Consensus statement on the safe use of respiratory therapy and sleep studies to minimise aerosolisation of CoVID-19*

26 March 2020

Preamble

The Australasian Sleep Association (ASA) is mindful that many of our members are currently working with their hospitals and local health networks to plan for the inevitable increase in hospital admissions that will occur in the coming days and weeks. We know that respiratory and sleep clinicians will always try to do the best for their patients. This document has been developed with input from clinicians at different institutions (both public and private). This is a work in progress in a primarily evidence free zone and will continue to be updated as the pandemic evolves. We have much to learn from each other during this crisis and we must work together to minimize risk to ourselves and thus help our patients. It is hoped that this document will help to focus our thinking on how to work safely during this crisis and guide allocation of resources (equipment and manpower etc).

Background

CoVID-19 virus is highly contagious and capable of being spread by aerosolisation of respiratory droplets from infected patients to health care workers. As the number of hospitalised cases increases, it is essential to minimise the chance of aerosol spread within hospitals by restricting the use of some common respiratory therapies. As the pandemic spreads we will need to assume that all patients requiring respiratory therapy have potential CoVID-19 and be mindful that there is up to a 30% false negative rate for the viral swab.

The use of nebulisers, high flow oxygen and non-invasive ventilation all pose a risk of transmission of viral infection to staff and patients. While these therapies offer significant benefits to some patients, there are often alternative approaches to management that have less risk of transmitting viral infection via aerosolisation. **The risk of transmission can be minimised by restricting the use of these high-risk therapies to patients that really need them and ensuring health care workers are aware of the risks and use isolation /single rooms and personal protective equipment (PPE).**

Ideally this approach should be applied to all patients, even those who do not have suspected or confirmed CoVID-19. This is to minimise the risk of aerosolisation of virus in the patient that is asymptomatic but has CoVID-19. This is especially relevant in a paediatric setting where in contrast with infected adults, most infected children appear to have a milder clinical course

Address: 114/30 Campbell Street Blacktown NSW 2148 **ABN:** 51 138 032 014
Phone: 61 2 9920 1968 **Fax:** 61 2 9672 3884 **email:** admin@sleep.org.au **web:** www.sleep.org.au

including asymptomatic infections. Many hospitals have decided to have a designated CoVID-19 team seeing all patients and planning management.

Nebulisation and humidification

- Nebulisation of bronchodilators and steroids is not necessary for most patients and this therapy should be replaced by metered dose inhaler (MDI) with a spacer.
- Nebulisation of saline to improve sputum clearance should not be used.
- Nebulisation of antibiotics has clear benefit in only a very limited number of chronic respiratory diseases and should not routinely be used.
- If nebulisation is used in a patient with suspected or known CoVID-19, the patient should be managed in the highest level of isolation available (class N-negative pressure room is optimal, single room with door closed is adequate) with PPE precautions for health care personnel.
- Humidification should be avoided due to the risk of aerosolisation.

High flow oxygen

- For oxygen therapy the lowest flow rate of oxygen should be used to maintain oxygen saturations to minimize risk of viral aerosolisation. Although commonly used, high flow oxygen therapy via nasal prongs (HFNP) is unnecessary for many patients and this therapy should be replaced by O_2 via standard nasal prongs/cannula, Hudson mask, or non-rebreather mask.
- Some sleep physicians suggested that oxygen flow rates higher than 6L/min led to more aerosol dispersion and humidified HFNP with well-fitted nasal prongs may be a better option. This may potentially delay intubation or avoid it. The choice of therapy will depend on resources, staffing, PPE etc and should be made on a case by case basis after review by ICU/respiratory/sleep physician. However rapid intubation and ventilation remains the safest option to reduce the risk of aerosol transmission to health care workers in the current CoVID-19 setting. In China, patients on oxygen therapy wore masks and it is unclear whether this led to a reduction in aerosolization of virus.
- If a patient with suspected or confirmed CoVID-19 is a suitable candidate for endotracheal intubation and ventilation, HFNP should be avoided completely and early intubation considered to reduce risk of transmission to health care workers.
- If HFNP is to be used in a patient with suspected or known CoVID-19, the patient should be fitted with an interface to minimize leak in the highest level of isolation available (class N-negative pressure room is optimal, single room with door closed is adequate) with PPE precautions for health care personnel.

