

The role of face masks and respirators in health and disability care settings

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Purpose of this document

The purpose of this document is to provide information on when and how health care workers should wear medical/surgical masks and respirators (commonly known as N95/P2) correctly. The correct and consistent use of masks/respirators will ensure they are available to protect frontline health care workers when they need it.

Background on SARS-CoV-2 and COVID-19

The World Health Organization (WHO) reports that based on available evidence, the SARS-CoV-2 virus is transmitted via droplets and fomites through close contact, not by airborne transmission.^{1, 2}

Droplet transmission occurs when respiratory droplets travel from the respiratory tract of the infectious individual to the susceptible mucosal surfaces of the recipient, generally over short distances (1-2 metres). Droplets are $>5 \mu\text{m}$ in size, and are generated when an infected person coughs, sneezes or talks. Respiratory droplets fall to the ground, under the effect of gravity, soon after being expelled and so only those people in close contact with the infected individual are at risk of exposure. Examples of other viruses transmitted by droplet spread diseases include influenza and rhinovirus.³

Airborne transmission occurs when airborne droplet nuclei containing infectious agents remain infective over time and distance. Droplet nuclei are $\leq 5 \mu\text{m}$ in size and can remain suspended in the air for longer periods of time. They can be dispersed over long distances via air currents, meaning susceptible individuals who have not been in close contact with the infected individual can be at risk of exposure. Examples of diseases spread by airborne transmission include measles and varicella.

There is evidence that some viruses which are generally spread by droplet transmission (such as influenza and rhinovirus) can be transmitted via small-particle aerosols within a defined space (eg, patient room) when specific aerosol generating procedures such as: endotracheal intubation, non-invasive ventilation, tracheostomy, bronchoscopy, manual ventilation, sputum induction, high flow nasal oxygen, cardiopulmonary resuscitation are undertaken.

Because SARS-CoV-2 is spread mainly through droplet transmission, medical/surgical masks are recommended for use in the care of patients when procedures without the risk of producing aerosols are performed. This includes taking nasopharyngeal and throat swabs, as these are not considered aerosol generating procedures.

If the patient with probable or confirmed COVID-19 can tolerate wearing a medical/surgical mask, they should be provided with a mask and instructed how to put on and take it off correctly.

What a medical/surgical mask is used for

Medical/surgical masks are used as a physical barrier to protect the wearer from splashes or sprays of body fluids including respiratory droplets from coughing or sneezing. When someone talks, coughs, or sneezes they may release tiny drops into the air that can infect others. If someone who is symptomatic with a

respiratory infection can wear a mask, it can reduce the number of germs (bacteria and viruses) that the wearer releases and can protect other people from becoming sick. This is called source control.

Medical/surgical masks and other PPE are just one level of control used to prevent infections. Other more effective controls involve engineering controls, administrative controls and specific work practices (eg, installing physical barriers, teleworking, grouping cares for a patient, practicing respiratory hygiene and cough etiquette, performing hand hygiene, and physical distancing when possible and practical). PPE is the least effective control because it is highly dependent on proper fit and correct, consistent use.

When a medical/surgical mask should be worn

Medical/surgical masks are used for different purposes, including:

- placed on sick people to limit the spread of infectious respiratory secretions to others
- worn by health care providers to prevent accidental contamination of patients' wounds by the organisms normally present in mucous and saliva
- worn by health care workers to protect themselves from splashes or sprays of blood or body fluids. They also keep contaminated fingers/hands away from the mouth and nose.

Health care settings have specific rules for when people should wear medical/surgical masks based on Standard and Transmission Based Precautions. To offer protection, masks need to be worn correctly and consistently.

What a N95/P2 respirator is used for

N95/P2 respirators are used as a physical barrier to protect the wearer from inhaling airborne droplets smaller than 5 microns in diameter when there is a high probability of airborne transmission due to infections such as pulmonary tuberculosis (TB) and measles or high-risk procedures such as: endotracheal intubation, bronchoscopy and diagnostic sputum induction.

What are the difference in respirators?

There are several types of respirator available in the health care setting in New Zealand, the 'duck bill' type mask and a molded respirator. The difference between N95 and P2 is based on the standard that the respirator is tested against based on country (American and European). '95' relates to the efficiency of the filtration of the mask – 95% of particles with a diameter between 3-5 microns in size. The letter N informs that the mask is not resistant to oil.

Disposable face masks or respirators are typically categorised with a 'P' rating in the construction and industrial sectors. The 'P' refers to the particle size of the particulate matter that the mask is designed to protect against. P2 masks must comply with Australian and New Zealand standards to ensure the best protection for workers.

Essentially the N95 and P2 respirator are the same respirator type mask and offer the same filtration levels.

What is fit testing?¹

Fit testing is a process used to evaluate the fit of a respirator including the make and model to ensure that it fits the wearer correctly. A risk management approach should be undertaken to ensure that staff working in high risk areas or situations in which exposure to diseases that are transmitted via an airborne route, are fit tested and should know how to perform a fit check.

What is fit checking?

Fit checking is when the wearer puts on and positions the respirator to ensure there is a good seal around all edges of the respirator to their face. Fit checking is something that the wearer of the respirator needs to do each and every time they don a respirator.

Beards and facial hair can make obtaining a good seal difficult and could potentially pose a risk of exposure to infection to the wearer.

