#### FACE COVERINGS FOR COVID-19 PREVENTION



Guidance: Face Coverings for COVID-19 Prevention

OCIETY O

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# Guidance on Face Coverings for COVID Prevention

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### Occ-COVID Conversations December 9, 2022



# FACE COVERINGS FOR COVID-19 PREVENTION -----

- Part of OSPE's package of documents on Indoor Air Quality for COVID protection
- Intended to be introductory, mostly related to face coverings used by public (i.e. not legally required workplace use under OHS legislation)

WHWB -	Today -		
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#### HIGHLIGHTS OF THE FACE COVERINGS DOCUMENT

#### SOME DETAILS ON A FEW POINTS

(NOT NECESSARILY PART OF DOCUMENT, REVIEWING ISSUES COVERED IN PREVIOUS OHCOW WEBINARS)

#### WHY WEAR FACE COVERINGS?

SMALL CHANGES MAKE A BIG DIFFERENCE

# Terminology (as used in guidance doc.)

Face-covering – overall term

WHWB

- Respirator approved by a certifying organization, e.g. NIOSH, CSA as meeting a standard for respiratory protection
- Mask not approved as meeting a respiratory protection standard





WHWB

To reduce risk of becoming infected or infecting others, wear a well-fitting respirator or face covering that provides particle filtration equivalent to an approved respirator such as an N95, in indoor settings or crowded outdoor areas.







- 1. For the best protection, wear a respirator when indoors or in crowded outdoor spaces if infected people may be present (or if you may be infected).
- 2. If you do not use an approved respirator, select a mask that has a filtration efficiency equivalent to an N95 or better.
- 3. Get as good a fit as possible if you can, get fit-tested. If you can't get fittested, learn how to get the best fit and check the seal when putting on your face covering
- 4. Respirators with headbands usually fit better than masks with ear loops. If you must use ear loops, learn how to get the best fit.
- 5. Face coverings can be re-used.
- 6. Where a respirator is used in the workplace, legal requirements may apply.



## What do these terms mean?

Filtering facepiece respirator (FFR) – an approved respirator in which the whole facepiece is the filter, e.g. an N95

N (as in N95) – does not protect against oil-coated particles 95 –filters 95% of the most penetrating particle size; 99 – filters 99% of most penetrating size

KN95 – Chinese standard KF94 – Korean standard

FFP2, FFP3 – European standard PFE – particle filtration efficiency

NIOSH-approved: has been approved by the US National Institute for Occupational Safety and Health as meeting respirator standards Health-Canada authorized: has received interim authorization from Health Canada as meeting standards, usually for filtration, breathability. Approves some KN95 and KF94 with earloops.

## The 3F's of Mask/Respirator Effectiveness







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# Filtration

How well does the material used remove particles from the air?

Media Efficiency or

Penetration (%)

Fit

How much air leaks round the perimeter when the product is worn, affecting its protectiveness?

Quality of facial seal, fit testing, fit checking, protection factor

Function

How much does the product affect the wearer's comfort and ability to breathe easily? Adapted from Simon Smith

Airflow resistance, skin compatibility, balance, communication, physiological burden, CO<sub>2</sub>, heat and moisture build-up

Key Question

> Associated Factors

🛆 🍵 nytimes.com/interactive/2020/10/30/science/wear-mask-covid... (

Magnified view of the fibers of an N95 respirator

Larger particles are easier to trap. They slam straight into the fibers and get stuck when the air stream brings them within touching distance, or when their momentum causes them to veer off course.

The smallest particles are bounced around by air molecules in a random zig-zag pattern, increasing the time they spend in the fiber forest and their chances of getting captured. 0

# HOW FILTRATION WORKS

https://www.nytimes.com/interactive/2020/10/30/science/wear-mask-covid-particles-ul.html?te=1&nl=the-morning&emc=edit\_nn\_20211223

#### Magnified view of the fibers of an N95 respirator

Here are the fibers of an N95 respirator. They are made of synthetic material, vary in size and are arranged randomly.

Electrostatic charge

And they have an extra feature: an electrostatic charge that attracts and captures particles of all sizes.



