

[Every attempt is made to ensure this information is broadly applicable, but it should not replace good judgement of each situation]

[Links to Twitter use XCcancel to avoid recent changes to reply and profile visibility - remove the word "cancel" to get original X link]

[Links to Amazon and Walmart are used often for broad accessibility, quantity of reviews, quality of photos/details, and price matching]

Masking Info

Quantitative Fit Testing (QNFT)

A Condensation Particle Counter (CPC) is used to calculate on-face respirator efficacy and fit

Particles are measured from both ambient air and air inside respirator

This shows the Total Inward Leakage (TIL) of particles both through and around the respirator

Score represents the Harmonic Mean Fit Factor (HMFF)

Harmonic Mean is an average that reduces impact of highest dataset values

This provides a more realistic estimate of protection capability

Fit Factor represents the number of particles outside the respirator for every particle inside

In other words, how many times cleaner the air is inside the respirator

This communicates the scale of efficacy differences better than percentages

1=0%, 2=50%, 5=80%, 10=90%, 20=95%, 100=99%, 200=99.5%, 1000=99.9%

Filtration percentage is called Fitted Filtration Efficiency (FFE)

100 is a passing score for OSHA QNFT given to medical and industrial workers

TSI PortaCount is the most common brand of particle counter fit testing equipment

Community fit testers mostly use retired 8020, 8020A, or 8020M models

The alternative to QNFT is Qualitative Fit Testing (QLFT)

This utilizes a bitter or sweet aerosol and whether the user tastes it or not while masked

QLFT isn't as accurate and does not support objective measurement across respirators and users

But any fit testing is still far better than none, and QLFT can be done inexpensively at home

Extended duration QNFT (1-6 hours) has revealed that almost all respirators require regular retightening

Talking and jaw motion tugs at the nosepiece which stretches it open, even if only slightly

Retightening/reforming the nosepiece should be performed at least every 30 minutes

Extended talking also necessitates more frequent retightening - every 15 minutes

Fit Factor to filtration percentage formula:

$$[1 - (1 / \text{HMFF})] \times 100 = \%$$

Calculator steps:

$$1 / \text{HMFF} = \text{TIL}$$

$$1 - \text{TIL} = \text{FFE}$$

$$\text{FFE} \times 100 = \%$$

Filtration percentage to Fit Factor formula:

$$1 / [1 - (\% / 100)] = \text{HMFF}$$

Calculator steps:

$$\% / 100 = \text{FFE}$$

$$1 - \text{FFE} = \text{TIL}$$

$$1 / \text{TIL} = \text{HMFF}$$

Classifications & Features

Any mask is better than no mask, and that's good to keep in mind when discussing styles and choices

However, if substantial protection is the goal, some types and models are better than others

Whenever possible, seek specific high-quality models rather than only relying on certification

Some certifications don't require broad fit test verification, just checklists of features

Regardless of certification, a tight-fitting disposable is categorized as a Filtering Facepiece Respirator (FFR)

FFRs as a category usually max out at fit factors of up to a few hundred on most people

Other categories:

Quarter-mask or half-mask elastomeric respirator

Full-face elastomeric respirator

Powered Air-Purifying Respirator (PAPR)

Many of these types regularly achieve fit factors in the thousands or tens of thousands

There are many FFR standards globally, but only U.S. standards like N95, N99, & N100 **require** headbands

Most common FFR standards allow for both earloop and headband models

Including: KN95-China, KF94-South Korea, FFP2/FFP3-Europe, P2/P3-Australia/New Zealand

Headbands ensure a better seal for the overwhelming majority of people, respirators, and situations

Headbands also do a better job overall of resisting leaks or loss of seal due to movement

Even when a person can pass QNFT with an earloop model, they still tend to do better with headbands

However, most people cannot pass an OSHA or international QNFT with earloop respirators

<https://hse.gov.uk/safetybulletins/ear-loop-respirators.htm>

While ear savers/earloop hooks can improve the fit and seal some, headbands still win out

If earloops are necessary, there are two options that have passed QNFT on a reasonable variety of people:

ZiMi earloop models

3M Aura models with the headbands cut in half and tied into earloops

But if a 3M Aura does not fit a person well with headbands, it likely won't work with earloops

Gerard Hughes' QNFT of a 3M Aura 9205+ with headbands cut and tied into earloops:

<https://youtube.com/watch?v=wtDAcoGucBc>

This may work with other trifold designs like Dräger 1950, Trident RTCFFP3, and Makrite 4803

However, these models have not undergone published QNFT with this earloop mod

Among FFRs, there are many categories grouped together by similar shapes and designs:

Flat-fold respirators

Trifold or three-panel or boat-style

Bifold or vertical bifold

Duckbill or pouch

Inner Frame Respirators

Cup-style or cup-shaped or molded cup respirators

Adhesive respirators

Bifolds with a crease that runs from nose to chin are less likely to seal well even if the filter material is good

The shape does not accommodate jaw motion as well, since the flexibility is in the opposite direction

The nosepiece shipping bent in half makes it difficult to form into shape without leaks around the nose

Note that many inner frame respirator filters are packaged like bifolds, but in practice, wear more like cup-style

The filter's gasket combined with the frame better handles jaw motion and doesn't require a nosepiece

Filter Material

FFR filter material is electret meltblown polypropylene in more/thicker layers than surgicals

Here's a video explaining the ways electret respirator material does its filtration:

<https://www.youtube.com/watch?v=eAdanPfQdCA>

A factory-applied electrostatic charge helps respirators attract more particles

This charge can be degraded by:

Captured particles

Time (5-10+ years)

Storage in condensing humid environments

Exposure to high percentage alcohol fumes (50%+)

Submersion in liquid

Heavy and/or sustained splashing with liquids

While water exposure does degrade filtration efficacy, it generally takes more than a sprinkling to do so

A little rain or splashback from a sink won't make much difference

It's even possible to wear certain respirators to shower, walk in the rain, or swim (head above water)

Though, this increased water volume will certainly decrease filtration efficacy vs. dry

This community member tested swimming laps and even direct shower spraying:

<https://xcancel.com/AdvancedTweaker/status/1815930182064300274>

Fit factor decreases with extended exposure, but respirator model determines by how much

Surgical fluid-resistant respirator models do not degrade as quickly

Fit factors are unfortunately likely to reach lower than the preferred 100 threshold

Many are still meaningfully protective in these more challenging situations

The 3M Aura 1870+ is the most affordable and available fluid-resistant respirator

The 3M VFlex 1804 & 1804s are also readily available, but generally cost more

Respirators should **not** be reused after being exposed to more than just a little water

While the efficacy loss may be acceptable, if combined with reuse, it would be too much

It is always best to avoid getting respirators wet in order to maintain the highest protection possible

But if protection is needed in a shower or at a waterpark, it is actually achievable

3M Aura has the most successful testing, and ReadiMask is known to totally fail when wet

The electrostatic charge of an electret polypropylene filter helps it attract particles rather than just catch them

This effect works to keep us safer from all kinds of particles found in the air we breathe:

Allergens - pollen, pet dander, mold spores, etc.

Dust & debris - insulation, drywall, woodwork, etc.

Infectious aerosols & pathogens - viruses, bacteria, fungi, etc.

Smoke & ash - wildfires, regional brush clearing, burn piles, etc.

Vehicle emissions - brake dust, fuel soot, tire scrapings, etc.

This filter type **cannot** protect against gases - ozone, combustion gases, carbon monoxide, VOCs, etc.

This is why you can still smell things through a common N95 respirator

Some models have activated carbon to reduce nuisance odors

But they are not equivalent to cartridge respirators or gas masks

Many sources of air pollution create both particles and gases/VOCs, especially combustion

The best by/use by date is the manufacturer's guarantee of all components and matters for employer liability

This is not a true expiration date, as most filters are good for an additional 5-10+ years after date

However, the straps on older respirators may get more brittle and prone to breakage

(Tip: 3M Aura 1870+ and 9205+ bulk boxes regularly get deep discounts due to surplus or near date)

Respirator Reuse

Most respirators that fit and perform well to begin with can also be reused

A generally acceptable maximum would be 20-24 hours of wear time regardless of donnings

A more reasonably safe maximum would be 12-16 hours of wear time

A conservative maximum would be 6-10 hours and replacing daily

If there is no other option, longer wear time is still more protective than surgical or cloth masks

Keeping a pen/marker handy for tracking hours with tick marks on respirator is a good strategy

How many hours of wear they can withstand before dropping below N95 filtration varies

Initial filtration efficacy, ambient particle quantities, moisture exposure, etc. all contribute

How many hours of wear before unhealthy levels of fungal/bacterial colonies form varies

These can trigger/aggravate allergies, asthma, and other respiratory conditions

The warm, humid, porous environment inside a respirator can promote growth over time

Reasonable wear times broadly avoid this issue

How many donnings and doffings they can withstand before they cease to seal well varies

Material type/quality, head size, skin oils, how far elastics are stretched, etc. all play a role

Respirator efficacy decreases with usage - both through wear time and number of donnings

Captured particles reduce respirator filtration efficacy

Humidity impacts effect of particle buildup on electret material

In HVAC filters, particle buildup can actually increase filtration, but lowers airflow

This is due to the generally mid to low humidity environment

In respirators, particle buildup depletes the electrostatic charge

This is because the environment is always humid due to exhaled breath

Respirator breathability/airflow can also be reduced by heavy buildup

It will fall below N95 filtration standard before that happens

Respirators should not be reused to this point if at all avoidable

Physical degradation can also occur:

