

**Last update:** 2022-01-12

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## **Face Coverings FAQ**

### **Overview:**

This document aims to answer common questions about N95 or equivalent masks, and whether they are necessary or effective for regular people in 'community settings' like workplaces, school, and public spaces. Hopefully, these answers may help people to choose to acquire these masks to protect themselves from Covid-19.

This is not a comprehensive treatise on every aspect of PPE and its usage throughout the country. It is a starting point for anyone who is making decisions on obtaining respiratory protection for themselves, their family, their employees, and other stakeholders.

This is not medical advice. Please consult with relevant experts when in doubt, for example aerosol scientists, HVAC and other indoor air quality engineers, occupational hygiene therapists, and so on.

Please send any inaccuracies or additional questions to the email above. Feedback will be incorporated into future versions.

### **Q1: Are 'surgical' or 'medical-grade' masks good for blocking coronavirus particles?**

**A1:** No. Surgical masks or medical masks are not designed to fit a person's face. Covid-19 is an airborne respiratory disease. Its particles can hang around in the air for hours and can then be breathed in by people moving through that space, even when the infectious person is gone.



A face covering that protects against airborne particles needs to fit a person's face, so that air passes through the filter material, instead of leaking around the edges of the mask.

More detail: Many surgical masks use a certification process like ASTM 2100, which tests masks along 5 dimensions, 2 of which are related to filtration efficiency. A surgical mask certified at ASTM level 1, for example, will provide at least 95% filtration of all particles in the 3 micron size range (bacteria) and the 0.1 micron size range (viruses).

	ASTM Level 1	ASTM Level 2	ASTM Level 3
Bacterial Filtration Efficiency @ 3 $\mu\text{m}$	$\geq 95\%$	$\geq 98\%$	$\geq 98\%$
Differential Pressure ( $\text{mm H}_2\text{O}/\text{cm}^2$ )	$< 4.0$	$< 5.0$	$< 5.0$
Sub-Micron Particulate Filtration @ 0.1 $\mu\text{m}$	$\geq 95\%$	$\geq 98\%$	$\geq 98\%$
Resistance to Penetration by Synthetic Blood ( $\text{mmHg}$ )	80	120	160
Flammability	Class 1	Class 1	Class 1

However, none of these tests evaluate whether the mask seals around the face. And without that, dangerous aerosols will skip the filter and sneak into the lungs through the edges.

[Understanding ASTM Levels for Facemasks](#).

A better fit can be achieved with a surgical mask using a mask brace.

<https://www.popularmechanics.com/science/health/a35520817/what-is-a-mask-brace/>

## Q2: Then which masks do work against an airborne virus?

**A2:** Masks that are certified both on *filtration* and *fit*: N95 and equivalent masks.

Many countries have their own standards: NIOSH N95 for the United States, CAN95 for Canada, KF94 for Korea, KN95 for China, and FFP2 for Europe. These certifications test for leakage around the mask, as well as the capacity of the mask's filter material.

This chart shows the key differences between surgical masks and N95 respirators:

Understanding the Difference	Surgical Mask	N95 Respirator
<b>Filtration</b>	Does NOT provide the wearer with a reliable level of protection from inhaling smaller airborne particles and is not considered respiratory protection	Filters out at least 95% of airborne particles including large and small particles
<b>Intended Use and Purpose</b>	Fluid resistant and provides the wearer protection against large droplets, splashes, or sprays of bodily or other hazardous fluids. Protects the patient from the wearer's respiratory emissions.	Reduces wearer's exposure to particles including small particle aerosols and large droplets (only non-oil aerosols).
<b>Face Seal Fit</b>	Loose-fitting	Tight-fitting
<b>Leakage</b>	Leakage occurs around the edge of the mask when user inhales	When properly fitted and donned, minimal leakage occurs around edges of the respirator when user inhales
<a href="https://www.cdc.gov/niosh/npptl/pdfs/UnderstandDifferenceInfographic-508.pdf">https://www.cdc.gov/niosh/npptl/pdfs/UnderstandDifferenceInfographic-508.pdf</a>		