Non-invasive ventilation, including CPAP (acute)

- Non-invasive ventilation is delivered by a mask or mouthpiece and includes BiPAP and CPAP. As the pandemic spreads, we need to assume that all patients requiring NIV have potential CoVID-19 (including those with COPD/OHS etc), and therefore use double-limb non-vented masks with an expiratory filter in the circuit and PPE until swabs are negative (safest). When this equipment is depleted, single limb circuit with a well fitted non-vented full face mask, attached to an appropriate microbial filter and

exhalation port (on the side of the filter closest to the device) can be used with PPE (next best option). In both configurations, a humidifier should not be used as this will saturate the filter and increase airway resistance. The microbial filter should be replaced every 24 hours.

- Patients without suspected or proven CoVID-19 may be treated with non-invasive ventilation (NIV) for standard acute clinical indications. These patients will usually be managed in ICU (or in CCU for pulmonary oedema requiring CPAP) or in a specialized respiratory ward.
- Patients with suspected or proven CoVID-19 alone (i.e. no comorbidities) should not need bilevel NIV since hypoxemia is best treated with oxygen therapy and early intubation where necessary (i.e. bilevel NIV should be avoided). There may be a role for CPAP acutely to open up alveoli (PEEP) which may help to delay intubation or assist in the post-extubation phase. This should be considered on a case by case basis with careful attention to the use of non-vented masks and filters.
- However, some patients with comorbidities may develop an indication for NIV (e.g. acute hypercapnia due to COPD, obesity hypoventilation etc) and may be considered for acute NIV. In this situation there is a clear benefit to the patient to commence NIV.
- If NIV is used in a patient with suspected or known CoVID-19, the patient should be fitted with an interface with minimal leak in the highest level of isolation available (class N-negative pressure room is optimal, single room with door closed is adequate) and with “airborne” / PPE precautions.
- Planning needs to be underway for Phase 2 when all isolation rooms and ICU beds are full and there will be CoVID-19 designated wards. NIV may be needed in this situation and there will be a significant risk of aerosolised infection.
- It is recommended that all respiratory and sleep physicians and nurses be upskilled in the practical use of NIV.

Non-invasive ventilation, including CPAP (long term users) at home

- There is no evidence that the long-term use of NIV (including CPAP) increases the risk of development of upper or lower respiratory tract infections. Therefore, patients without suspected or proven CoVID-19 can continue their usual CPAP/Bilevel NIV.
- An important issue is possible aerosolization of upper airway secretions by NIV which may assist viral spread. This would likely occur via the exhalation port of the mask. Users of these therapies who are or are potentially infected with CoVID-19 should be aware of this possibility and should not use CPAP or bilevel NIV around others. This is relatively easy in most adults but very difficult to minimise household co-infection for paediatric patients where parents have necessary regular close contact and may co-habit the bedroom.
- Therapy continuation or discontinuation in the setting of suspected or proven CoVID-19 infection should be advised by the treating respiratory or sleep physician and individualised depending on patient- related risk/benefit.
- Manufacturer guidelines should be followed regarding cleaning/disinfection of mask and tubing.