Elastic earloops and headbands can get stretched out

Metal nosepieces can fatigue and not hold shape well

Foam seals can get too oily or compressed to stay in place and maintain a seal

Filter material can fray, crease, or otherwise lose structural integrity

Manufacturer guidelines, independent research, and community testing agree that wear time matters

They just don't have a firm consensus on a threshold for hours of usage

This is because different respirators, needs, and users all impact the math

Texan_Reverend's thread discussing wear time:

https://kind.social/@Texan_Reverend/111254894101178927

It includes the following two studies:

<https://ncbi.nlm.nih.gov/pmc/articles/PMC7738039>

<https://scispace.com/pdf/particle-loading-time-and-humidity-effects-on-the-efficiency-3sqd0dh1xf.pdf>

Beard Band

Facial hair has a negative effect on the fit and seal of respirators

If respirators can't press snugly against the skin, they let unfiltered air bypass them and leak inside

A TPU exercise loop or band can be worn to cover a beard and enable a respirator to seal properly

It is worn from chin to crown of head, covering the beard area from tip of chin to neck

The elastic band creates a gasket, containing the beard and compressing it against the skin

Respirator filter material gets a very good seal against the smooth, slightly grippy TPU elastic

People can achieve QNFT scores comparable to what they get when clean shaven

This is the Singh Thattha Technique developed by Dr. Rajinder Singh - UK transplant surgeon

Singh is the doctor's name and Thattha is the word for a traditional Sikh beard care wrap

Initial advocacy and testing was undertaken by the Sikh Doctors and Dentists Association UK

Exercise loop variant was originally trialed by Texan_Reverend

Certified for hospital use in the UK, Australia, New Zealand, and working on more

Exercise loops/bands come in various resistance levels, sizes, colors, and materials

Avoid latex, as sensitivities or allergies can develop after repeated exposure

Avoid elastic fabric bands, as they are not airtight

12" lengths are the most common and fit most people well, some 10" and 14" options also exist

For most people, one of the lighter tension 3" wide loops will contain up to about 2" facial hair

Example 3" wide exercise loops (only available in a set, unfortunately):

<https://amazon.com/dp/B019NU05HU>

Note: most exercise loops on Amazon are only 2" wide and are more difficult to achieve a seal

For longer/bushier beards, the original method of tying a wider band into a knot on the head is best

Example 4" wide bands:

<https://amazon.com/dp/B003YR7G8K>

Example 6" wide bands:

<https://amazon.com/dp/B0D14X4VM1>

Like all elastics, exercise loops/bands eventually stretch out with repeated use

They should be replaced every 1-3 months depending on hours and frequency of wear

If a band is wrinkly at the edges instead of fully reverting to normal shape, it should be replaced

If a band no longer feels snug, it should be replaced

Demonstration of the exercise loop variant:

https://youtube.com/watch?v=PPN_TRqYqMc

Demonstration of the original knotted exercise band version:

<https://youtube.com/watch?v=5tRvFTptgSA>

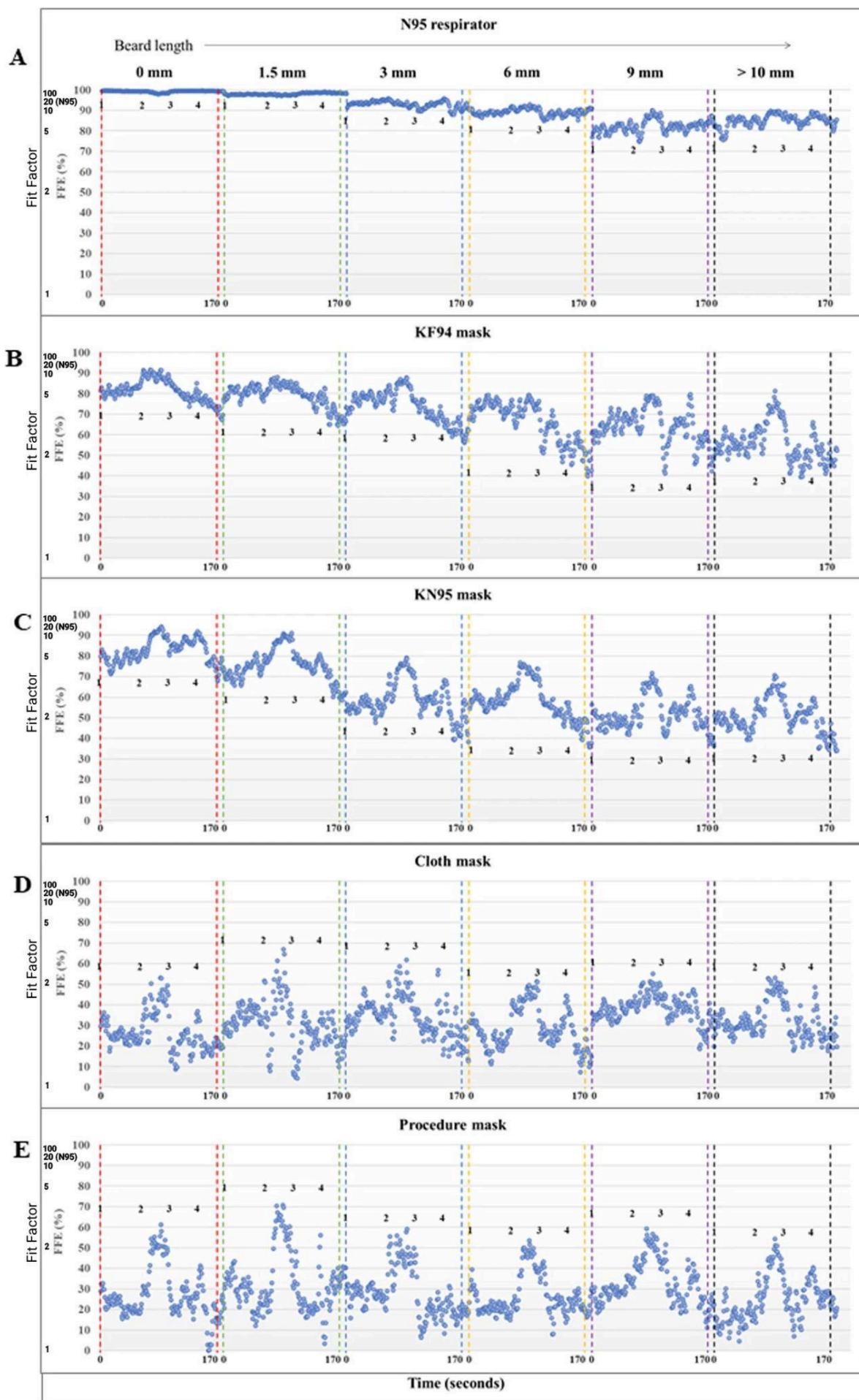
On the next page is a graph that highlights the effects of progressively longer beard lengths on respirator seal

It also gives a good representation of efficacy differences between headband and earloop models

Fit factor scale annotations next the filtration percentage scales were added by Texan_Reverend

The study which the graph is pulled from:

<https://nature.com/articles/s41370-021-00337-1>



Drinking Valve

A silicone valve can be mounted in a respirator to allow a straw through and enable drinking while masked
It is reusable across 10-15 respirators, though the opening should be inspected for tears each time
The first to assemble this kind of valve and popularize its use was the SIP Airtight Drinking Valve
These are assembled into a kit from these entirely off-the-shelf parts which anyone can order:

The silicone valve - Tablecraft 1SV (This is what's used in condiment bottles at places like Subway)

<https://etundra.com/restaurant-dining-room/tabletop-supplies/squeeze-bottles/tablecraft-1sv-valve-for-squeeze-bottle>

The sealing ring - 1.25"x.625"x.062" Nylon flat washer (Alternative: 28mm*16mm*1mm)

<https://zieglerbolt.com/125x625x062-nylon-flat-washer-58nylon-flat-washer-58-2>

<https://amazon.com/dp/B07NRYX583> (Alternative - can be double stacked on thin filter material)

(Optional) The cap - Cap for 1 / 2.5 / 3 dram vials

<https://thorntonplastics.com/caps-for-vials.html>

The hole punch - The easiest, most precise method to cut a hole for the valve is a 14mm leather punch

Traditional 14mm punch used with a mallet or hammer:

<https://amazon.com/dp/B0D25GXS76>

14mm punch with a 1/4" hex bit:

<https://amazon.com/dp/B0BGFH955L>

Used with an electric screwdriver/power drill or a manual press:

<https://amazon.com/dp/B09PFCX8Q1>

<https://amazon.com/dp/B09PD2M7L1>

(Alternative) The scissors - small, curved medical/craft scissors will feel more familiar to some

Less precise circle, but does not require swinging a hammer or controlling a drill

More precise and smoother circle than common, large scissors or kitchen shears

<https://amazon.com/dp/B07Y98M5KX>

<https://amazon.com/dp/B07HLQ7LL6> (10 pack)

The straws - An exterior diameter of up to 6mm is ideal (if too large, the opening could tear)

Reusable 5mm stainless steel straws - 4 pack

<https://amazon.com/dp/B07MDHQ6L8> (10")

<https://amazon.com/dp/B000AUIN18> (8.5")

Biodegradable 8" x 6mm Collins straws (Tall cocktail straws)

<https://amazon.com/dp/B0CRVY8R3L> (5000ct bulk)

<https://amazon.com/dp/B0841QVRPP> (200ct individually wrapped)

These drinking valves have been tested on a variety of respirators without compromising protection

That does depend on proper installation, so practicing beforehand on used respirators is helpful

The cap can keep the valve clean when not drinking, but is not necessary for function