## Fit Tests and Seal Checks

## Fit tests

WHWB

- Done to select the best respirator for you
- Required when respirators are mandated in the workplace
- Desirable but not usually done for community use (or discretionary workplace use)

Seal check – should be done whenever respirator is donned (put on)

## Respirator Fit Tests and Seal Check

### **Qualitative Fit Test**

### **Quantitative Fit Test**

### **User Seal Check**

![](_page_12_Picture_4.jpeg)

- Subject dons respirator as normal
- Hood over head
- Bitter or sweet aerosol introduced into hood
- Taste indicates leakage

![](_page_12_Picture_9.jpeg)

Subject wears respirator with probe

Sensitive particle analyser compares

Ratio is measured during movement

ratio of airborne dust outside to

breathing and speech exercises

to sample interior

inside facepiece

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SI Incorporatec

![](_page_12_Picture_11.jpeg)

- Subject dons mask and blocks air paths
- Sharp inhalation and exhalation, feel for air leakage around faceseal

### Simon Smith

#### 13

![](_page_13_Picture_0.jpeg)

# PUTTING ON A HEADBAND FFR

### Breathe Easy, Part 2: How to Properly Use a Respirator in an Emergency | Blogs | CDC

### **OHCOW Fact Sheet**

#### Try not to touch inside of respirator.

Hold respirator so straps are on outside of hand.

Place respirator on face with metal nose piece on bridge (top) of nose.

Make sure bottom panel is snug at chin – tuck under first if helps.

Pull top strap over head, position high, above ears.

**Pull bottom strap** over head, **below** ears and against skin (i.e under hair).

The respirator should sit comfortably on your face with flaps completely unfolded and securely in place.

Make sure nothing prevents a good fit or seal (i.e.hair, jewelry, clothing).

![](_page_13_Picture_12.jpeg)

### The best face covering is the best one you will wear!

![](_page_14_Picture_2.jpeg)

![](_page_14_Picture_3.jpeg)

To prevent COVID transmission, we need a layered approach – that is, many different preventive measures that add up to the best protection possible. An implication of this is that even poor protection is better than no protection, especially if it is complemented by other measures. A well-fitting, N95 or equivalent respirator should be the standard for protection. But if it is impossible to use the best fitting, best filtering respirator, using a less efficient mask is better than nothing if the user recognizes the mask's limitations and observes other protective measures.

![](_page_14_Figure_5.jpeg)

![](_page_15_Picture_0.jpeg)

### COVID is Airborne: How Well Does a Surgical Mask Protect You?

Quantitative fit testing comparison showing protection factor based on measured particle levels outside and inside

![](_page_15_Picture_3.jpeg)

![](_page_15_Picture_4.jpeg)

Surgical Mask Protection Factor about 2

![](_page_15_Picture_6.jpeg)

Test Complete Failed								
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HEAD OF AND DO COULDOD COULDOD COULDON		ST2 PRENT HUND		sorier wait				

### Hand over Mouth Protection Factor about 2

![](_page_15_Picture_9.jpeg)

![](_page_15_Figure_10.jpeg)

#### **Fitted N95-level Respirator** Protection Factor about 200

transmissioncoalition.ca/

## **OHCOW Fact Sheet**

![](_page_16_Picture_1.jpeg)

Time* to Infectious Dose -15 Minutes	(hypothetical)
--------------------------------------	----------------

* MINUTES	Receiver is wearing (% inward leakage)								
MINOTES		Nothing	Cloth	Surgical	n-FT-N95	FT-N95			
Source is wearing (% outward leakage)	urce is wearing utward leakage) 100%		75%	50%	20%	10%			
Nothing	ng 100% 15		20	30	75	150			
Cloth	75%	20	27	40	100	200			
Surgical	50%	30	40	60 (1)	150	300			
n-FT-N95	20%	75	100	150	375 (6h)	750			
FT-N95	10%	150	200	300	750	1500 (25h)			

\* Times above are in SECONDS – unless otherwise indicated by minutes in (h) FT = Fit Tested n-FT = non-Fit Tested

# wнwв

# Comparison to Reference Time to Infection (based on times in OHCOW Fact Sheet)

Time to Infectious Dose - Comparison to Reference Time

		Receiver is wearing								
		Nothing	Cloth	Surgical	n-FT N95	FT-N95				
Source is wearing		100%	75	5% 50	% 20%	6 10%				
Nothing	100%	1.00	1.	33 2.0	0 5.00	0 10.00				
Cloth	75%	1.33	1.	80 2.6	6.67	7 13.33				
Surgical	50%	2.00	2.	67 4.0	0 10.00	20.00				
n-FT-N95	20%	5.00	6.	67 10.0	0 25.00	<mark>) 50.00</mark>				
FT-N95	10%	10.00	13.	33 20.0	0 50.00	0 100.00				

