

Respiratory Protection Against Airborne Infectious Agents for Health Care Workers

 [ccohs.ca/oshanswers/prevention/respiratory_protection.html](https://www.ccohs.ca/oshanswers/prevention/respiratory_protection.html)



Do health care workers need respiratory protection?

To minimize exposure to airborne infectious agents, health care facilities use control measures such as isolation rooms, negative pressure ventilation, air filtration, and disinfection. However, in certain settings, these engineering and administrative controls may not adequately protect health care workers from infectious airborne particles, also known as aerosols, that can remain suspended in the air for an extended duration.

Therefore, when there is a potential for exposure to airborne infectious agents, in addition to routine practices, health care workers should follow airborne precautions, including the use of respiratory protection. These precautions are especially important for protection against infectious agents that are easily transmitted through the air (e.g., tuberculosis), and during aerosol-generating medical procedures (AGMPs) (e.g., intubation, bronchoscopy, sputum induction, non-invasive positive pressure ventilation, and other procedures).



Do surgical masks protect workers?

Health care workers routinely use surgical masks as part of their personal protective equipment. However, surgical masks are not respirators and are not certified as such. They do not protect the wearer from inhaling small particles that can remain airborne for long periods of time.

Surgical masks are effective barriers for retaining large droplets which can be released from the wearer through talking, coughing, or sneezing. Surgical masks are useful in many patient care areas. In fact, they may reduce wound site contamination during surgical or dental procedures. But surgical masks cannot be used as a protection from many airborne particles or droplets. The filter material of surgical masks does not retain or filter out submicron particles. In addition, surgical masks are not designed to fit tightly, meaning they do not eliminate air leakage around the edges.



What kind of respirator should health care workers use?

Respirators used in health care settings should be selected according to the filtering efficiency of the respirator, the potential infectious agents and other hazards that are present, and according to the type of procedure to be carried out.

When respirators are required to be worn, only respirators that are required by your jurisdiction's occupational health and safety legislation should be used. Most often these are respirators that are approved by NIOSH or ones that meet an applicable CSA standard (e.g., CSA Z94.4 -18 Selection, use, and care of respirators, or CSA Z1610-11 (R2016) Protection of first responders from chemical, biological, radiological, and nuclear (CBRN) events).

Surgical respirators are considered to be a class I medical devices and must be approved for import, distribution and manufacture by Health Canada.

Procedures for selecting the appropriate respiratory protection, as well as other requirements for respirator use, should be identified in the respiratory protection program.

As stated in the Canadian Biosafety Handbook Second Edition, "Where applicable, respiratory protection should conform to standard CSA Z94.4, Selection, Use and Care of Respirators" and "Using the wrong respirator or misusing one can be as dangerous as not wearing one at all." No single respirator (or any type of personal protective equipment (PPE)) can be expected to provide protection against all types of hazards. Be sure you are wearing the correct PPE for the task and hazards.

One of the most common respirators used in health care facilities is the type N95 disposable respirator. These respirators used to be called dust/fume/mist (DFM) masks that were certified under a previous standard. N95 filters belong to a group of air purifying particulate filters. NIOSH (National Institute for Occupational Safety and Health in the U.S.) certifies these respirators (and other respirators) and these certified products are used in Canada.

The "N95" is one of three types of filters - N, R and P. These designations refer to the type of resistance they have to the degrading of their filtering efficiency when exposed to different kinds of airborne particulates, mists, etc. To help people remember which filters can be used for protection against different kinds of airborne particulates (e.g., dust, fume and mist). NIOSH provides the following guide:

N - Not resistant to oil

R - Somewhat Resistant to oil

P - Strongly resistant to oil (oil **P**roof)

The "95" in N95 refers to the filter efficiency. There are three levels of filter efficiencies - 95% (N95), 99% (N99), and 99.97% (N100 or HEPA filter) tested against aerosol (fine mist) droplets 0.3 microns in diameter. N95 type respirators are the respirators recommended by the Government of Canada and the U.S. Centers for Disease Control and Prevention (CDC) for use by health care workers in contact with patients with infections that are transmitted from inhaling airborne droplets (e.g., tuberculosis (TB)); also recommended for health care staff working with patients having or suspected of having SARS, severe acute respiratory syndrome).