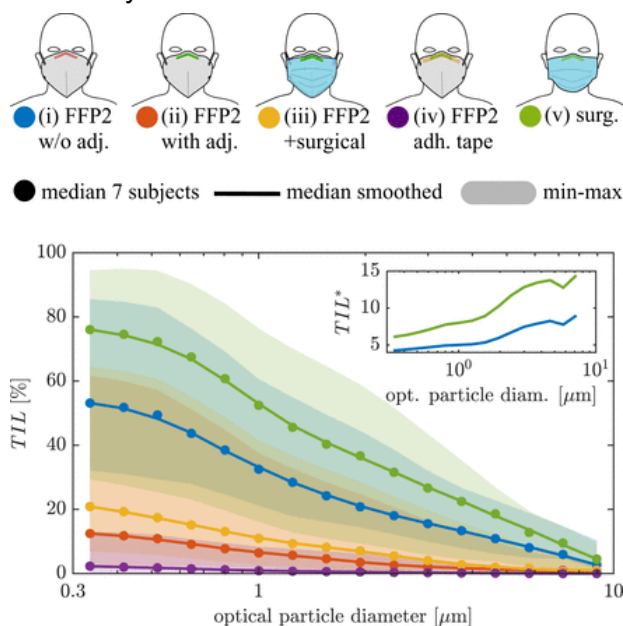
In fact, the word 'Surgical' can be used to describe several mask designs. It is usually meant to convey that the mask provides some degree of fluid resistance. As the word implies, a surgical mask of any design is useful to protect people engaged in surgical procedures, in the event of arterial spray from the patient, for example. The 3M Aura 1870+ is an example of a surgical N95.

However, when you see the term 'surgical mask', or 'medical-grade mask' it usually does not mean surgical N95 respirators. A surgical N95 respirator achieves a great fit, in addition to powerful filtration through the material.

[VLOG: Fluid Resistance Testing for Surgical Masks and Respirators - Transforming Outcomes](#)

[An upper bound on one-to-one exposure to infectious human respiratory particles | PNAS](#)

This study demonstrates that a naive fit of a respirator is superior to the use of a surgical mask.



The graphic shows that the use of a surgical mask had a leakage rate of around 75% to 65% for particle sizes of 0.3 microns to 1 micron. Whereas an unadjusted N95 equivalent respirator (FFP2) had leakage of 55% to 40% That is without even sealing along the nose bridge. For our use case, we would expect leakage of 15% to 10% with an N95 equivalent without a fit test.

**Q3: I hear that fit is important for N95s. But not all faces are the same, so how do I achieve a good fit?**

**A3:** Do a fit check to identify obvious leaks in the interface between your face and the respirator fabric. A fit check should always be performed after donning a respirator. Here are some tips on how to do your own fit check.

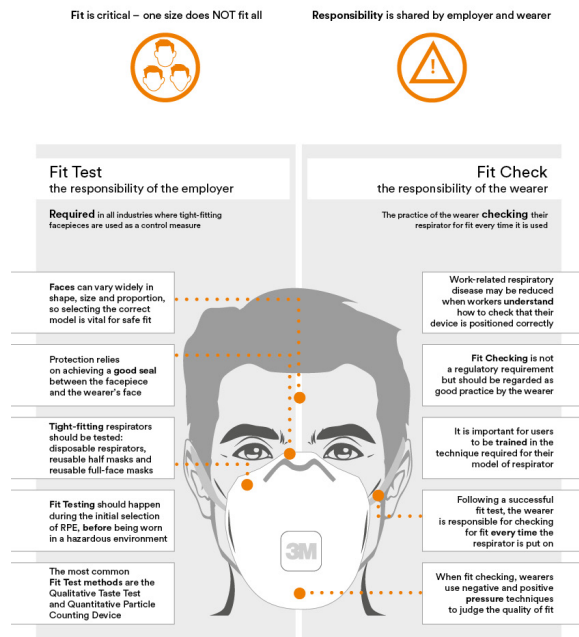
[Performing a Seal Check When Donning an N95 Mask](#)

[How long can you wear a KF94 or KN95? How to get a good face fit and more!](#)

[Let's Up Your Mask Game! – Masks4Canada](#)

**Q4: I've also heard the expression 'fit test.' Is that different from a fit check? If so, what is it, and do I need to do one?**

**A4:** A fit test (qualitative or quantitative) confirms with a high degree accuracy the level of effectiveness a specific respirator will have for a given person. It's a legal requirement in certain work settings.



If you have the resources to perform a fit test, by all means do! It will give you greater confidence that your respirator will protect against viral aerosols. Fit tests can range from \$30 to \$70 in Calgary. They're offered by distributors of safety equipment, safety certification organizations, hospitals, etc.

Here are instructions for how to perform qualitative fit tests from home.