Gerard Hughes' QNFT of a 3M Aura 9205+ with a SIP drinking valve installed:

https://youtube.com/watch?v=tFp_PTJbEGY

Using the drinking valve:

Place straw into beverage before passing it into valve, or it becomes a direct path for unfiltered air

Avoid inhaling while a straw is inserted through the valve

Do not slurp the last of the drink at the bottom, as that pulls in lots of unfiltered air

Hole Punch Installation instructions:

Clean the hole punch of any dirt, debris, or machining oil

Prepare a sturdy surface and cover it with some scrap wood or cardboard

Don the respirator, press the front of it to your pursed lips, and make a pen mark at the center

Remove, check where that mark is, then lay the respirator face down on your scrap wood or cardboard

Center the punch on the mark and away from any seams, then make the hole from inside the respirator

Hold the sealing ring aligned with the hole on the outside of the respirator

Squeeze the front lip of the 1SV valve through the hole and sealing ring from the inside of the respirator

The flat, wide flange should stay on the inside, flush against the respirator with no wrinkles

The sealing ring should fill the gap between the lip of the valve and the face of the respirator

It also holds the respirator material snug against the silicone flange inside

Scissors Installation instructions:

Clean the scissors of any dirt, debris, or machining oil

Don the respirator, press the front of it to your pursed lips, and make a pen mark at the center

Remove, center the sealing ring around the dot, and trace the inside of the sealing ring with a pen

Snip a hole in the center of that circle with scissors, then work your way around to cut out the circle

Hold the sealing ring aligned with the hole on the outside of the respirator

Squeeze the front lip of the 1SV valve through the hole and sealing ring from the inside of the respirator

The flat, wide flange should stay on the inside, flush against the respirator with no wrinkles

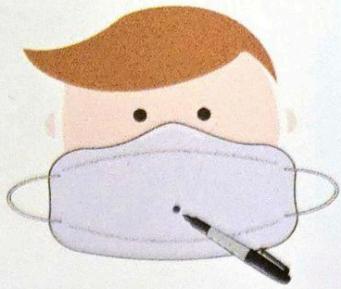
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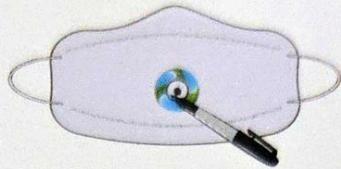


What you'll need:
a mask, pen & scissors

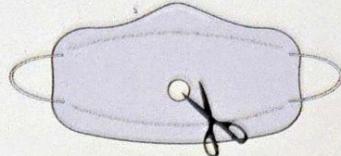
- 1 For a customized fit, put your mask on and mark a dot between your lips.



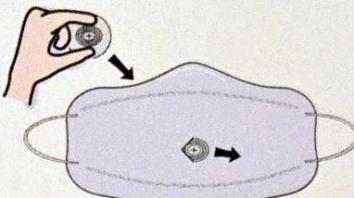
- 2 Remove your mask and place the securing ring around the marked dot, centering it. Trace the ring's inner circle.



- 3 Cut around the outside of the circle you just traced on the mask. Do not cut a hole smaller than the circle!

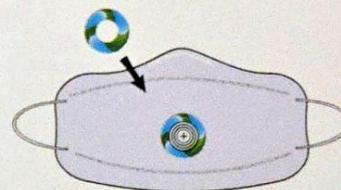


- 4 Starting from inside the mask, pinch the valve head and squeeze it through the hole (like a button).



The valve head should end up on the outside of the mask, while the wider base should remain on the inside.

- 5 Slip the securing ring over the valve head, squeezing the head through the securing ring's hole.



- 6 Inspect the valve, making sure the valve petals are closed.

To ensure an airtight seal, replace with a new valve after 10 installs or every 30 days of use.

- Put the straw into your drink BEFORE putting it into the valve. Between sips, pull the straw out of the valve, not your drink.

- Put the straw in and out of the valve as you would normally use a straw with your mouth. Don't leave the straw just hanging in the valve unless actively sipping.

Chin Panel Staples

Many flat-fold respirators can have a pleat folded and stapled into place in the bottom edge of the chin panel

This reduces the overall opening size to make it fit more tightly

As a result, people with smaller faces/chins can utilize a broader range of respirator models

A stronger inward angle to the pleat can also improve fit on narrower chins

This type of swivel adjustable stapler makes reaching odd angles easier:

<https://amazon.com/dp/B0B3MWG7JG>

(It's also great for assembling zines)

Video of stapling process by @WeMaskColorado on Twitter:

<https://xcancel.com/WeMaskColorado/status/1895564665511669807>





Glasses Fogging

Fogging of glasses while wearing a respirator is difficult to completely eliminate

There are a few strategies for significantly reducing fogging

Choose versions of respirators with exhalation vent valves

Most of the heat and moisture vents directly out away from glasses

Good models include:

3M Aura 9211+, 3M 8511, Dräger 1950 V, Moldex AirWave 4400/4700/4701

Apply stickers or tape to the upper portion of the respirator near the glasses

This is the least expensive option and it works with respirators you already have

While this deflects exhaled breath, it also reduces breathability somewhat

Use anti-fog sprays/drops/wipes on the glasses

Unfortunately, many of these products contain heavy levels of PFAS

Some PFAS-free wipes:

<https://www.e-optician.com/products/anti-fog-wipes-for-glasses>

Markers

Markers are a non-destructive decorative option even when the entire respirator surface is covered

Scented markers often use phthalates in their fragrances, so they should be avoided

Washable markers are the lowest VOC option, but they smudge easily and will run when wet

Airing out overnight should be sufficient in most cases

Permanent markers will set fully, but they emit 400x as many VOCs as standard washables

They should have extended air-out times of 24-48 hours or more

Even after airing out for multiple days, they may still retain some odor

Water-based acrylic markers also set fully, and they are generally a very low VOC option

After 12-24 hours of airing out, they should be fully dry with no odor

Arguably the best option - permanent, low VOC, able to layer colors, function on black masks

Sharpie Creative acrylic markers are among the easiest to work with

<https://amazon.com/dp/B0CPMFV2ZF>

<https://amazon.com/dp/B0DK9RK89H>

Marker airbrushes can enable different styles of art, and they pair well with stencils

Crayola Air Marker Sprayer - wall plug; uses broad-line Crayola markers as ink cartridges for airbrushing

<https://amazon.com/dp/B01CIMC8J1>

Crayola Marker Airbrush - AA batteries; uses broad & thin Crayola markers plus standard Sharpies

<https://amazon.com/dp/B0DTB2N2D9>

Actekart Marker Airbrush - USB-C rechargeable; uses nearly any marker type and is compatible with acrylics

<https://amazon.com/dp/B0C2TMFHKL>

(Most expensive model, but it has massive compatibility and lots of control over output)



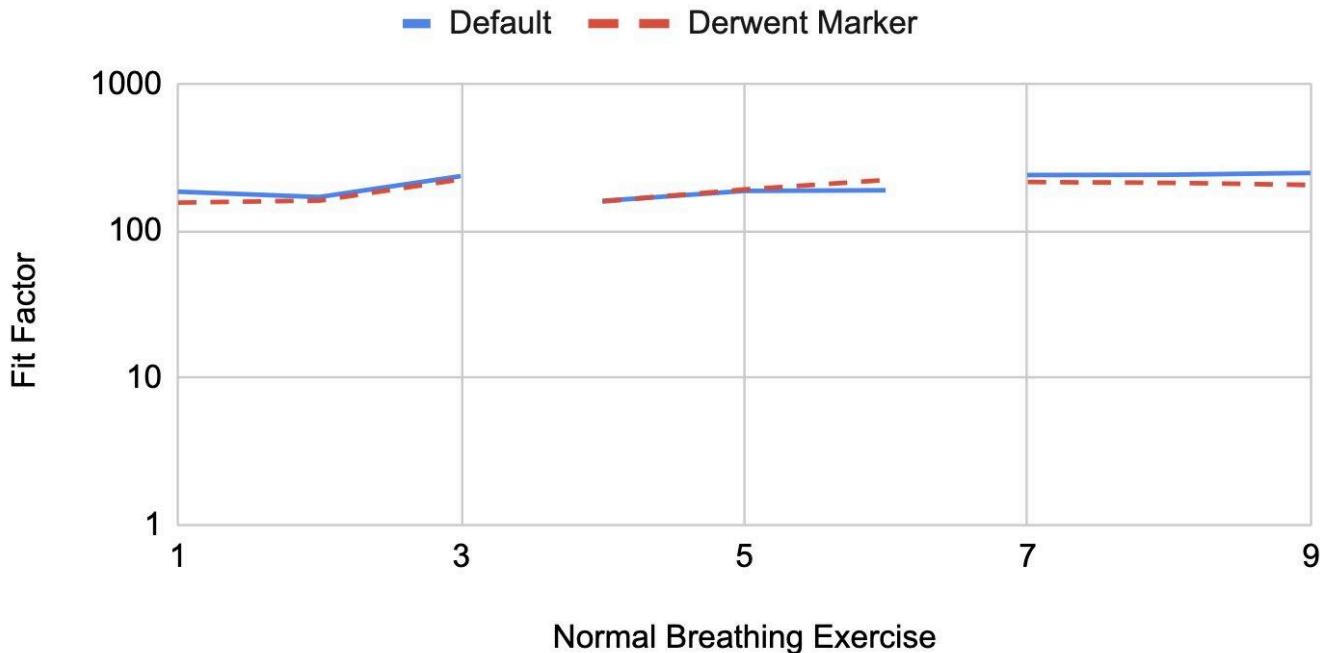
Credit: @Texan_Reverend@Kind.Social on Mastodon

https://kind.social/@Texan_Reverend/114497723563863428

Below is a graph and photo of a community member's QNFT after completely covering a 3M Aura in marker:

3M Aura 9210+ Default vs "Black Aura" Marker Mod

3x3 normal breathing exercises, redonning in between. Derwent Academy black marker.



