



Factsheet: Extended P2/N95 respirator and eye protection use -preventing facial injury during COVID-19

Last updated: 16 August 2021

OFFICIAL

Version	Date	Revised by	Changes
2	August 2021	Infection Prevention Control Advice and Response Cell (IPCAR)	Revision of face mask rules as per public health directions. Additional information provided for hydrocolloid dressing use under P2/N95 respirators

Who is this guidance for?

The following guidance applies to all healthcare and non-healthcare workers to identify and manage facial injuries/skin damage occurring due to prolonged personal protective equipment (PPE) use. This guidance should also be considered by employers to ensure that they are supportive of their workers who may be required to take actions as provided under this guidance. While this guideline provides important evidence-based recommendations for prevention of pressure injuries it is important to note that wearing PPE to prevent coronavirus (COVID-19) transmission **cannot be compromised**.

Background

Currently, all Victorians aged 12 years and over must wear a fitted face mask when they leave home when required by public health directions. All healthcare workers are required to wear a surgical face mask for all interactions, and eye protection for all clinical interactions regardless of assessed or perceived risk. Filtering facepiece respirators (FFRs), also known as P2/N95 respirators, are required to be worn in some settings often for extended periods. For more information about current restrictions, please visit the Victorian Department of Health [Coronavirus website](https://www.dhhs.vic.gov.au/victorias-restriction-levels-covid-19) <<https://www.dhhs.vic.gov.au/victorias-restriction-levels-covid-19>>.

A mask wearer's skin may become injured due to prolonged wearing of PPE.

Skin Injury

Skin injury may occur in settings where healthcare staff are wearing PPE for prolonged periods. Mechanical forces (that is, pressure and shear) can cause pressure injuries in healthcare providers wearing PPE, specifically FFRs, face shields and goggles, for long periods of time.

In addition, skin conditions such as rosacea, dermatitis, atopic eczema, dry and chapped lips, and acne can be exacerbated by the heat and sweating which occurs when wearing PPE.^{1,2}

FFRs have a particularly high risk for injury due to requirements for a firm fit. Skin injury can occur as a result of friction and the accumulation of moisture under the mask. Skin excessively moisturised by sweat and humidity is susceptible to irritation, while dry skin may become inflamed by cracks and fissures. Masks may also trap heat, causing greater humidity and increasing skin fragility.

There are three primary factors that can both influence and impact on prevention of these types of pressure injuries³:

- intensity of pressure (and shear)
- duration of pressure (and shear)
- tissue tolerance of the individual (including the effects of friction and moisture on tissue tolerance).

Use of FFRs

Use of FFRs is recommended for healthcare workers caring for patients with suspected or confirmed coronavirus (COVID-19) infection in high-risk settings or for aerosol generating procedures (AGPs) on these patients. To be effective in preventing coronavirus (COVID-19) infection, FFRs require a firm seal that should be correctly fitted and fit-checked by the user each time the respirator is donned.

Responsibility of the employer

- Appropriately monitor workers wearing respirators.
- Take action if workers report discomfort or skin injuries arising from respirator use.
- Ensure workers are wearing respirators which provide an appropriate fit.
- Ensure workers are provided with appropriate education and training in undertaking fit checking, and the use of respirators, as well as in the prevention of facial injuries when required to wear respirators.

Responsibility of the wearer

- Ensure their own personal safety through fit checks throughout the course of wear time/work shift.
- Report discomfort or skin injury arising from their respirator to their supervisor.
- seek a medical assessment and likely referral to a dermatologist if allergic reactions to wearing PPE.
- Ensure that, if a thin dressing is placed between the skin and FFR, it does not interfere with the function of the respirator.
- Check manufacturer instructions for further details.

Guidance to prevent injury from friction and moisture

- The best prevention from injury occurring as a result of FFR use is to ensure that you only use FFRs when the clinical situation requires use.
- Give your skin a break by limiting respirator use when not required.
Wherever possible, remove your mask every 2 to 4 hours for up to 15 minutes and align with break times.
- Maintain good skin care practices. Keep the skin clean and appropriately hydrated by drinking plenty of fluids during your break times.
 - Avoid alkaline soaps/cleanser/toner and harsh chemical solutions.
 - Keep facial skin care regime simple and avoid wearing makeup.
 - Moisturise regularly using pH balanced products, use lip balm and avoid fragranced products.⁴
- Application of a liquid skin sealant/protectant, moisturising lotion, or barrier creams on skin surfaces that will be in contact with PPE may help prevent friction injuries without interfering with the fit of respirators or eye protection.