<https://www.medrxiv.org/content/10.1101/2020.08.04.20168344v1.full.pdf>

However, when we wear a mask in daily life, our goal is to maximize respiratory protection. In many cases, we don't have the resources of time, money, or expertise to do a proper fit test. But we shouldn't let the perfect be the enemy of the good. *A mask designed to protect against airborne transmission will still provide better protection than one that is not designed for that purpose*, even without a fit test. If we can find an N95 type of respirator that we're happy with, we should upgrade as soon as possible. We should do the best that we can, given the constraints we're operating in.

**Q5: I have heard N95's are uncomfortable.**

**A5:** N95's and equivalent respirators come in many shapes and sizes. There are many brands and models that receive rave reviews by those who wear them. For example, the 3M Aura series (1870+, 9205+, and 9210+) has consistently received great reviews. Also, consider the Vitacore line of CAN95/CAN99 masks. It's important that the respirator works for you, and there are many effective options.

<https://twitter.com/omarshahine/status/1321550467281899523>

<https://twitter.com/michaelzlin/status/1477395266386870273>

<https://twitter.com/AbraarKaran/status/1475248779649421313>

When evaluating comfort, check how it feels around your ears (if using ear loops); around your face; breathability; odor; and other measures, to make sure your respirator is the right one for you. There are hundreds of respirators out there. There is no need to settle for ones that cause discomfort.

**Q6: What's the deal with ear loops versus head straps?**

**A6:** In general, head straps create greater tension, which means better fit and less leakage. They also don't strain the back of your ears. Whether head straps work for you depends on your head shape and facial structure.

The NIOSH N95 standard doesn't allow for ear loops. However, ear loops are common with other aerosol filtering respirators, such as KN95s.

[KN95 and 3M N95 - Differences, Uses, and Performance Data](#)

Ear loops do have a specific advantage, namely, ease of use. Donning and doffing masks happens often for people using them in their day to day. A respirator with headbands may be more awkward to take off and put on frequently.

If you do go with a mask with ear-loops, it's important that your mask has a strong connection between the facepiece and the ear loops, or you risk the mask coming off at inopportune moments. Do a tension test by tugging on the ear loops to confirm they can handle the strain.

To reduce strain on the ears when wearing ear loops, consider buying ear savers.

**Q7: Aren't N95 or equivalent masks in short supply? Shouldn't we save them for health care workers who are exposed to Covid-19?**

**A7:** This is not a concern at this time. Government and hospital authorities limit the use of N95s in health care settings, requiring them only in the case of specific procedures. In addition, there are plenty of Canadian and American companies ready to increase manufacturing and distribution of these masks to consumers. This has been confirmed by industry associations like the American Mask Manufacturer Association and the Canadian Association of PPE Manufacturers. See these links.

[AMMA Response to Health Industry Distributors Call for Increased Access to Low-Quality Foreign PPE](#)

[CAPPEM supports Auditor General's recommendations on Ontario PPE](#)

**Q8: How expensive are they?**

**A8:** On a per unit level, we're looking at around \$1 to \$2. And keep in mind, unlike disposable surgical masks, these masks can withstand multiple uses.

Many users rotate through a set of 5 to 7 N95 or equivalent masks by storing them in brown paper bags labeled with the day of the week. This allows the masks to air out odors and for existing viral particles to reduce concentration in the filter fabric.

However, this last is not even strictly required, as N95s use their electrostatic property to trap particles in the filtration layer. It would take much more than ordinary handling to shake infectious particles loose to the point where they risk infecting the person handling the mask.

[The Astounding Physics of N95 Masks](#)

Users replace their masks as often as they want to, depending on the straps/loops holding to one's head, and the amount of dirt buildup on the material itself. In most office environments, the latter will not be much of an issue.

[How long can you wear a KF94 or KN95? How to get a good face fit and more!](#)

**Q9: If they're so good, and so cheap, why is the Alberta government and the CMOH not advocating for their use, and even providing them to workers and students around the province?**

**A9:** That is a good question. Science evolves. Many countries and jurisdictions around the world have acknowledged, or are currently acknowledging that Covid-19 is spread by airborne transmission, something that was not fully understood at the beginning of the pandemic. Airborne threats require airborne protections, so it follows that eventually the guidance for PPE (personal protective equipment) should evolve too. Here are some resources that link to scientific papers and experts who address these questions.

**Further Resources:**

<https://twitter.com/ppetoheros/status/1453138j868451037192>