(Derwent Academy marker never fully set and continued to rub off on hands and clothing for weeks)

Credit: @antiviral_mktn on Twitter, now @antiviral.bsky.social

https://xcancel.com/antiviral_mktn/status/1819289714182037938

Magnets

Magnets make great reusable decorations which do not decrease the efficacy of respirators

However, too much weight can drag down a respirator and compromise the seal/efficacy

Covering lots of surface area can potentially increase breathing resistance

Not a suitable decoration for children, as the inner magnet could end up in their mouth and choke them

Not compatible with respirators which use pleated filter media - like Moldex AirWave

The preformed curves of molded cup respirators may limit which sizes/shapes of magnets will work

The frame of inner frame respirators may also limit which sizes/shapes of magnets can fit securely

Good items to use as magnetic decorations:

Magnetic lapel pin

<https://amazon.com/dp/B0BXWVM4SV>

<https://amazon.com/dp/B0CLFG6TG6>

Refrigerator magnet or chain magnet

<https://amazon.com/dp/B09RWJPMDJ>

<https://amazon.com/dp/B0DM946SFX>

Paired with a hijab magnet on the inside

<https://amazon.com/dp/B0DWFW3RZZ>

Magnetic name tag with printed or drawn art, names, pronouns, slogans, etc.

<https://amazon.com/dp/B09TSXGCG9>

Needle minder used for cross stitch

<https://amazon.com/dp/B0DTK5Q2GH>

<https://amazon.com/dp/B09YV3Q6L2>

<https://amazon.com/dp/B0BH2C4JWC>

Magnetic brooch/pin converter

<https://amazon.com/dp/B0DSZL2PK8>



Other Decorations

Some respirators have features or physical characteristics which enable unique decoration opportunities

Models with a single loop headband like Dräger 1950, Easimask FSM18, and any Moldex AirWave:

Headband clips allow string, paper clips, or ornament hooks to suspend lightweight charms

3M VFlex models:

Wings on the sides don't do any filtering and can be pierced to attach enamel pins or similar

Staples can also be used to attach things to the wings - printed paper, ribbons, etc.

3M Aura models:

Staples can be used to attach things at the side edges near strap staples - paper, ribbons, etc.

Common enough respirator to have reusable fabric covers available on Etsy

https://etsy.com/shop/LoveTheLookStudio?section_id=37009349

Any three-paneled respirator (3M Aura, Dräger 1950, Trident RTCFFP3, Makrite 4803, etc.)

DIY panel cover

Lay respirator face down on breathable fabric, like thin cotton, and trace panel outline

Cut out fabric panel and place over respirator panel to ensure correct shape and size

Gently apply Elmer's Washable Purple Glue Stick to perimeter of respirator panel

Place fabric panel into position and press around glued perimeter to adhere

Allow 5 minutes minimum to dry, but 2+ hours gives a conservative offgassing period

To remove: moisten glued perimeter of fabric with warm, wet paper towel or rag

Once saturated, fabric panel should peel off easily

Wash fabric panel as normal for fabric type - washing machine or sink

Fabric panel can be applied to new respirators as desired

A wide collection can be made from fabric scraps

Make your own designs on cotton fabric panels using bleach after cutting them to shape

Can use stencils, shaped sponges, rubber stamps, etc.

<https://clorox.com/learn/how-to-do-bleach-art-on-clothes>

Lightweight mask chains which attach to headbands or headband clips are good if they don't tug at fit/seal

Stickers can work well, as long as they don't cover too much surface area, making it harder to breathe

Rub-on transfers for scrapbooking also work and have the same caveat of not covering too much

Unlike inks and markers, stickers and transfers don't require a waiting time before donning

Rubber stamps with ink pads can add intricate designs easily or even spell things out

Some inks are specifically formulated for plastic and shouldn't smudge once they dry

Much like markers, inks should be allowed to dry and offgas overnight to avoid breathing VOCs

DIY stamps can be made by carving common rubber erasers



Special Situation Respirators

There are many masking scenarios that land outside the standard of an adult at work, out shopping, etc.

Specific respirator models and/or strategies can be used to meet those needs

Respirators which perform well and are sized appropriately to fit kids are quite few and far between

For a model very similar to a 3M Aura but with available sizes fitting preschoolers to linebackers:

Trident RTCFFP2 and RTCFFP3 - P2/P3

For bigger kids, teens, and small adult faces:

3M VFlex 9105s and 1804s - N95

For high fit customizability, the smallest possible sizes, and a semi-rigid inner frame to maintain shape:

ZiMi ZM95S w/ headbands - KN95

ZiMi XS frame + ZiMi ZM7711F filter w/ headbands - KN95

Inspect the fit carefully and during movement/play to see if modifications are needed

If nothing else fits, adhesive masks still should, but they can potentially be hard on skin to wear daily:

ReadiMask - N95

MRI exams require metal-free respirators, as do most CT/X-Ray exams of the head

Some metal-free models which are MRI/CT-safe:

ReadiMask (acrylic adhesive version - the silicone adhesive generally does not seal as well)

The best application method is side-seal rather than under the chin

Easimask FSM18

All Moldex AirWave models

All ZiMi inner frame models

Staple-free flat-fold respirator with nosepiece removed & double-sided mask tape in its place

Dräger 1950 fits this use-case, as the only metal it has is the nosepiece

Double check entire respirator for any other metal before selecting it for this purpose

Double-Sided Mask Tape Strips

<https://amazon.com/dp/B093S1H68B>

Double-Sided Mask Tape Roll

<https://amazon.com/dp/B08CJWDDS8>

Always take at least one spare copy of your chosen respirator to the appointment

This allows you to show it to the technician for inspection/verification that it is metal-free

Technicians are more likely to push back against flat-folds with nosepiece removed than others

Hair appointments

ReadiMask

The best application method is side-seal rather than under the chin

Disposable respirator/FFR with both straps at neck level + double-sided mask tape at least under chin

Dentist appointments and doctor appointments where mouth access is needed

Nose-only ReadiMask (with larger respirator over it for waiting room and until procedure time)

Similar to side-seal but bottom edge goes across the upper lip rather than under the chin

Practice donning ahead of time along with nose-only breathing while mouth is open

Credit: @findmeabluebird donning video on Twitter:

<https://xcancel.com/findmeabluebird/status/1517896018188197891>

Gerard Hughes' QNFT of nose-only ReadiMask:

<https://www.youtube.com/watch?v=gPsQKrpKOYY>

<https://www.youtube.com/watch?v=VUJGYM894Bw>

ReadiMask Donning

Being too small to effectively seal is a bigger issue in ReadiMask sizing than being too big, so sizing up is ok

Too large just means some extra material outside the edges of the face seal with no loss of function

Extra material may also increase available filter surface area, decreasing breathing resistance

The manufacturer's default method of donning entails pinching the seal closed into a flap under the chin

Over time, this can often end up developing a small leak under the chin where the two sides meet

The flap under the chin can also get bumped or snagged more easily, creating a leak

The community-designed side-seal method pinches at the jawline on both sides & folds the flaps up at cheeks

Folding the flaps up to stick to the face, covering where they meet at the jawline, strengthens the seal

This method develops fewer leaks and yields consistently higher fit test scores

Where the flaps fold over against the cheek, mask tape can be used to reinforce/secure the seal

To use the side-seal method, the donning steps are:

Remove label strip beforehand - it makes the area under it stiff and difficult to fold/shape

Wash face with soap and water or clean all sealing edge areas with alcohol - nose, cheeks, under chin

Place center of upper edge near top of nose bridge, then press down on either side to stick to nose

Smoothly press outward along both cheekbones to seal upper edge, then down cheeks to jawline

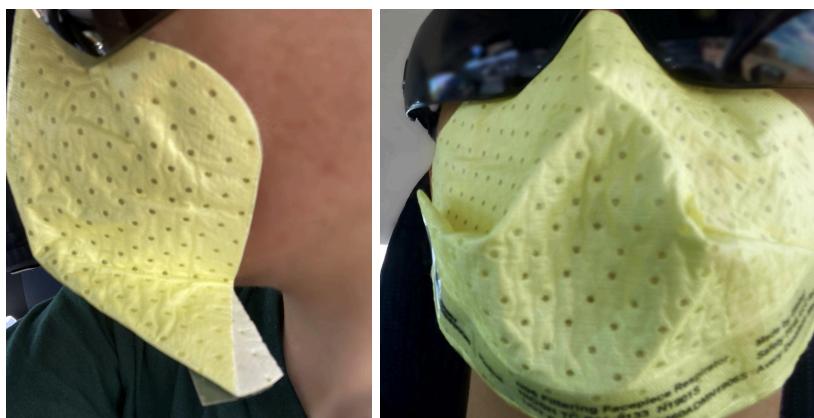
Fold lower edge towards underside of chin, then seal lower edge starting at center & working outward

Pinch lower edge seal on each side against side edge seals coming down the cheeks, creating flaps

Fold flaps upward and backward, roughly toward the ears, then stick them to the cheeks

