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Brief Report

Implementation of a respiratory protection program within healthcare facilities during the COVID-19 pandemic- lessons learned

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A B S T R A C T

The use of fit tested respirators in the workplace is required to protect health workers against airborne pathogens. The COVID-19 pandemic required rapid upscaling of fit testing which was achieved using the framework of a respiratory protection program. Implementing and sustaining such a program in the midst of a pandemic was challenging and required clear direction from a lead agency combined with stakeholder engagement.

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BACKGROUND

The emergence and rapid worldwide spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), demonstrated the need to improve health worker safety and protection.¹ On 25 January 2020 the first case of COVID-19 was diagnosed in New South Wales (NSW), Australia which has a total population of 8.18 million.² The NSW Public Health system operates more than 220 hospitals employing around 170,000 health workers. SARS-CoV-2 is highly contagious with the World Health Organization recognizing the transmission routes to be droplet, aerosol and indirect via contact.³ The use of personal protective equipment, mainly respirators are designed to protect the wearer from the inhalation of airborne infectious particles. Pre-pandemic training in the use of respirators mostly relied on teaching of fit checking (user seal-check or self-check) rather than fit testing.

Fit checking is a subjective self-check aiming to detect good facial seal through the absence of detectable air leaks using both positive and negative pressure tests.³ Most international⁴ and national⁵ guidelines and manufacturers recommend respirator fit checking as part of the donning process. Adequate fit checking increases fit

testing pass rates and is required as part of donning to ensure the respirator is worn correctly at the point of use.^{3,4}

Fit testing is a validated process for determining the type and size of respirator that achieves an adequate seal on an individual's face.⁶ Australian and New Zealand Standard (AS/NZS1715:2009)⁷ and Australian Guidelines for the Prevention and Control of Infections in Healthcare² advises fit testing prior to using a different type respirator and in regular intervals as fit test pass rates decrease over time.⁸ Operationalizing these requirements was very challenging as fit testing health workers had not been routine practice. Prior to the pandemic, fit checking was described and recommended but was not included in audits of personal protective equipment. As COVID-19 case numbers increased, the need to ensure health workers were fit tested to disposable P2/N95 respirators increased and a coordinated process for the widespread fit testing of health workers was instigated. The NSW respiratory protection program supported local implementation and was enabled by strong leadership, governance, resources, policies, and procedures.

The Clinical Excellence Commission (CEC) is the lead agency for patient safety and quality care for NSW Health, including having responsibility for developing and leading the statewide Respiratory Protection Program. A multidisciplinary Respiratory Protection Program board was convened and chaired by the CEC Chief Executive and included representatives from work health and safety, workplace relations and clinicians along with legal and union delegates (Appendix 1 The Respiratory Protection Board Membership). The Board worked closely with Occupational Hygienists to build on the process aligned to health standards and acknowledging specific needs in health. The principal responsibility of the CEC was the provision of

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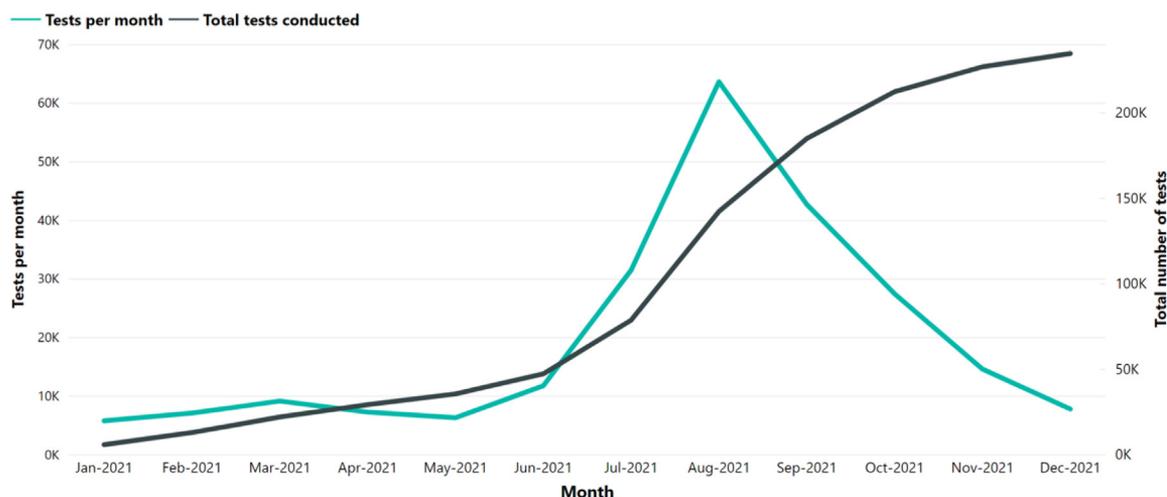


Fig 1. Total number of fit tests performed in NSW 2021.

strategic advice and guidance on implementation, monitoring, and outcomes of the NSW Respiratory Protection Program.

CHALLENGES OF IMPLEMENTING A STATEWIDE FIT TESTING PROGRAM DURING A PANDEMIC

The NSW Health COVID-19 response included collaboration and support from multiple agencies including NSW Health facilities, procurement and supply chains, relevant education and training bodies, Safety and Governance directors, residential aged care facilities and Ambulance services. Whilst there was certain level of preparedness for a possible influenza pandemic, the uncertainty about the impact of this novel virus, lack of effective antiviral therapy and vaccination coupled with conflicting views on transmission dynamics created significant challenges to a standardized approach to control and containment measures. Other challenges included health workers knowledge, skills, and confidence in existing infection prevention and control strategies, uncertainty on the significance of droplet vs aerosol transmission of SARS CoV-2, and the need to measure and remediate air flow and ventilation within health facilities.

