Coronavirus (COVID-19)

Healthcare Worker PPE: use of N95 respirators in clinical settings
Update 6 April 2020

Information about protecting yourself against COVID-19

During the coronavirus disease (COVID-19) pandemic, the Department of Health and Human Services (the department) will regularly update its personal protective equipment (PPE) guidance as new evidence becomes available. This information is also available in the *Coronavirus disease 2019 (COVID-19) Guideline for health services and general practitioners*. To find out general information about COVID-19, visit the department's website at coronavirus.vic.gov.au.

What is this guidance about?

The Victorian Government has procured N95 respirators/masks (also known as P2 or K95 respirators) for use in Victorian public health services. This guidance describes the different types of respirators and indications for their use.

For the purposes of this document, the term P2 respirator/mask can be used interchangeably for N95 respirator/mask.

When should a P2/N95 respirator be used when caring for a patient with COVID-19?

For routine care of suspected and confirmed cases, droplet and contact precautions are recommended, that is, the use of a single-use surgical mask.

Airborne and contact precautions, that is the use of a P2/N95 respirator instead of a surgical mask, are recommended in specific circumstances when undertaking aerosol generating procedures (AGPs). These are circumstances are outlined in more detail in the *Coronavirus disease 2019 (COVID-19) Guideline for health services and general practitioners*.

Airborne and contact precautions are also recommended when caring for patients admitted to ICU with severe COVID-19 infection as they are likely to have a higher viral load, although the risk of aerosol transmission is reduced once the patient is intubated with a closed-circuit ventilator.

What are the types of N95 respirators?

An N95 respirator reduces the wearer's risk of inhaling hazardous, airborne particles (including infectious agents), vapours or gases. The mask is designed to remove particles, both small and large, from the air that are breathed through it.

There are two types of N95 respirators distributed through the state supply chain. These are:

1. standard N95 respirators (for example 3M 8110, 8110S and 8210).

8110 8210

2. medical and surgical N95 respirators (for example 3M 1860, 1860S, 1870+, BSN 72509-10).

1860

1870

BSN 72509-10

What is the difference between the two?

While all N95 masks distributed to health services via the state supply chain are appropriate for use in medical settings, there are important differences between them based on two standards: particulate resistance and fluid resistance.

Further information is detailed below and the general rule to follow is:

- particulate resistance is provided by **both types** of respirators
- fluid resistance is provided by **medical and surgical respirators** only.

When masks are referred to as having a **N95** rating, it is important to note this only indicates its resistance to particulates, not its resistance to fluids.

What is particulate resistance?

Particulate filtering respirators capture airborne contaminates. According to the United States' National Institute of Occupational Safety and Health (NIOSH) classification system, N95 respirators have a filter efficiency of at least 95 per cent when tested with sodium chloride aerosol at a flow rate of 85 litres per minute. The particle size of this aerosol is approximately 0.3 micron.

When aerosols strike the surface of a respirator, they are captured like other airborne contaminants. Although these respirators are branded for use in building activities, they provide the same protection against aerosols and airborne liquid droplets as N95 medical respirators do.

What is fluid resistance?

Respirators undergo testing for fluid resistance against a high-pressure jet of simulated blood, replicating an arterial puncture, sprayed directly at the respirator.

The American Society for Testing and Materials (ASTM) F1862 / F1862M – 17 classification system rates a respirator as Level 1, Level 2 or Level 3 based on its resistance to a 2ml high velocity directed blood spray at a distance of 300mm:

- Level 1: resistant at 80mmHg
- Level 2: resistant at 120mmHg
- Level 3: resistant at 160mmHg.

Many of the surgical or medical respirators distributed statewide meet the Level 3 standard. Each surgical or medical respirator provided will note its level under the ASTM F1862 / F1862M – 17 classification system.

A respirator's ASTM F1862 / F1862M – 17 classification rating is not an indication of its ability to filter airborne particles.

Medical and surgical respirators are appropriate for use during surgical procedures where a fluid strike of 2ml is likely to occur.

How do I know which respirator to use with suspected or confirmed COVID-19 patients?

Consistent with our international peers[1], the **standard** N95 respirators are suitable for use around confirmed or suspected COVID-19 patients in non-surgical settings, or settings where there is unlikely to be fluid spray beyond a cough or sneeze.

The **medical and surgical** N95 respirators should be used where there is a risk of exposure to high velocity splashes, sprays or splutter. Where this is not possible, a **standard** respirator can be used with the addition of a **face shield.**

How do I correctly fit an N95 respirator

- Healthcare workers must perform fit checks every time they put on a P2 respirator to ensure it is properly applied
- No clinical activity should be undertaken until a satisfactory fit has been achieved.
  - Fit checks ensure the respirator is sealed over the bridge of the nose and mouth and that there are no gaps between the respirator and face.

The procedure for fit checking includes (see Figure X):

• placement of the respirator on the face

• placement of the headband or ties over the head and at the base of the neck

• compressing the respirator to ensure a seal across the face, cheeks and the bridge of the nose

• checking the positive pressure seal of the respirator by gently exhaling. If air escapes, the respirator needs to be adjusted

• checking the negative pressure seal of the respirator by gently inhaling. If the respirator is not drawn in towards the face, or air leaks around the face seal, readjust the respirator and repeat process, or check for defects in the respirator.

The manufacturer's instructions for fit checking of individual brands and types of P2 respirator should always be referred to.

- Healthcare workers who have facial hair (including a 1–2 day beard growth) must be aware that an adequate seal cannot be guaranteed between the P2 respirator and the wearer's face. In these instances, other PPE alternatives will need to be considered such a PAPR

Where can I find out more information?

For Victorian updates: coronavirus.vic.gov.au

For national updates: health.gov.au/news/latest-information-about-novel-coronavirus

[1] https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirator-use-faq.html

For international updates: who.int/westernpacific/emergencies/novel-coronavirus

WHO resources: who.int/health-topics/coronavirus