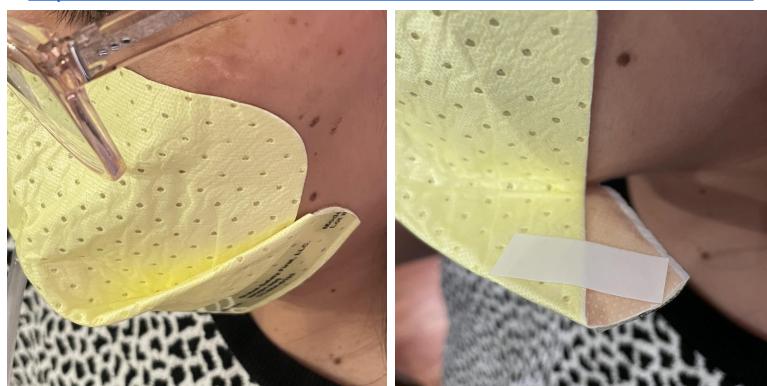
The flaps will adhere to some amount of the side edges and the cheeks, covering the jawline pinches

Double-sided mask tape can be added to the flaps to help them better adhere to the cheeks if needed



Credit: @ParentMishmash on Twitter

<https://xcancel.com/ParentMishmash/status/1788988704364642505>



Credit: u/piggyphish on Reddit

<https://reddit.com/r/Masks4All/comments/1elso5j/comment/lguusqy>

Harassment Mitigation

These are ideas used by community members for reducing harassment due to masking
Hopefully you're never in a position to need them

Around strangers, like at the grocery store:

Hold a phone to your ear the whole time and either be on a call or pretend to be

Social conditioning makes people generally not want to interrupt

Wear a business/office looking lanyard with faux access/ID badge, keys, etc.

People avoid bothering those who appear to be working or to have authority

Decorated and/or colorful respirators defuse many people who might otherwise comment

When it looks more like a fashion choice/accessory, people process it differently

Anti-maskers often "see white" on an N95 like bulls "see red" and just react

Short-circuiting that subconscious reaction can help reduce incidents

Some decoration themes may of course bring their own harassment risks

Wear scrubs

Remarkably fewer people have an issue with medical staff wearing respirators

Wear a magnetic name tag on your respirator with the words "Chemo Sucks" written on it

Or write "Chemo Sucks" directly on the respirator

If anyone gives you guff, say "Chemo sucks. I hope no one you love ever has to go through it."

No further explanation, discussion, or justification needed

There's powerful social pressure against being mean to people perceived as having cancer

Around coworkers, either when they bring it up or preemptively in general conversation:

Mention spending time with a vulnerable family member and needing to protect them

People are more amenable when it's "noble" and worn to protect someone else

Doctor says I'm at risk due to:

Compromised immune system from childhood illness

Past heart issues

Past lung/respiratory issues

[Insert plausible past or chronic malady here]

[Insert actual past or chronic malady here]

Or just "My doctor says I'm in a higher risk category, so masking is advised."

Around family/friends:

Countless people wish they knew how best to handle this

Try to establish clear boundaries

Sorry if you lose friend or family connections like so many of us unfortunately have

Misc Comments & Recommendations

Respirator fit and which model is best for a given person are heavily influenced by their face size and shape

People with low/shallow/less pronounced nose bridges sometimes struggle with flat-fold respirators

This most frequently affects Black and Asian people, but it can occur in anyone

Cup & inner frame respirators w/ a full gasket or adhesive respirators may do better

Options with good performance (when they're a good fit on the face) include:

Moldex AirWave 4150/4151, 4300, 4620/4621, 4800/4801

Easimask FSM18

All ZiMi models w/ headbands & no valve

ReadiMask

Involving people (especially kids) in the decoration of their own respirator greatly enhances buy-in

They're more likely to wear it and to keep it in good condition when they've contributed to making it

For kids, having a weekly respirator crafting session can help them engage with their own protection

This helps them to be excited each day to pick out which of the ones they decorated they want to wear

Consistent rituals like this help normalize and solidify the habit

It helps further if a parent decorates their own with the kid & picks one out with them each day

Potentially, even let kid decorate parent's respirator

The parent's decorated respirator could be swapped to a plain one at work if needed

Decorated masks can remain for personal use like errands, outings, events, etc.

Consider keeping an emergency/hospital respirator kit in your home, vehicle, and maybe workplace

This should include:

At least one copy of an MRI/CT-safe model

Multiple copies of the respirator you're most comfortable wearing for extended periods

This could include sleeping, so test it while lying down to make sure it stays sealed

Several surgical-rated N95s to offer healthcare workers when asking them to mask

Compliance is higher when the hassle of going to find an N95 is removed

The 3M Aura 1870+ is the least expensive and is familiar to most healthcare workers

They come individually sealed which keeps them hygienic in storage & hospital

Some workers may prefer to use facility-provided N95s and that's fine

But do try to insist on them wearing an N95, not just surgical/procedure masks

Double-sided mask tape in case of sealing issues, maybe secure respirator while sleeping, etc.

Paper/cardboard sign asking staff to wear N95s when in your room or taking you to procedures

Ideally, this should be colorful/decorated to attract attention and feel non-threatening

Clear ziploc bag for holding healthcare worker respirators to dispense

Blue painter's tape to mount the sign and the open ziploc of respirators to wall just inside door

If they'll let you mount it on outside of door, that is best, but many facilities won't

If you have an air cleaner, plan on bringing it with you if possible

Bring several copies of a surgical-rated N95 to any dental/medical appointments to provide for staff during visit

Unique feature of single-loop headband models like Dräger 1950, Easimask FSM18, any Moldex AirWave, etc.

Easily drop upper strap and filter for airport security, DMV photo, etc. then re-don all in a single breath

The neck strap stays in place with enough slack to let the filter hang fully out of the way

U.S. Respirator Sourcing

The following is a list of respirators and links to their lowest cost, legit, purchasing options (as of Dec. 2025)

Due to the ever-changing nature of retail, these links may not be cheapest or valid at time of reading

For Amazon/Walmart links, choose sellers that ship from Amazon/Walmart (Woot is owned by Amazon)

This improves the security and ease of any returns/refunds if issues arise

Flat-Fold Respirators

3M Aura 1870+ N95 - Can be modded to earloop - Same or lower bulk cost as earloop KN95 models

- Trades off with 9205+ for lowest cost high-quality respirator at \$0.12-0.20/ea - Surgical fluid-resistant

<https://amazon.com/dp/B0937JGMY7> (440 count bulk box)

<https://amazon.com/dp/B09HY48BK6> (20 count pack - \$0.30-0.50/ea)

3M Aura 9205+ N95 - Can be modded to earloop - Same or lower bulk cost as earloop KN95 models

- Trades off with 1870+ for lowest cost high-quality respirator at \$0.07-0.20/ea

<https://amazon.com/dp/B08J1THV9G> (440 count bulk box)

3M Aura 9210+ N95 - Elastic fabric headband is more comfortable/durable for some use cases

<https://amazon.com/dp/B0BCL5XZKQ>

3M Aura 9211+ w/ valve N95 - Elastic fabric headband is more comfortable/durable for some use cases

- Vent valve reduces heat & moisture buildup and reduces glasses fogging

<https://amazon.com/dp/B0CG2G99MJ>

Dräger 1950 N95 - Stable seal with less need to retighten - Structure reduces chin gaps & slipping

<https://amazon.com/dp/B09WB65XWK> (Size S)

<https://amazon.com/dp/B0F335PJCL> (Size M/L)

Dräger 1950 V N95 - Stable seal with less need to retighten - Structure reduces chin gaps & slipping

- Vent valve reduces heat & moisture buildup and reduces glasses fogging

<https://amazon.com/dp/B09WBDV77V>

Makrite FIT+ 4803 N95 - Surgical fluid-resistant - Blue

<https://walmart.com/ip/10517201342>

Trident RTCFFP2 P2 - Surgical fluid-resistant

<https://hlpmedical.net/products/trident%C2%AE-surgical-p2-respirator-level-3-hospital-grade-face-masks-individually-packaged-box-20> (Global shipping)

Trident RTCFFP3 FFP3 (aka Project 3) - Surgical fluid-resistant - White or Black

<https://usafacemaskstore.com/product/trident-ffp3-disposable-face-mask>

<https://usafacemaskstore.com/product/project-3-by-trident-ffp3-black-face-mask-respirator-with-head-band-straps> (Lowest cost Trident model after shipping)

3M VFlex 9105 N95 - Very low breathing resistance - Under \$1/ea

<https://amazon.com/dp/B005KLZAYU>

<https://walmart.com/ip/41437940>

<https://zoro.com> (Search: G0862784)

3M VFlex 9105s N95 - Very low breathing resistance - Under \$1/ea

<https://amazon.com/dp/B06WD6B3QX>

<https://walmart.com/ip/41068326>

<https://zoro.com> (Search: G2183693)

3M VFlex 1804 N95 - Very low breathing resistance - Surgical fluid-resistant - Under \$1/ea

<https://zoro.com> (Search: G4376393)

3M VFlex 1804s N95 - Very low breathing resistance - Surgical fluid-resistant - Under \$1/ea

<https://zoro.com> (Search: G3793004)

Molded Cup Respirators

Easimask FSM18 FFP3 - MRI/CT safe

<https://usafacemaskstore.com/product/easimask-fsm18-ffp3-unvalved-cup-shape-face-mask-mri-safe-box-of-10>

3M 8511 w/ valve N95 - Vent valve reduces heat & moisture buildup and reduces glasses fogging

<https://amazon.com/dp/B0002YKBV2>

Moldex AirWave 4150 w/ full flange N95 - MRI/CT safe - Very low breathing resistance - Blue - M/L
- Surgical fluid-resistant

<https://zoro.com> (Search: G407963608)

