PPE Conservation: Potential Re-Use of N95 Respirators
Backgrounder April 2020

Drivers

Appropriate and judicious use of Personal Protective Equipment (PPE) continues to be the single most important strategy for conserving PPE supply in Alberta. However, the potential for future shortages of N95 respirators require AHS to actively pursue contingency plans for conservation of PPE.

AHS Goals for PPE supply and conservation:

Alberta Health Services will:

1. Endeavour to secure sufficient supply of PPE through contracts with global distributors. This includes sourcing alternate respirators from non-traditional suppliers and fit testing to these respirators.
2. Ensure alternate respirators and other PPE conform to the highest quality standards possible (NIOSH, OSHA and/or other bonafide certifications).
3. Ensure appropriate use of PPE by supporting staff with evidence based standards and guidelines, training and access to supplies.
4. Reduce excessive use of PPE by addressing health care worker concerns and misinformation related to supply levels and exposure risk.
5. Explore options for extended use of respirators (e.g. Alberta Labour acceptance for fit testing extension; possible use of expired respirators).
6. Increase the future supply of respirators by exploring an evidence-based decontamination, sterilization and re-use strategy.

This Backgrounder is focused on Goal # 6.
Decontamination, Sterilization and Re-Use Initiative

Decontamination and sterilization technology pilot

The concept behind this multidisciplinary initiative is to determine whether N95 respirators can be “reprocessed” while effectively maintaining performance. The initiative is the result of an ongoing research partnership, funded by AHS, together with the University of Calgary and the University of Alberta. After trialling three methods, the partnership has arrived at a preferred method: gravity steam sterilization. The early results indicate that steam sterilization of N95 1870+ model respirators maintains integrity of the respirator. This work continues and will include confirmation of virological eradication.

Several Canadian jurisdictions, such as British Columbia, Manitoba and Ontario, are also pursuing decontamination strategies.

Efficacy and acceptability

- Fit and Filtration: a key consideration of the pilot is the impact of the decontamination and sterilization process on the structural and functional integrity of the respirator. Quantitative fit testing is being conducted with a Portacount to determine the effectiveness of the seal post decontamination. The UofA will also conduct filtration checks on reprocessed respirators before the project is scaled up.
- It is not yet clear how many times a respirator can be reprocessed before degrading. It is likely to be in the order of two or three times.
- Visual inspections will occur at doffing and post-decontamination to ensure that only those respirators that are in good condition, intact and non-stained are retained.
- The acceptability of respirator reuse to health care workers is unknown at this time. It will be important to establish that clinicians feel confident that a recycled respirator is a safe and viable option for respiratory protection.
- The ethics of deployment are yet to be worked out: who will be assigned and/or use the recycled devices?
- AHS has kept our Unions apprised of the intent to explore the reprocessing and reuse of N95 respirators. All three of AHS’ Unions - AUPE, HSAA and UNA - have expressed significant concerns about this approach, from the perspectives of health and safety, legislative compliance and psychological safety. The perspective of PARA, the Residents’ Association, is not yet known. One or more Unions may formally submit a complaint to Alberta Labour.

Manufacturers’ specifications

3M does not recommend any of the known sterilization or cleaning processes. According to their April 2020 technical briefing, each method affects fit and filtration performance.
Collection of respirators

In April 2020 AHS will begin collecting used N95 model 1870+ respirators from select acute care facilities for decontamination, sterilization, re-packaging and storage.

Recycling Specifics:

To ensure effective reprocessing, sites will be provided with lidded bucket receptacles placed near the doffing stations on units where teams are caring for patients with COVID-19. Teams will place their used model 1870+ N95 respirator upon doffing into the bucket, and the buckets will be collected regularly. The respirators will be reprocessed, repackaged and stored. Following additional stakeholder consultation, reuse will only occur if demand for N95 respirators exceeds supply and/or AHS is unable to purchase sufficient single-used items in the months ahead.

The Appendix – Memorandum to ZEOCs - includes further information and detail.