- Cautiously apply liquid skin sealants/protectants to avoid contact with eyes and mucous membranes these products are frequently used in wound care to enhance skin protection and integrity when applying an adhesive to the skin.
- Apply at least 30 minutes before PPE wearing and allow to fully dry before applying PPE.
- Use of any compound that could enhance slippage and affect the function of the PPE is not recommended.
- A thin hydrocolloid dressing (e.g. DuoDERM ® or 3M™ Tegaderm™ Hydrocolloid Dressing)^{5,6} or a foam dressing (Mepilex® Lite)⁵ may be placed on facial pressure areas caused by PPE.⁴ **There is uncertainty on whether these dressings impact on the risk of COVID-19 transmission in healthcare settings.** Some adhesives may be irritating for some people – seek treatment if symptoms of contact dermatitis occur.
 - There are preliminary clinical reports of the successful use of thin prophylactic dressings under P2/N95 respirators in relieving injuries to facial pressure points (for example, nasal bridge and cheek bones),^{5,6} with no evidence of aerosolisation of viral particles upon dressing removal.⁸ While these reports did not indicate any compromise of the N95 seal if applied correctly,⁷ dressings should always be used with caution.⁴
 - **There is however, newer evidence suggesting that hydrocolloid dressings may reduce the overall fit factor of some P2/N95 respirators, in particular of non-rigid style N95 respirators (that is, vertical flat-fold cup type and the duckbill type designs).⁸ Therefore, if non-permeable hydrocolloid dressings are indicated to be used under P2/N95 respirators, fit-testing should ideally be repeated with the prophylactic dressing in place. There are however, some P2/N95 respirators under which hydrocolloid dressings are not recommended to be used.⁹**
 - All P2/N95 respirators need to be fit-checked with a wrinkle-free dressing in place to ensure the respirator seal is not impaired.
- If a dressing is to be used, the following practices are recommended:³
 - Wash hands and apply no-sting barrier film wipe (e.g. Cavilon™) to facial areas where the dressing will be applied.⁵ Allow to dry before applying the dressing.
 - Cut the thin dressing into strips for the nasal bridge, cheek bones and behind ears if in contact with mask/respirator or straps.
 - A dressing on the bridge of the nose may be sufficient.
 - Do not stack multiple dressings as pressure may increase.
 - As skin dressings may be contaminated, perform hand hygiene after removing dressings.
 - All adhesive dressings should be removed with an adhesive removal wipe (for example, Convacare® Adhesive Remover Wipes) to avoid excessive skin stripping or trauma.
 - If using a foam dressing, ensure the outer layer is non-permeable, and use careful precision when applying the dressing to the nasal crease to avoid wrinkles and gaps.⁶ Porous dressings may allow transfer of fluids or microorganisms on to the skin and are therefore not recommended.
- Securing fit of FFRs (fit checking) when skin dressings are utilised:
 - After applying dressings, secure the respirator in place and mould the nose piece
 - Place one or both hands over the middle panel or cup of the respirator
 - Confirm the seal of your respirator by sharply inhaling and exhaling and checking for leaks
 - Adjust the respirator until no leaks can be felt before beginning patient contact.
 - If wearing prescription glasses or goggles, the eyewear will fog if the seal is insufficient – repeat the process until fit checking is complete and eye protection does not fog.
 - Perform a formal buddy check of the fit to prevent the transmission of potential aerosolised coronavirus (COVID-19).¹⁰

- Guidance to reduce duration of pressure:
 - As above, the best prevention is to ensure that you only use FFRs when the clinical situation requires use of an FFR.
 - Spend time with your mask/respirator removed (ideally for 5 minutes or more) when you are outside of areas of patient contact, which could best be aligned with break times.
 - if you remove the mask/respirator from your face it must be replaced with a new one, and perform hand hygiene before and after removing mask.

Treating facial injuries from FFRs or eye protection

- Treat abrasions with topical moisturisers, lighter silicone -based product,⁴ or liquid skin protectants/sealants.
- Thin hydrocolloidal occlusive dressings may be used to protect open wounds if they do not interfere with the mask seal.
- If the skin is aggravated by heating or sweating and dermatitis occurs, consider using gauze inside the FFR on areas of irritation.⁴
- Out of the work environment, compresses with gauze (3–4 layers thick) soaked in cold water/normal saline may be applied to the skin for 20 minutes. In more severe cases, gauze compresses with povidone iodine diluted with normal saline (1:9) can be used with a medical dressing.^{1,2}
- With severe irritant contact dermatitis, low-strength topical steroids can be used, starting with 0.5–1% hydrocortisone cream available over the counter.⁴
- Consider applying a greasier moisturiser at night to intact skin,⁴ especially if the skin feels irritated.
- If pressure from goggles is the main problem, switch to a face shield.
- Staff who develop a pressure injury may either need to be trialled with a different FFR or eye protection type that is more appropriate, or potentially be re-deployed to a different area which does not necessitate prolonged use of FFRs.
- Where there is difficulty managing a pressure-related skin injury or achieving an adequate fit, further options will need to be discussed with your manager, an infection prevention and control consultant, or potentially an occupational health medical practitioner, general practitioner or dermatologist if required.