Moldex AirWave 4151 w/ full flange N95 - MRI/CT safe - Very low breathing resistance - Blue - S
- Surgical fluid-resistant

<https://zoro.com> (Search: G607963514)

Moldex AirWave 4300 w/ full flange N95 - MRI/CT safe - Very low breathing resistance - M/L

https://rshughes.com/p/Moldex-AirWave-Particulate-Respirator-4300P95-Size-Medium-Large-MOLDEX-4300P95/moldex_4300p95

Moldex AirWave 4400 w/ full flange & valve P100 - MRI/CT safe - Very low breathing resistance - M/L
-Vent valve reduces heat & moisture buildup and reduces glasses fogging - Blue

<https://www.magidglove.com/airwave-p100-disposable-respir-4400p100>

Moldex AirWave M 4620 w/ full flange N95 - MRI/CT safe - Very low breathing resistance - Black - M/L

https://rshughes.com/products/moldex_m4620v.html

<https://amazon.com/dp/B0CCSVYHHV>

<https://magidglove.com/unvalved-n95-particulate-non-m4620>

Moldex AirWave M 4621 w/ full flange N95 - MRI/CT safe - Very low breathing resistance - Black - S

https://rshughes.com/products/moldex_m4621v.html

Moldex AirWave 4700 w/ full flange & valve N100 - MRI/CT safe - Very low breathing resistance - M/L
-Vent valve reduces heat & moisture buildup and reduces glasses fogging

<https://zoro.com> (Search: G9505307)

<https://amazon.com/dp/B0CCSWJR6J>

Moldex AirWave 4701 w/ full flange & valve N100 - MRI/CT safe - Very low breathing resistance - S
-Vent valve reduces heat & moisture buildup and reduces glasses fogging

<https://amazon.com/dp/B0CCSVQGWY>

Moldex AirWave 4800 w/ full flange N95 - MRI/CT safe - Very low breathing resistance - Grey - M/L

<https://magidglove.com/moldex-airwave-4800-n95-plus-nuisance-ov-disposable-respirator-with-smartstrap-8-dp-m4800n95>

Moldex AirWave 4801 w/ full flange N95 - MRI/CT safe - Very low breathing resistance - Grey - S

<https://zoro.com> (Search: G707963759)

Adhesive Respirators

ReadiMask w/ acrylic adhesive N95 - MRI/CT safe - Under \$1/ea - Yellow

<https://alliantbiotech.com/product/readimask-strapless-n95-niosh-approved>

60-75% off coupon code that's been active since 2023: NonSmokingZone

Inner Frame Respirators

These often require modifications like trimming the gasket, trimming the frame, or adding foam to the frame

These extra steps make them better suited for enthusiasts, but the upside is a highly custom fit

Once the frame has been successfully customized, it can be reused with replacement filters

KN100

ZiMi ZM100 w/ headbands KN100 - Wide gasket - MRI/CT safe - L

<https://zimiair.com/product/zm100-particulate-protective-mask-adult-l-size-kn100>

ZiMi ZM100F filters w/ headbands N100 - MRI/CT safe - White or Black - L

<https://zimiair.com/product/zm100f-filter-adult-l-size-kn100>

ZiMi ZM9233 w/ headbands KN100 - Wide gasket - MRI/CT safe - M

<https://zimiair.com/product/zm9233-particulate-protective-mask-adult-m-size-kn100>

ZiMi ZM9233F filters w/ headbands KN100 - MRI/CT safe - White or Black - M

<https://zimiair.com/product/zm9233f-filter-adult-m-size-kn100>

KN95

ZiMi B95-XL w/ headbands KN95 - MRI/CT safe - White or Black - XL

<https://zimiair.com/product/b95-xl-particulate-protective-mask-adult-xl-size-kn95-mask-with-frame>

ZiMi B95F-XL filters w/ headbands KN95 - MRI/CT safe - White or Black - XL

<https://zimiair.com/product/b95f-xl-filter-adult-xl-size-kn95>

ZiMi ZM8210 w/ headbands KN95 - MRI/CT safe - White or Black - L

<https://zimiair.com/product/zm8210-particulate-protective-mask-adult-l-size-kn95>

ZiMi ZM8210F filters w/ headbands KN95 - MRI/CT safe - White or Black - L

<https://zimiair.com/product/zm8210f-filter-adult-l-size-kn95>

ZiMi ZM9541 w/ headbands KN95 - MRI/CT safe - M

<https://zimiair.com/product/zm9541-particulate-protective-mask-adult-m-size-kn95>

ZiMi ZM9541F filters w/ headbands KN95 - MRI/CT safe - White or Black - M

<https://zimiair.com/product/zm9541f-filter-adult-m-size-kn95>

ZiMi ZM7711 w/ headbands KN95 - MRI/CT safe - S

<https://zimiair.com/product/zm7711-particulate-protective-mask-adult-s-size-kn95>

ZiMi ZM7711F filters w/ headbands KN95 - MRI/CT safe - White or Black - S

<https://zimiair.com/product/zm7711f-filter-adult-s-size-kn95>

ZiMi XS frame - MRI/CT safe - XS

<https://zimiair.com/product/zimi-xs-size-frame-1pc>

Uses ZiMi ZM7711F filters w/ headbands KN95 - MRI/CT safe - White or Black - S

<https://zimiair.com/product/zm7711f-filter-adult-s-size-kn95>

ZiMi ZM95S w/ headbands KN95 - MRI/CT safe - XXS

<https://zimiair.com/product/zm95s-white-particulate-protective-mask-children-xss-size>

ZiMi ZM95SF filters w/ headbands KN95 - MRI/CT safe - White or Black - XXS

<https://zimiair.com/product/zm95sf-filter-children-xss-size>

ZiMi Accessories & Notes

ZiMi flat foam for inner frame

<https://zimiair.com/product/spong-strips>

ZiMi wave foam for inner frame

<https://zimiair.com/product/wavy-type-sponge-stripe>

Nose bridge cutting guide sticker

<https://zimiair.com/product/cut-sticker>

Every ZiMi respirator model number has a corresponding filter model that matches it but with an F added

All ZiMi models offer versions of their filters with exhalation vent valves

ZiMi KN100 filters have a wider strip of gasket fabric which can be more forgiving of face shape and movement

Double-Sided Mask Tapes

Uplift Double Sided Mask Tape Strips

<https://amazon.com/dp/B093S1H68B>

Pro Tapes 1502 Double Coated Mask Tape Roll

<https://amazon.com/dp/B08CJWDD8>

Size-Sorted Respirator List

The following respirator list is organized **very roughly** from smallest to largest with lots of overlap

These are all quality protective respirators, so how well they work is primarily down to how well they fit

Remember: respirator fit is 3D, so differently shaped models of similar size may fit better or worse

XXXS-XS	ZiMi ZM95S
XXXS-S	ReadiMask S
XXS-S	ZiMi XS frame + ZiMi ZM7711F filters
XS-S	Trident RTCFFP2 XS
XS-S	Trident RTCFFP3 XS
XS-M	ZiMi ZM7711
S-M	Trident RTCFFP2 S
S-M	Trident RTCFFP3 S
S-M	3M VFlex 1804s
S-M	3M VFlex 9105s
S-L	Moldex 4151
S-L	Moldex 4621
S-L	Moldex 4701
S-L	Moldex 4801
S-L	ZiMi ZM9233
S-L	ZiMi ZM9541
S-L	Easimask FSM18
S-L	Trident RTCFFP2 Reg
S-L	Trident RTCFFP3 Reg
S-L	Dräger 1950 S / 1950 V S
S-L	Makrite FIT+ 4803
S-L	ReadiMask L
M-XL	3M Aura 9210+ / 9211+
M-XL	3M Aura 9205+
M-XL	3M Aura 1870+
M-XL	Moldex 4150
M-XL	Moldex 4300
M-XL	Moldex 4400
M-XL	Moldex 4620
M-XL	Moldex 4700
M-XL	Moldex 4800
M-XL	ZiMi ZM100
M-XL	ZiMi ZM8210
M-XL	Dräger 1950 M/L / 1950 V M/L
M-XXL	3M 8511
M-XXL	3M VFlex 1804
M-XXL	3M VFlex 9105
M-XXL	ReadiMask XL
L-XXL	Trident RTCFFP2 Reg XL
L-XXL	Trident RTCFFP3 Reg XL
L-XXL	ZiMi B95-XL
XL-XXXL	Trident RTCFFP2 XXL
XL-XXXL	Trident RTCFFP3 XXL

Air Cleaner Info

Corsi-Rosenthal Box

DIY air cleaner based on HVAC filters which meets or beats the performance of most off-the-shelf HEPA units

Costco routinely has the best price on Filtrete 1900/2200/2500 filters, and all sizes are the same price

Texan_Reverend's thread about them, including parts sourcing:

https://kind.social/@Texan_Reverend/112432142624648275

HOW TO BUILD A CORSI-ROSENTHAL BOX

The Corsi-Rosenthal Box is an affordable DIY air-cleaning system made with simple materials found in hardware stores. The box fan pulls air through the filters on the sides and blows out clean air. It is proven to reduce indoor exposure to airborne particles including those containing the virus that causes COVID-19. The box can also decrease the levels of other particles in the air, such as dust or wildfire smoke.