![](_page_18_Picture_0.jpeg)

WHWE

# WE NEED TO THINK ON A POPULATION LEVEL AS WELL AS AN INDIVIDUAL LEVEL

### ON A POPULATION LEVEL, SMALL CHANGES MAKE A BIG DIFFERENCE

![](_page_19_Figure_0.jpeg)

 $2^{10}$  (2x2x2x2x2x2x2x2x2x2x2x2) = 1024

1.9<sup>10</sup> (1.9x 1.9x 1.9 x1.9x 1.9 x1.9x 1.9 x1.9x 1.9x 1.9) = 613

Trisha Greenhalgh 🤣 @trishgreenhalgh · Jul 11, 2021

More fundamentally, we're not just interested in whether my mask protects either me or you from catching Covid during a short intervention period (say, one month). We're interested in how masking impacts on the \*exponential spread\* of an accelerating pandemic. 24/

Q 4 1, 264 ♥ 2,198

Trisha Greenhalgh ♀ @trishgreenhalgh · Jul 11, 2021
Take the number 1 and double it, and keep going. 1 becomes 2, then 4, etc.
After 10 doubles, you get 512. After 10 more doubles, you get 262144. Now instead of doubling, multiply by 1.9 instead of 2 (a tiny reduction in growth rate). After 20 cycles, the total is only 104127.
25/

1.989

![](_page_19_Picture_8.jpeg)

 $\bigcirc$ 

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Trisha Greenhalgh 交 @trishgreenhalgh · Jul 11, 2021

**1** 286

=> if masks reduce transmission by a TINY bit (too tiny to be statistically significant in a short RCT), population benefits are still HUGE. UK Covid-19 rates are doubling every 9 days. If they increased by 1.9 every 9 days, after 180 days cases would be down by 60%.

<u>,</u>↑,

<u>,</u>

? ► ? < ▼							🖺 Rem	ix 🌒
main.py		1.2e8						
GlowScript 2.9 VPython		1.0e8						
<pre>tgraph=graph(xtitle="Time [Days]",ytitle="Number Infected", widt f1=gcurve(color=color.blue, markers=False) f2=gcurve(color=color.red)</pre>	fected	0.8e8						
#number of infected humans at start N=1	nber In	0.6e8						
#infection rate - TRY CHANGING THIS	Nun	0.4e8						
a=2 a2=1.9		0.2e8						
#starting time		0						
#time step		0	2		4	6	8	10
dt=.1 N2=1					Time [Da	ays]		
<pre>#this is a loop for 40 days while t&lt;10:</pre>	Dif	ference =	5.66997	e+7 p	eople			

https://trinket.io/glowscript/756cf6efd5

![](_page_21_Picture_0.jpeg)

# We can stop this

HEALTH News

Flu surges on heels of RSV, COVID-19 to overwhelm children's hospitals

### Children's hospitals are overwhelmed across Canada. Experts weigh in on what's to blame – and what's not

TORONTO News

![](_page_21_Picture_6.jpeg)

Ontario pediatric ICUs operating above capacity, provincial data shows

![](_page_21_Picture_8.jpeg)

# Where to buy respirators/masks and info sources

# wнwв

- Hardware stores, Staples, safety supply stores
- Canada Strong Masks <u>https://canadastrongmasks.ca/</u>
- mask4Canada sources: <u>https://masks4canada.org/how-to-properly-make-buy-and-use-a-mask/</u>
- Direct from some manufacturers, e.g. Vitacore
- @masknerd testing info
- Other online sources: be wary and check brands on Health Canada or NIOSH
- Children's masks: none are NIOSH approved or HC-authorized. See masks4canada, Canada Strong. If brand (for adults) is approved, the childrens' masks are likely good.
- OHCOW webinars and resources <u>https://www.ohcow.on.ca/covid-19/</u>

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![](_page_23_Picture_1.jpeg)

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![](_page_23_Picture_5.jpeg)

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