High risk procedures such as bronchoscopy and autopsy, or when the virus is unknown, may require additional protection. For example, protection may include full facepiece negative-pressure respirator, powered air-purifying respirators, and positive pressure airline respirators equipped with a half-mask or full facepiece. A supplied-air respirator or powered air-purifying respirator with a hood may be needed for staff who cannot be properly fitted with respirators with a facepiece.

In medical procedures that generate aerosol mists, goggles or face shields (with safety glasses or goggles) should also be used to prevent eye contamination. Full facepiece respirators can also be worn to prevent eye contamination.

Laser Plumes - Health Care Facilities has some additional, related information on controlling exposure to certain airborne contaminants in health care facilities.



Is it necessary to have a respiratory protection program?

If health care workers need to use a respirator, then a respiratory protection program is necessary. The program should include the following procedures for:

- Hazard identification, assessment, and control.
- Selection and use of respirators.
- Respirator user training.
- Respirator fit testing.
- Inspecting, cleaning, maintaining and storing respirators.

In addition, CSA standard Z94.4 requires that the employer ensure the individual is medically approved to wear a respirator. It is important to refer to the occupational health and safety legislation in your jurisdiction for additional requirements for respirator use.

Other OSH Answers documents Designing an Effective PPE Program, Respirator Selection and Respirator Care have additional informational information that will assist in setting up a respiratory protection program.



What should health care workers do if a respirator is required?

As listed in the Canadian Biosafety Handbook:

- Complete respirator training and ensure proper fit through qualitative or quantitative fit-testing before beginning any activities that require a respirator.
- Perform a seal check every time the respirator is worn.
- Prevent the filters or cartridge from becoming wet during decontamination.
- Replace cartridges that are near the end of service life.

- Never reuse disposable respirators or masks, unless directed by the manufacturer or public health authority. Decontaminate used respirators and masks before disposal.
- Inspect the respirator after use. Dispose, or repair any defective parts.
- Remove respiratory protection at the point at which a risk assessment deems it safe to do so upon exit from the containment zone.
- Clean, and sanitize or decontaminate the respirator after every use according to the manufacturer's instructions or safe operating procedures, even if it is stored in the containment zone.
- Reusable respirators should be stored so that they are protected from hazards that may affect the respirators (e.g., dust, sunlight, heat, extreme cold).



Are there recommendations for respirators when working in health care during the COVID pandemic?

COVID-19 can be transmitted from an infected individual to others through respiratory droplets and aerosols. The droplets vary in size from large droplets that fall right to the ground immediately (with seconds to minutes), to smaller particles (aerosols) that may linger in the air.

The risk of contracting COVID-19 increases in situations where people are in closed spaces (with poor ventilation) and crowded places when with people from outside their immediate household. Risk is higher in settings where these factors overlap and/or involve activities such as close-range conversations, singing, shouting or heavy breathing (e.g., during exertion). Many medical procedures would also be considered to be activities that involve a higher risk of transmission.

It is important for health care workers to follow the appropriate infection control measures required by their employer and public health authorities. Current recommendations for health care workers include masking for the full shift (e.g., use of medical masks as there is evidence that transmission can occur from others who have few or no symptoms), and to use N95 or equivalent respirators during aerosol-generating medical procedures (AGMPs) on patients that may potentially have COVID-19. N95 respirators may be necessary in other situations based on a point-of-care risk assessment.

Note that guidance for respiratory protection as it relates to COVID-19 may change as more is learned about the transmission methods. Also, the use of respirators or masks is in addition to other droplet and contact precautions that may be required.