Extended PPE use

- Unless damp or soiled, a disposable surgical mask or gown can be worn for **up to 4 hours**.
- Remove and dispose of **all disposable** PPE before going on a break and perform hand hygiene. Upon finishing breaks, perform hand hygiene and replace with new or cleaned PPE before resuming work.
- While an FFR can be worn continuously for **up to 4 hours**, it should be disposed of when damp or soiled and before going on a break, and replaced before resuming work.

References

1. Donovan J, Kudlar I, Holness L, Skotnicki-Grant S, and Nethercott J (2007). Skin reactions following use of N95 facial masks. *Dermatitis*, 18 (2): 104
2. Foo CC, Goon AT, Leow YH, & Goh CL (2006). Adverse skin reactions to personal protective equipment against severe acute respiratory syndrome--a descriptive study in Singapore. *Contact Dermatitis* 55(5) 291–294. <https://doi.org/10.1111/j.1600-0536.2006.00953.x>

3. National Pressure Injury Prevention Advisory Panel (NPIAP), *Position Statements on Preventing Injury with N95 Masks*. Retrieved from: https://cdn.ymaws.com/npiap.com/resource/resmgr/position_statements/Mask_Position_Paper_FINAL_fo.pdf.
4. Occupational Dermatology Research and Education Centre. *Keep your face looking healthy during COVID-19!* Retrieved from: <https://www.occderm.asn.au/wp-content/uploads/2020/08/Skin-problems-with-masks-photo.docx.pdf>
5. Coyer F, Coleman K, Hocking K, Leong T, Levido A and Barakat-Johnson M (2020). Maintaining skin health and integrity for staff wearing personal protective equipment for prolonged periods: A practical tip sheet [online]. *Wound Practice & Research: Journal of the Australian Wound Management Association* 28 (2) Jun 2020: 75–83.
Availability: <<https://search.informit.com.au/documentSummary;dn=266526039503745;res=IELHEA>> ISSN : 1837–6304. [cited 06 Oct 20]
6. Lansang P, Orrell KA, Tran J, & Chen T (2020). Skin Damage Prevention Strategies During COVID-19: Assessing Their Effect on N95 Mask Seal Integrity. *Journal of Cutaneous Medicine and Surgery*. <https://doi.org/10.1177/1203475420943861>
7. Solmos S, Personal communication (2020). Fit Testing N95 Masks with Prophylactic Dressings in Place. University of Chicago Medicine, Chicago, IL, US.
8. Ng, I., Kave, B., Begg, F., Sage, S., Segal, R., & Williams, D. L. (2021). Impact on quantitative fit-test results after application of prophylactic hydrocolloid dressing under N95 respirators. *Infection control and hospital epidemiology*, 1–4. Advance online publication. <https://doi.org/10.1017/ice.2021.293>
9. Shared Health Manitoba. (2020). Quick Reference Guide Prevention & Management of Skin Injury from Personal Protective Equipment (PPE). Retrieved from <https://sharedhealthmb.ca/files/covid-19-ppe-skin-injury-qrg.pdf>. [cited 17 Aug 21]
10. Ocampo A, Burnett E (2020). Comparison of Prophylactic Dressings under N-95Respirator Masks: Fit and Aerosolization with Dressing Removal Determined by Glo Germ with UV Light.Cedars Sinai, Los Angeles, CA, US.
11. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, Pan Pacific Pressure Injury Advisory Panel (2019). *Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline*. Third ed: EPUAP-NPIAP-PPPIA.

To receive this document in another format, phone **1800 651 160**, using the National Relay Service 13 36 77 if required, or email [Emergency Communications](mailto:em.comms@dhhs.vic.gov.au) **<em.comms@dhhs.vic.gov.au>**.

Authorised and published by the Victorian Government, 1 Treasury Place, Melbourne.

© State of Victoria, Australia, Department of Health, August, 2021.

Available at DHHS.vic – [coronavirus disease \(COVID-19\)](https://www.dhhs.vic.gov.au/coronavirus) **<https://www.dhhs.vic.gov.au/coronavirus>**