- For CPAP users
    - **Adult or paediatric patients with suspected or proven CoVID-19 in the home environment should be advised to consider discontinuation of CPAP therapy until recovered (up to 14 days) under the advice of their sleep or respiratory physician.** Temporary cessation of CPAP is generally safe for patients. This is what has been suggested by AASM and is a conservative approach. Some sleep physicians felt that CPAP may be protective in this setting and given the importance of sleep on immune function that it could be continued if the patient could self-isolate. Other potential higher risk groups for cessation may include occupational drivers who become sleepy off therapy. This decision should be made by the treating respiratory or sleep physician and should be reviewed regularly.
- For Bilevel NIV users
    - **For those suspected or proven CoVID-19 Bilevel NIV users in the home environment therapy should continue unless advised by the treating respiratory or sleep physician.** These patients should be monitored closely by phone or telemedicine and the approach individualized depending on the patient-related risk/benefit. The patient should practice self-isolation in the bedroom if Bilevel NIV is continued.

Non-invasive ventilation, including CPAP in treatment naïve users (e.g. patients trialling CPAP or NIV in a clinic or at home)

- Many sleep laboratories in NSW, Victoria and SA have ceased face to face CPAP set ups because of the risk for aerosolization of CoVID-19 droplets that could infect the clinician/therapist/patient and other patients attending later. Particle dispersion is highest using nasal pillows at higher pressures (e.g. 20 cmH_2O) and may be the lowest with a well-fitting oronasal mask although no specific data pertaining to CoVID-19 is available currently. It is possible to send equipment to patients and instruct them via telehealth or via phone. Cleaning and disinfection guidelines from the manufacturer should be strictly adhered to during this time.

- **The ASA recommends that non-essential face to face CPAP or NIV set ups should now cease to limit the potential community spread of CoVID-19 and for staff safety. This aligns with current Department of Health guidelines to cease elective surgery and the TSANZ recommendation to cease lung function testing.**

- For essential CPAP/NIV set ups that must occur face to face patients should still be screened for risk as per the latest Department of Health guidelines (epidemiological risk factors and symptoms) and delayed if suspected or confirmed case of CoVID-19. Otherwise, for those who proceed a risk mitigation approach is to perform set up under isolation (class N-negative pressure room is optimal, single room with door closed is adequate) and with “airborne” / PPE precautions.

Laboratory sleep studies

- Many sleep laboratories in NSW, Victoria and SA have already ceased performing laboratory sleep studies (diagnostic and PAP studies). This is because of the increased risk of aerosolization of CoVID-19 droplets when applying nasal prongs, oro-nasal thermistors or masks in asymptomatic CoVID-19 patients and the inability for the sleep scientist/CPAP therapist to distance themselves from the patient whilst setting up/disconnecting patients.

- **The ASA recommends non-essential diagnostic and CPAP sleep studies with face to face set up cease to reduce the risk of community spread of CoVID-19 and for staff safety. This aligns with current Department of Health guidelines to cease elective surgery and the TSANZ recommendation to cease lung function testing.**

- For essential studies patients should still be screened for risk as per the latest Department of Health guidelines (epidemiological risk factors and symptoms) and delayed if suspected or confirmed case of CoVID-19. Otherwise, testing should be performed. in the highest level of isolation available (class N-negative pressure room is optimal, single room with door closed is adequate) and with "airborne" / PPE precautions.

Home sleep studies

Home sleep studies (Level 2) have the same issues as above for the face to face set up education session. But it may be possible for kits to be mailed to patients with phone or telemedicine set up and written instructions. Cleaning and disinfection guidelines from the manufacturer should be strictly adhered to during this time.

- **The ASA recommends non-essential diagnostic home sleep studies with face to face set up cease to reduce the risk of community spread of CoVID-19 and for staff safety. This aligns with current Department of Health guidelines to cease elective surgery and the TSANZ recommendation to cease lung function testing.**

Redeployment of staff

This is a challenge for all of us. Sleep scientists in many hospitals are being redeployed to back up respiratory therapy services, perform outstanding PSG analysis, pack up labs if beds are required for CoVID-19 patients or other hospital areas entirely (eg administration, finance, data analysis). Some staff have volunteered to take leave.

*Modified from Epworth/Austin Hospital Guidelines with contributions from experienced respiratory and sleep clinicians from the Clinical Committee of the ASA and around Australia and New Zealand.