Refer to manufacturer's instructions on how to fit test a specific make or model of mask and respirator.

Risks of wearing a medical/surgical mask/respirator incorrectly

The most significant risk is of contact transmission from touching the surface of the contaminated mask. If the mask is worn incorrectly, the wearer will tend to adjust it by touching it and potentially contaminate their hands. One study found that nurses averaged 25 touches per shift to their face, eyes, or mask during extended use.⁴

Contact transmission occurs through direct contact with others or through indirect contact by touching contaminated surfaces. Respiratory pathogens on the mask surface can potentially be transferred by touch to the wearer's hands and thus risk causing infection through subsequent touching of the mucous membranes of the face (eg, mouth, nose, eyes) through self-inoculation. Masks may become contaminated with other pathogens acquired from patients who are co-infected with common healthcare pathogens such as MRSA, VRE, *Clostridioides difficile* or norovirus.

Other risks include a reduction in the mask's ability to protect the wearer caused by rough handling or excessive reuse.

There are risks associated with incorrect disposal.

General reminders for safe usage of masks and respirators

- Ensure you have received training on how to don and doff your mask (and other PPE).
- Always perform hand hygiene before putting on a mask.
- Do not touch your mask or face while wearing a mask.
- Always perform hand hygiene before and after removing a mask.
- Once mask is on, only touch loops, ties, or bands to remove.
- Replace a mask if it becomes damp, damaged, or has been worn for more than four hours.
- Do not re-use single-use masks and dispose of immediately upon removal.
- Practice other IPC measures, including the 5 moments for hand hygiene and physical distancing.

¹ <https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/infection-prevention/transmission-precautions/p2n95-mask>

How to don a mask or respirator safely

1. Clean your hands with hand sanitiser before touching the mask.
2. Check there is no obvious tears or holes in either side of the mask.
3. Determine which side of the mask is the top. The side of the mask that has a stiff bendable (metallic strip) edge is the top and is meant to mold to the shape of your nose.
4. Determine which side of the mask is the front. The colored side of the mask is usually the front and should face away from you,
5. Follow the instructions below for the type of mask you are using. For N95 /P2 masks perform a fit test to ensure there is a good seal against the skin.
 - a. *Face mask with ear loops:* Hold the mask by the ear loops. Place a loop around each ear.
 - b. *Face mask with ties:* Bring the mask to your nose level and place the ties over the crown of your head and secure with a bow.
 - c. *Face mask with bands:* Hold the mask in your hand with the nosepiece or top of the mask at fingertips, allowing the headbands to hang freely below hands. Bring the mask to your nose level and pull the top strap over your head so that it rests over the crown of your head. Pull the bottom strap over your head so that it rests at the nape of your neck.
6. Mold or pinch the stiff edge to the shape of your nose.
7. If using a *face mask with ties:* Take the bottom ties, one in each hand, and secure with a bow at the nape of your neck.
8. Pull the bottom of the mask over your mouth and chin. Ensure mask fully covers the nose, mouth and is stretched over the chin and fits snugly over the face. If fit properly, your eye protection or glasses should not fog.
9. Change mask if it becomes damp or damaged.

How to perform a fit check

1. Place the respirator on your face.
2. Place the headband or ties over your head and at the base of your neck.
3. Compress the respirator to ensure a seal across your face, cheeks and the bridge of your nose.
4. Check the positive pressure seal of the respirator by gently exhaling. If air escapes, the respirator needs to be adjusted.
5. Check the negative pressure seal of the respirator by gently inhaling. If the respirator is not drawn in towards your face, or air leaks around the face seal, readjust the respirator and repeat process, or check for defects in the respirator.
6. Always refer to the manufacturer's instructions for fit checking of individual brands and types of P2/N95 respirators.

How to doff a mask or respirator safely

1. Clean your hands with hand sanitiser or soap and water before touching the mask. Avoid touching the front of the mask. The front of the mask is contaminated. Only touch the ear loops/ties/band.
2. Follow the instructions below for the type of mask you are using.
 - a. *Face mask with ear loops:* Hold both ear loops and gently lift and remove the mask.
 - b. *Face mask with ties:* Untie the bottom bow first then untie the top bow and pull the mask away from you as the ties are loosened.

- c. *Face mask with bands*: Lift the bottom strap over your head first then pull the top strap over your head.
3. Dispose of mask in clinical waste or a sealed bag that goes into general waste.
4. Clean your hands with soap and water or hand sanitiser.

Other resources information or posters on correct use and disposal of masks

For information or posters on correct use and disposal of masks, please see the [WHO website](#).

References

1. Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19). Interim guidance. 27 February 2020. Geneva, World Health Organization. apps.who.int/iris/handle/10665/331215
2. Advice on the use of masks in the context of COVID-19. Interim guidance. 5 June 2020. Geneva. World Health Organization. [https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-\(2019-ncov\)-outbreak](https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak)
3. Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee, 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings (Updated July 2019). [cdc.gov/infectioncontrol/guidelines/isolation/index.html](https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html)
4. Rebmann, T., R. Carrico, and J. Wang: Physiologic and other effects and compliance with long-term respirator use among medical intensive care unit nurses. *American Journal of Infection Control* 41(12): 1218-1223 (2013).