompkins et al *op cit*.
18. Verbeek JH et al (2019). 'Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff', *Cochrane Database of Systematic Reviews*, 19(4): CD011621, doi: 10.1002/14651858.CD011621.pub3.
19. Caputo KM et al (2006). 'Intubation of SARS patients: infection and perspectives of healthcare workers', *Canadian Journal of Anaesthesia* 53(2):122-129.
20. Loeb M et al (2004). 'SARS among critical care nurses, Toronto', *Emerging Infectious Diseases* 10(2): 251- 255, doi: 10.3201/eid1002.030838
21. Bischoff WE et al (2017). 'Evaluation of a novel powered air-purifying respirator (PAPR) vs a N95 respiratory mask for the protection against influenza in a human exposure model', *Open Forum Infectious Diseases* 4(1): 168, doi: 10.1093/ofid/ofx163.298
22. Zamora JE et al (2006). 'Contamination: a comparison of 2 personal protective systems', *Canadian Medical Association Journal* 175(3): 249-254, doi: 10.1503/cmaj.060094
23. Chen W et al *op cit*.
24. Kim H et al *op cit*.
25. Sorbello M et al (2020). 'The Italian coronavirus disease 2019 outbreak: recommendations from clinical practice', *Anaesthesia*, p1-9, doi:10.1111/anae.15049
26. *Handbook of COVID -19 Prevention and Treatment*, The First Affiliated Hospital, Zhejiang University School of Medicine (2020).
27. Yao W et al (2020). 'Emergency tracheal Intubation in 202 patients with COVID-19 in Wuhan, China: lessons learned and expert recommendations', *British Journal of Anaesthesia* pre print.

28. Lockhart S et al (2020). 'Simulation as a tool for assessing and evolving your current personal protective equipment: lessons learned during the coronavirus disease (COVID-19) pandemic', *Can J Anesth*, published online: <https://doi.org/10.1007/s12630-020-01638-z>
29. Chen W et al *op cit*.
30. Sorbello M et al *op cit*.
31. *Handbook of COVID -19 Prevention and Treatment*, The First Affiliated Hospital, Zhejiang University School of Medicine (2020).
32. Yao W et al *op cit*.
33. Lockhart S et al *op cit*.
34. Coronavirus Disease 2019 (COVID-19) CDNA National Guidelines for public health units, <https://www1.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-novel-coronavirus.htm>
35. Lau J et al (2004). 'SARS Transmission among Hospital Workers in Hong Kong', *Emerg Infect Dis*, 10(2): 280-286, doi: 10.3201/eid1002.030534
36. Liu W et al (2009). 'Risk factors for SARS infection among hospital healthcare workers in Beijing: a case control study', *Tropical Medicine and International Health*, 14(1): 52-59, doi:10.1111/j.1365-3156.2009.02255.x
37. Sorbello M et al *op cit*.
38. Hall S et al (2019). 'Evaluation of existing PPE worn by NHS staff for assessment of a patient with a suspected high consequence infectious disease', Health and Safety Executive, Harpur Hill, Buxton, Derbyshire SK17 9JN.
39. Carvalho A et al. 'SARS-CoV-2 gastrointestinal infection causing hemorrhagic colitis: implications for detection and transmission of COVID-19 disease', preprint, accessible via: https://journals.lww.com/ajg/Documents/COVID19_Carvalho_et_al_AJG_Preproof.pdf Accessed 2 April 2020.
40. Wander P et al (2020). 'COVID-19 presenting as acute hepatitis', *American Journal of Gastroenterology* preprint.
41. Wang et al (2020). 'Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China', *JAMA*, 323(11):1061-1069, doi:10.1001/jama.2020.1585
42. Liu W et al *op cit*.
43. Nicolle L (2003). 'SARS safety and science', *Canadian Journal of Anaesthesia*, 50(10): 983-988, doi: 10.1007/BF03018360
44. Lau J et al *op cit*.

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