Legislative compliance for single-use devices

- Standards for single use devices are governed under Alberta Health’s “Reusable and Single Use Device Standard”. AHS has applied for an exemption to this Standard.
- Standards for respiratory protection and respirator fit testing are governed by the Alberta Occupational Health and Safety Act (2018) and Code.
- AHS applied for an acceptance from Alberta Labour in respect of “Disinfection of Disposable N95 Respirators”. The response (dated April 8th, 2020) indicated that that AHS does not require an acceptance as the Manufacturer (3M) has published a technical bulletin to address the reprocessing of the product. The 3M technical bulletin does not comment on reuse, but includes a hyperlink to a CDC document that recommends a reprocessed product not be used for high risk procedures such as an AGMP.
- The foregoing can be interpreted to mean that AHS does not have Alberta Labour approval to reuse respirators unless and until the manufacturer (3M) endorses this approach.
- Additional discussion, direction and approval will be required before AHS can re-use N95 respirators. This work is ongoing and AHS is looking to the Government of Alberta to establish standards.
- These challenges do not preclude further work on the initiative to collect, sterilize and re-package respirators; however further stakeholder engagement is required before the respirators can be deployed.

Conclusion

AHS is beginning a process to safely collect N95 respirators for sterilization. Following sterilization, respirators will be stored and will not be re-used unless the organization is unable to source new supplies. That is, they will be brought out of the stockpile only once it is clear that we are unable to get new ones. In that scenario, having a sterilized N95 for re-use is better than having no respirator. An active program is underway to confirm that it is possible to sterilize the N95 and that the reprocessed N95 will maintain its integrity with respect to fit and filtration. AHS is collaborating with other jurisdictions that have engaged in similar work. Protection of our staff and patients is, and always will be, the number one priority of AHS.
References

- 3M Technical Bulletin for N95 Decontamination: https://multimedia.3m.com/mws/media/1824869O/decontamination-methods-for-3m-n95-respirators-technical-bulletin.pdf
- Centers for Disease Control and Prevention (CDC); Decontamination and Reuse of Filtering Facepiece Respirators CDC webpage
Appendix: N95 Recycling Project; Supply & Fit Testing

N95 Recycling Project

Effective Tuesday, April 14, Alberta Health Services (AHS) will begin collecting used N95 model 1870+ respirators from AHS Intensive Care Units in the Calgary and Edmonton Zones, for decontamination, a process of sterilization, and storing. This is a contingency plan that will allow us to preserve these used N95 respirators for potential reuse, if we require additional supply in the months ahead. As the process is refined, it will also be expanded to additional acute care facilities across Alberta.

At this time, the collected N95 1870+ respirators will not be circulated back to our sites for immediate use; however, because emerging research has shown that reprocessing does not damage or reduce the effectiveness and safety of these particular N95 respirators, AHS is proactively collecting this supply of used 1870+ models, in the unlikely event that demand exceeds our supply of single-use N95 respirators, in the months ahead.

This initiative proactively positions us to ensure short and long-term protection of our staff, and appropriately conserve the N95 respirator supply in Alberta.

Safety of our staff is paramount to all initiatives that we undertake, particularly during this pandemic.

Appropriate and considered used of our PPE supply continues to be the single most important element to conserving our PPE supply in Alberta. We ask that you continue to use PPE according to guidelines, following your point of care risk assessment. Please help us protect you.

Supply

In addition to the innovative N95 recycling project, we have successfully secured significant numbers of personal protective equipment (PPE) through contracts with global distributors.

The additional orders will continue to ensure frontline healthcare providers have access to the appropriate PPE to respond to the anticipated surge in patients who test positive for COVID-19.

These shipments were secured outside of AHS’ usual procurement channels, and are another example of AHS’ commitment to the safety of our frontline providers, as they care for Albertans in need.
Fit Testing

WHS is developing a fit test strategy and implementation plan to support the arrival of new models of N95 respirators. As the respirators are a different style than previously use, they will need to be fit tested to our workers. As part of the plan, WHS will begin fit testing healthcare workers in critical areas to the new respirator models once they arrive.

Last week, Alberta Occupational Health and Safety also extended the expiry of existing fit tests on the current respirator model to December 31, 2020. This applies to workers who have completed fit testing in the past two years for which the fit test certificate expires on or after April 1, 2020. Those workers fit tested to a current respirator (16,000 healthcare workers) will not need to renew fit testing until December 31, 2020.

Please be assured that AHS continues to ensure the required supplies are available where and when they are needed the most to continue to deliver quality patient care.

As sites consider strategies to ensure that staff have appropriate access to secured PPE, the Process Improvement Team is available to help you with access and flow planning. Site leads responsible can contact the Process Improvement team at aiw@ahs.ca for intake.

For detailed information all PPE guidance for COVID-19, visit www.ahs.ca/covidppe.