During the early part of 2020, a combination of substantially increased local and worldwide demand for respirators, and the impact of hard border closures on supply led to a supply crisis for disposable P2/N95 respirators. As there had been very limited fit testing prior to COVID-19, there was also limited access to both equipment and staff trained for fit testing. Industrial partners initially provided fit test training, however, this required adapting a program developed for worker protection from fumes and dust to a program for health worker protection from pathogenic microorganisms. This highlighted the need for developing healthcare specific training materials, policies, and procedures as well as reviewing the cleaning and disinfection requirements of fit testing equipment within healthcare compared to their use in industry. A standardized approach to respiratory protection program across the state was developed with governance and structures in place to implement a successful program. There was also a shortage of trained and experienced fit testers, further constrained by state border closures.

WHERE WE ARE NOW?

During 2021 local respiratory protection programs were implemented under the guidance of the CEC and the Respiratory Protection Program board. Local implementation was led by Infection Prevention and Control and implemented by experienced nurses and work health and safety experts and overseen by the CEC. More information

on the details of program implementation can be found on the CEC website under respiratory protection program. The respiratory protection program included the more complex aspects of managing health workers who are unable to pass a fit test and health workers who for religious or medical conditions, need to keep their facial hair. The Beard Cover Technique was developed and successfully trialed and implemented to enable this approach.

The Board also established a risk management process for health workers unable to be fitted with a disposable respirator including:

- Identification of high-risk procedures (eg, Aerosol Generating Procedures) the health worker is unable to perform and a suitable substitute
- Identification of high-risk patients the health worker is unable to provide care to
- Identification of health workers with an exemption to keep facial hair due to medical condition or genuinely held religious observance
- Redeployment to suitable duties or clinical area if necessary
- Provision of alternative respirators, for example a reusable respirator, with fit testing for essential health workers who are unable to be reassigned to an alternate clinical area

The program also had to be compliant with NSW Work Health and Safety legislation and standards. Further details can be found here: Clinical Excellence Commission Respiratory Protection Manual Chapter 1 [Appendix 1A: Respirator Fit Testing Algorithm](#) and Chapter 3 [Reusable Respiratory Protective Devices – Management and Use](#).

During 2021 NSW Health performed 234 499 fit tests on 84685 health workers ([Fig 1](#)). [Figure 2](#) shows the number of health workers with recorded results, and the proportion of health workers that achieved a fit test pass. [Appendix 2](#) gives the breakdown of different brand filtering device fit test outcomes. Overall, 98% of health workers ($n = 83210$) achieved a fit test pass during 2021, demonstrating the success of the program. Fit testing is now well established and continues as new staff enter the workforce, new respirators become available as well as repeat testing for those many frontline health workers who were fit tested early in the pandemic.

FUTURE CONSIDERATIONS

The Board is progressing with an evaluation of the respiratory protection program to determine its impact, effectiveness, and sustainability. Conducting this evaluation will provide additional useful information, enabling the incorporation of lessons learned into the

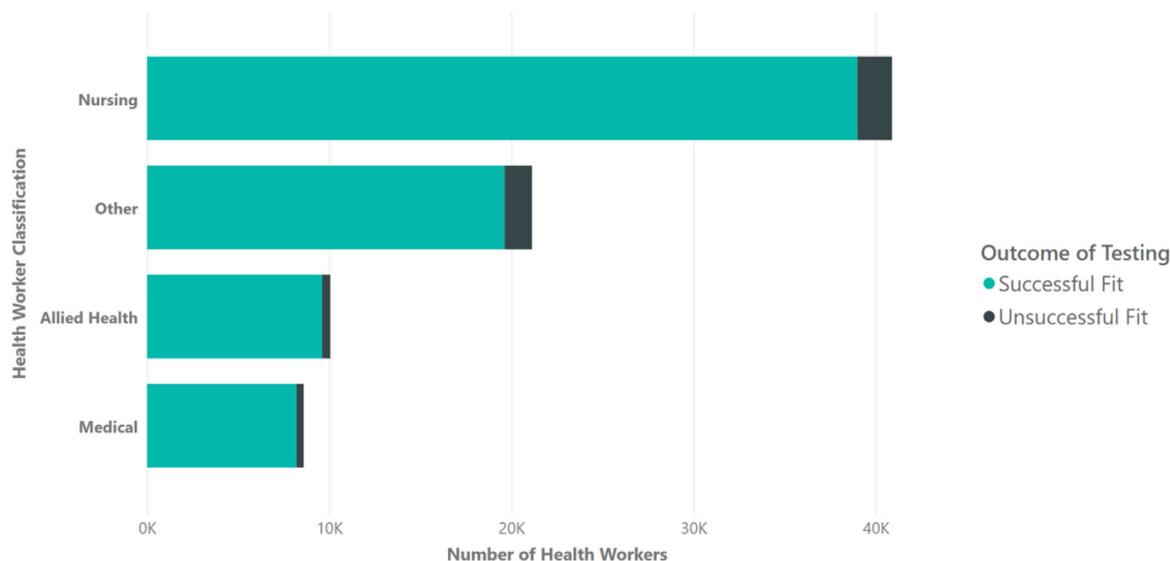


Fig 2. Number of health workers with a positive fit test outcome 2021.

decision-making process for NSW Health Facilities, the CEC and other jurisdictions planning to implement the same. Additional study is required to assess the link between fit testing vs fit checking effectiveness in controlling transmission and the significant cost associated with sustainability of the respiratory protection program.

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SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at <https://doi.org/10.1016/j.ajic.2022.05.016>.

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