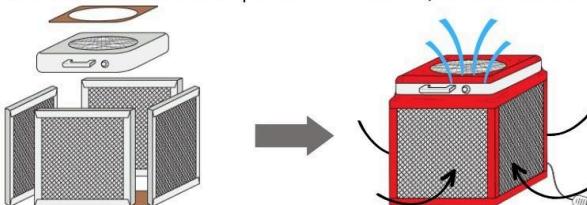
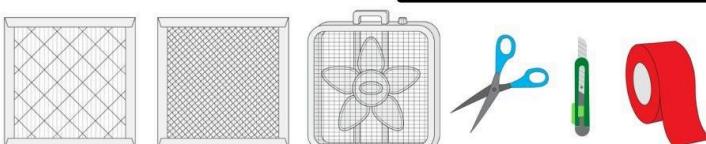


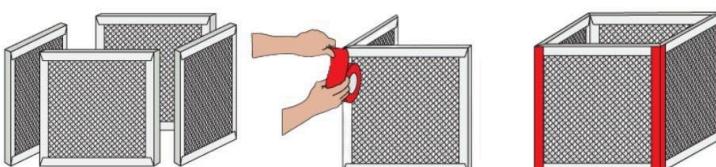
Illustration by Amanda Hu

- Filters can last up to a year
- Keep away from walls and corners



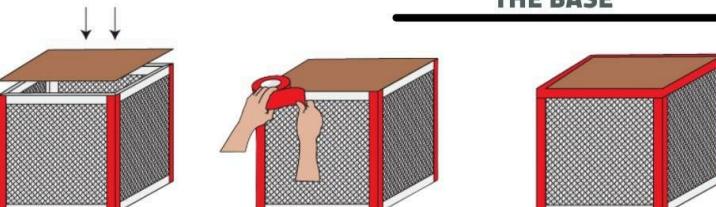
THE CUBE

- Filters: 3M MPR 1900 (20" x 20" x 1" or 20" x 25" x 1") or MERV 13 (20" x 20" x 2" or 20" x 20" x 1" or 20" x 25" x 2" or 20" x 25" x 1" [2-inch preferred])
- Lasko or Mainstays 20-inch Box Fan
- Scissors, Utility Knife, Duct Tape



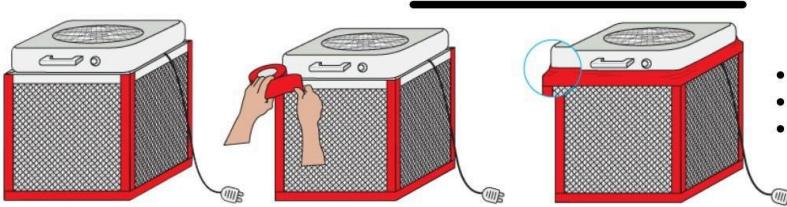
THE BASE

- Arrange the filters to create a symmetrical structure
- Ensure the arrows are pointing inwards
- Duct tape the four edges
- Vertical orientation of the pleats is preferred



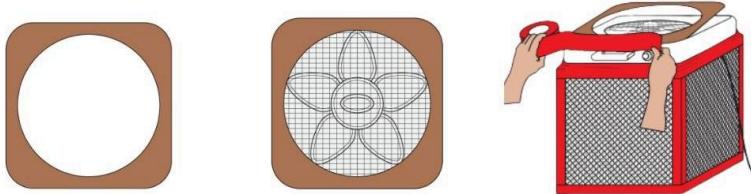
THE FAN

- Use one side of the fan's cardboard box
- Cut the cardboard to fit the base of the cube.
- Duct tape it on all four sides



THE SHROUD

- Place the fan on top of the cube
- Seal all sides, including corners
- Ensure any holes on the side of the fan are sealed off with duct tape



- Cut the other cardboard sheet to fit the top of the fan
- Cut a circular hole (Diameter: 15" for Lasko and 16" for Mainstays)
- Place the shroud on the fan and tape it on all four sides
- The shroud increases efficiency and decreases the noise level

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Illustrator: Marija Mladenović Creator: Shiven Taneja

HEPA Air Purifiers

HEPA air purifiers are the most readily available off-the-shelf air cleaning tools

Being off-the-shelf products can increase public/social acceptance over DIY

This is especially true in medical settings

Having shells that can be cleaned/disinfected can also be key in such settings

HEPA filters have a higher single-pass filtration rate than non-HEPA HVAC filters

This can be important in certain industrial or medical settings

In residences and most workplaces, this matters less than overall air cleaning performance

For most individuals and businesses, there are a few common points of comparison:

Clean Air Delivery Rate (CADR)

Sound level in operation at different speed levels

Cost - both for the unit and the replacement filters

Avoid models advertising ion, plasma, or UV features - or at least don't use those functions

These features can generate ozone and/or negatively interact with common VOCs and gases

This alters the chemical makeup of your air and can create unwanted knock-on effects

These do not provide meaningful additional protection from infectious aerosols

Most activated charcoal/carbon filters do little to mitigate VOCs

They are also generally depleted long before the HEPA filter

The limited units with good VOC performance all use activated carbon granules

The best of these will advertise how many pounds of carbon are in their filters

Activated carbon impregnated filters are largely marketing with brief or little efficacy

Models with flat filters tend to have easier and less expensive filter replacements

Levoit, Winix, and Coway are well-known brands with more affordable units & filters that are also very effective



Air Dilution

Whenever possible, moving fresh outside air through a space is more effective than just cleaning the air in it
This is best achieved by exhausting from one side of a space with doors/windows open on the opposite
This also helps mitigate the build-up of CO₂, VOCs, and stale smells
Weather and pollutant concerns don't always allow for that, so air cleaning is still a great tool

For whole building solutions, ERV (Energy Recovery Ventilator) systems provide a range of benefits
ERVs filter incoming air and balance its temperature and humidity with the outgoing air they exhaust
This means the air they bring in feels more like the indoor air than the outdoor air
The fresh air cycling done by ERVs also keeps CO₂ levels lower and reduces stale smells
Systems generally use smaller, dedicated ducts but can also use existing HVAC ducts
Unfortunately, these are substantial pieces of HVAC equipment, and are not inexpensive
They also aren't reasonable options for most renters

For ventilating with windows, the more that are open, the better

If using portable fans to help move air through a space:

Place them all on the same side of the building to create a draft from one side to the other
Place them blowing out of the windows to exhaust indoor air, pulling in from other windows
Place them 2-3 feet straight back from the window openings
This yields the highest total airflow

Testing and demonstration of fan orientation and distance from openings:

<https://www.youtube.com/watch?v=1L2ef1CP-yw>

Covid Info

Excellent printable and shareable zine of current (May 2025) Covid knowledge:

<https://newlevant.com/covidzine>

Every additional Covid infection increases the chance of developing chronic symptoms or Long Covid

Long Covid has surpassed asthma to become the most common chronic illness among children

2000+ studies linking Covid to chronic conditions:

<https://docs.google.com/spreadsheets/d/12VbMkvqUF9eSggJsdFEjKs5x0ABxQJi5tvfzJIDd3U>

Collected by @AugieRay <https://mastodon.social/@augieray>

Particle Exhalation

The number of particles/aerosols a person exhales increases based on:

Level of exhalation force - singing and yelling generate much more than calm breathing or talking

Level of bodily exertion - the metabolism speeds up and breathing gets faster and harder

Many people will expel over 100x as many particles during vigorous exercise as at rest

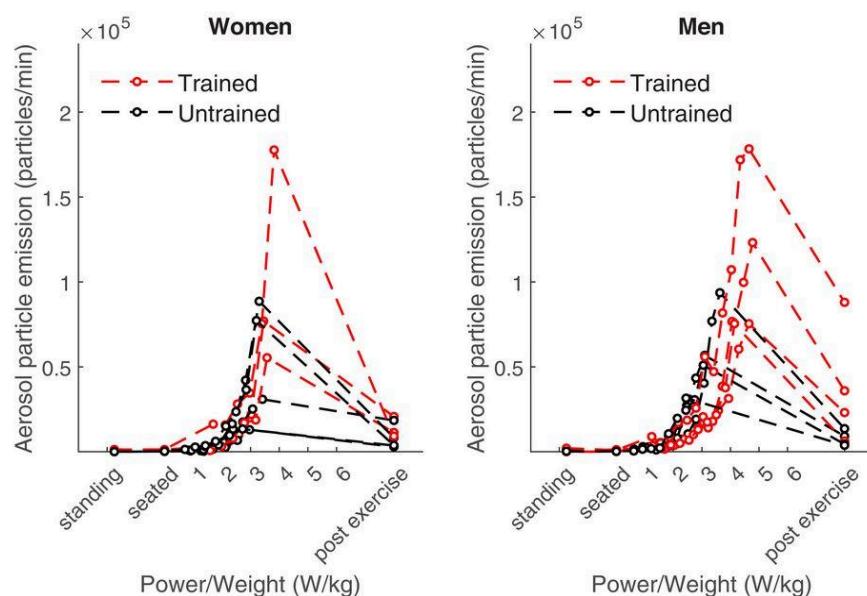


Fig. 4. Aerosol particle emission at rest and at different exercise intensities in women ($n = 8$, Left) and men ($n = 8$, Right). Standing and seated (on ergometer) values are in the order of the test procedure.

