

Fit-testing and Fit-checking of P2 Respirators for COVID-19

Question

What are the benefits and limitations of fit-testing and fit-checking for respirators in the COVID-19 Pandemic?

Answer

Fit checking should be used each time the mask is worn and is the most important procedure. Health care workers should perform a fit test to determine which brand / model of respirator has the most appropriate seal and repeat this annually. The benefits of wearing a correctly fitted P2 respirator when an airborne transmissible agent is known or suspected clearly outweighs any undesirable effects.

Background

The Australia Department of Health recommends that P2/N95 respirators are only required for aerosol generating procedures (AGPs) or where there is uncontrolled coughing in patients with suspected or confirmed COVID-19.¹ AGPs include: tracheal intubation, non-invasive ventilation, tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, and bronchoscopy (and bronchoalveolar lavage), high flow nasal oxygen. The use of nebulisers should be avoided and alternative medication administration devices (e.g. spacers) used

Unless used correctly (i.e. with **fit checking**), a P2/N95 respirator is unlikely to protect against airborne pathogen spread. An airtight seal may be difficult to achieve for people with facial hair. A range of P2/N95 respirators must be fit-checked to assess the most suitable one to achieve a protective seal. If a tight seal cannot be achieved, facial hair should be removed.

Fit Checking should be done each time the mask is worn to ensure that it seals correctly against the face by covering the mask with both hands. Fit checking at time of use is the most reliable method of ensuring the healthcare worker has achieved the required seal in real time. Fit checking (user-seal check) describes the process that health workers perform each time a respirator is donned to check that a good facial seal is achieved i.e. the respirator is sealed over the bridge of the nose and mouth and there are no gaps between the respirator and the face. Fit checking is a process used for all P2/N95 masks regardless of whether or not fit tested.

For a Fit Check chart - see this NSW Health Poster for COVID-19:

http://www.cec.health.nsw.gov.au/_data/assets/pdf_file/0010/566776/CEC-Principles-of-Fit-checking-chart-2020.pdf

Positive fit check: Check that no air escapes out from around the mask when breathing out.

Negative fit check: When breathing in a vacuum should be created causing the mask to be drawn in slightly towards the face.

Fit Testing is should be done prior to first use and to determine the adequacy of the respirator seal on the wearer's face. It is only applicable to the specific brand / make / model of the respirator. It can be used to select the most appropriate brand for the individual, if several are available. Without fit testing, there's no way of knowing if the respirator is actually able to provide its advertised level of protection for a specific worker.

When fit testing is to be undertaken, it should be done so based on relevant state/territory jurisdictional requirements in conjunction with a risk assessment with relevance to the healthcare setting. Fit testing can be complex and resource intensive.

Tests can be quantitative or qualitative. The qualitative fit test procedures rely on a subjective sensation (taste, irritation, smell) of the respirator wearer to a particular test agent while the quantitative use measuring instruments to measure face seal leakage.

Fit testing should be conducted by a trained individual, or after completing the manufacturers training. A fit testing kit is provided by the manufacturer and involves wearing a plastic hood (to create an air space) and spraying a testing substance (bitter taste) For example, for 3M: https://www.3m.com.au/3M/en_AU/safety-centers-of-expertise-au/respiratory-protection/fit-testing/

Standards Australia (Standard AS/NZS 1715: 2009)² outlines the fit testing protocols, based on the US Occupational Safety and Health Administration (OSHA), which approves fit testing protocols through the American National Standards Institute sub-committee on fit-testing.^{3,4}

and OSHA require annual fit testing and when physical changes have occurred (weight loss, dental work, facial changes). This is based on a prospective study of 134 health care workers where 10% lost fit at year 1 and 20% at year 2.⁵ Faster protocols have been proposed (particular for pandemics), however, they have not met the ANSI standards.⁶

Key Guidelines

Australian Guidelines for the Prevention and Control of Infection in Health Care, 2019 (p116-118)
<https://www.nhmrc.gov.au/about-us/publications/australian-guidelines-prevention-and-control-infection-healthcare-2019#block-views-block-file-attachments-content-block-1>

NSW Health Guidelines http://cec.health.nsw.gov.au/_data/assets/pdf_file/0006/572883/Application-of-PPE-in-Response-to-COVID-19-19-March-2020-V1.4.pdf

References

¹ Interim recommendations for the use of personal protective equipment (PPE) during hospital care of people with Coronavirus disease (COVID-19)

<https://www.health.gov.au/sites/default/files/documents/2020/03/interim-recommendations-for-the-use-of-personal-protective-equipment-ppe-during-hospital-care-of-people-with-coronavirus-disease-2019-covid-19.pdf>

NIOSH [2018]. Filtering out Confusion: Frequently Asked Questions about Respiratory Protection, Fit Testing. By Krah J., Shamblin M., and Shaffer R. Pittsburgh, PA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication 2018–129, <https://doi.org/10.26616/NIOSH/PUB2018129External>

² <https://www.standards.org.au/standards-catalogue/sa-snz/publicsafety/sf-010/as-slash-nzs--1715-2009>

³ American National Standards Institute (ANSI): *ANSI/AIHA Z88.10-2010 – Respirator Fit Testing Methods*. [Standard] Fairfax, VA: ANSI, 2010.

⁴ <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134AppA>
https://www.osha.gov/video/respiratory_protection/fittesting.html

⁵ Zhuang, Z., M. Bergman, E. Brochu, A. Palmiero, G. Niezgoda, X. He, R. Roberge, and R.E. Shaffer: Temporal Changes in Filtering Facepiece Respirator Fit. *J Occup Environ Hyg.* 2016;13(4):265-74. doi: 10.1080/15459624.2015.1116692 available at: <https://www.ncbi.nlm.nih.gov/pubmed/26576713>

⁶ McKay R. Respirator fit test methods — Are faster protocols equivalent to OSHA? *J Occup Environ Hyg.* 2018; 15(7). <https://www.tandfonline.com/doi/full/10.1080/15459624.2018.1463098>