(Participants were tested until failure/maximal exertion which led to varying Power/Weight endpoints)

Original study: <https://pnas.org/doi/full/10.1073/pnas.2202521119>

Some types of spaces/events/activities are inherently riskier than others as a result:

Gyms

Sports

Concerts

Choirs

Anywhere with yelling, singing, jumping/running/dancing around

An indoor gym with 50 people could potentially have a higher viral load than a museum with 1000 people

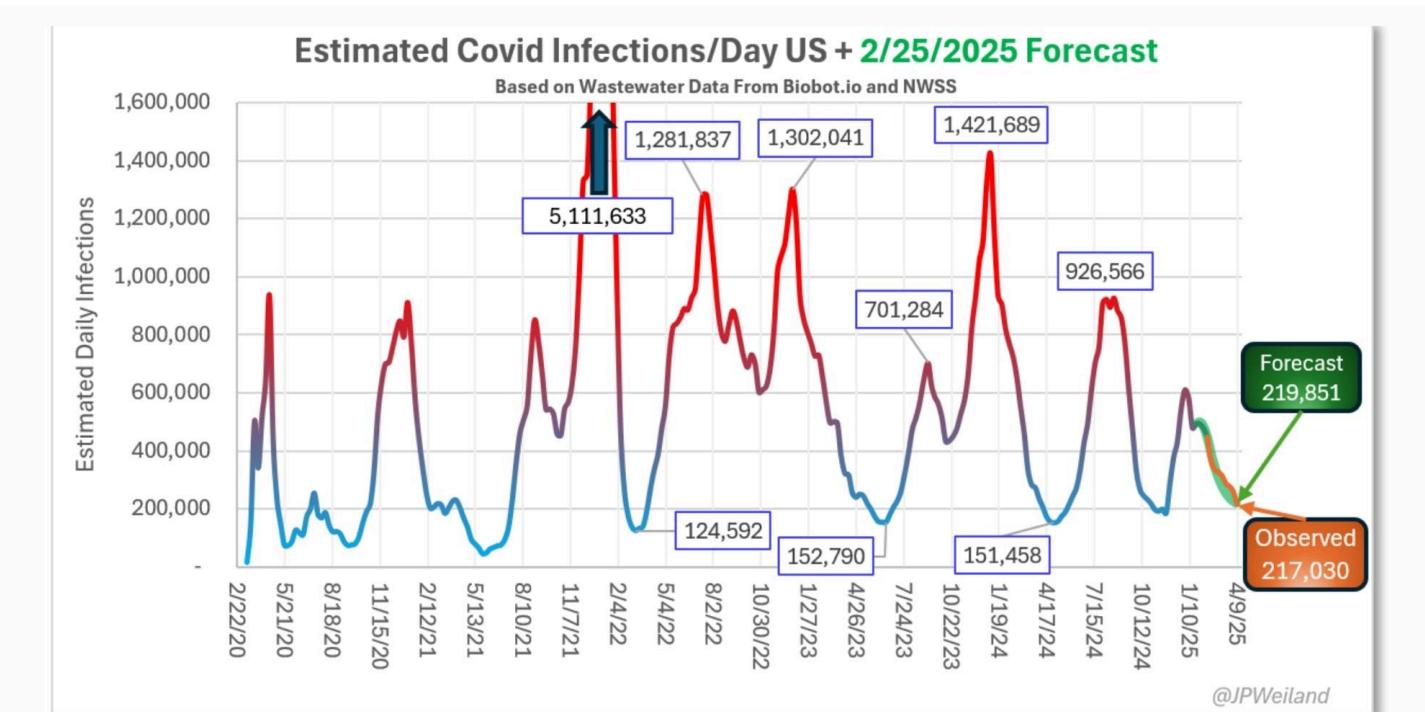
However, the odds of at least one person having Covid are still higher where more people present

Fundamentally, off-peak visits to grocery stores or libraries are going to be much safer than gyms or raves
This holds true outdoors just the same as indoors, but with a lower overall risk

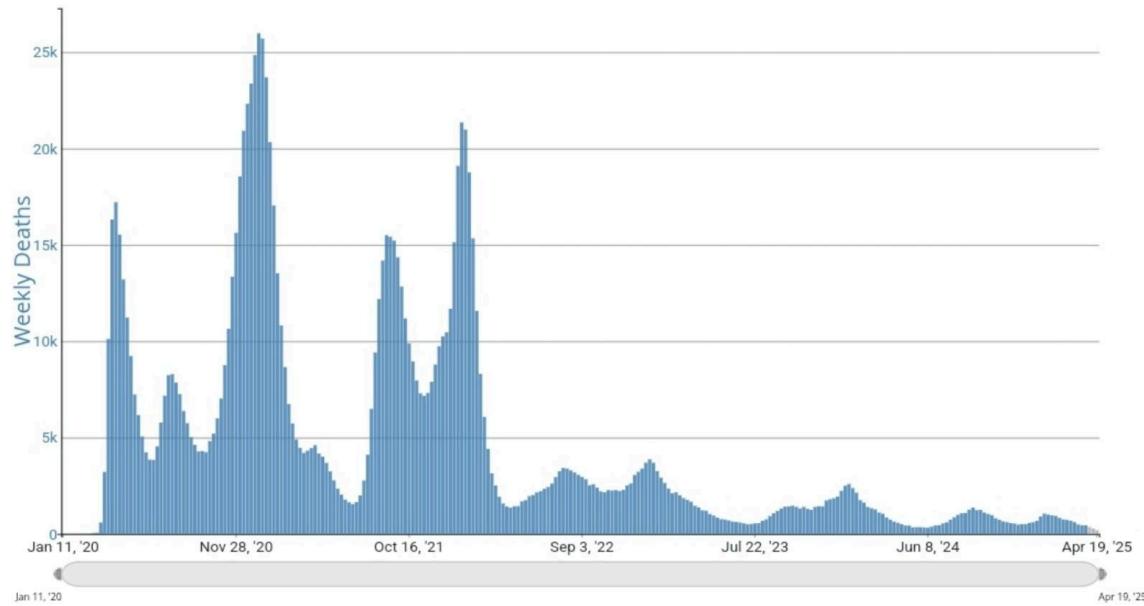
It can take up to 15+ minutes for calm, ambient, outdoor air to effectively disperse aerosols

Vaccinations

The clearest illustrations of the efficacy of Covid vaccines are graphs like these:



Provisional COVID-19 Deaths, by Week, in The United States, Reported to CDC



Waves of infections still happen regularly, but deaths are dramatically lower than pre-vaccine waves

Though, there are still an unfortunate and preventable number of them

Rates of Long Covid have not fallen in the same way, instead multiple infections increase the risk

Risk & Symptom Reduction

Rest

The #1 tool for improving your recuperation and reducing Long Covid risk is true rest with low stress

Rest like you never have before

Rest for longer than you think you need to

Light duty with minimal to no exercise beyond calm walking is recommended for 6-8 weeks

Regardless of initial infection severity

High exertion/intensity activities and exercise should be avoided for 4-6 months if at all possible

Stress and exertion hugely contribute to longer symptoms and to Long Covid sequelae

Do not “push through” when you feel drained, tired, or frazzled - let your body rest and recover

Hydration

As with many infections, it's very important to hydrate with lots of water

In addition, consider adding some electrolyte support like sports drinks, mix-in powders, etc.

Teas are also great and can provide warm soothing effects

Saline Irrigation

Nebulizer and/or nasal flush + gargle using isotonic saline reduces viral load and severe outcomes

<https://pmc.ncbi.nlm.nih.gov/articles/PMC10312243>

Can be used prophylactically to lower risk of developing infection after public outings

Can decrease symptom intensity, symptom duration, infectiousness, and severe outcomes when ill

Perform at least 3 rounds per day - more is better - up to every 3 hours

Isotonic saline can be made by mixing ½ teaspoon **non-iodized** salt into 8 ounces of **distilled** water

Can be mildly warmed for increased comfort

Can grow bacteria within 24 hours, so make fresh at least daily with washed hands

Best to refrigerate in a sealed container between uses

Example non-iodized salt option which also contains no other additives:

<https://amazon.com/dp/B07QW1G8MW>

Nasal flush can be done with a neti pot, ear bulb, or sinus rinse bottle

Saline nebulizer treatment can be used on its own or along with gargle and/or nasal rinse

If wanting to use only one, use nebulizer because it can reach nose, throat, and lungs

Nebulizer is ideal for infants, toddlers, and elderly people where other methods may be difficult

Also good for more significant infections when a person has very low energy or mobility

Nebulizers should be used on the lowest intensity setting for best absorption

Lean back or lie down to keep saline in contact with the vibrating nebulizer mesh in the nozzle

Keep a small towel below the chin like a bib to catch any drips from nebulizer mask

Example nebulizers which are handheld, quiet, rechargeable, & create small enough aerosols:

<https://amazon.com/dp/B0DSP6LSW3>

<https://amazon.com/dp/B0BWRTM8B7>

The saline regimen should be followed for 10-14 days or til 3 days after symptoms resolve, whichever is longer

Saline irrigation is also known to benefit allergies and most respiratory infections

OTC Treatments

Several low-risk over-the-counter options exist which can reduce symptom severity and risk of Long Covid
Check with prescribing doctor and pharmacist for potential drug interactions with current medications

This site is available for preliminary checking of interactions prior to speaking with a doctor:

<https://drugs.com/drug-interactions>

The following OTCs help treat common symptoms in addition to potentially reducing viral load

These have well understood drug interactions with long research histories

There are many other supplements and medications being researched, but not all have much data

1 dose of Naproxen (Aleve) with breakfast and dinner - taking with meals limits side effects

Inhibits viral replication and binding of SARS-CoV-2

Can improve cough and shortness of breath

Reduces inflammation - a major driver of symptom intensity and Long Covid sequelae risk

Relieves aches and reduces fever

<https://sciencedirect.com/science/article/pii/S1871402121003398>

1 dose of Acetaminophen (Tylenol) with lunch and 15-30 minutes before bed

Inhibits viral replication and expression of SARS-CoV-2

Relieves aches and reduces fever

<https://sciencedirect.com/science/article/pii/S2405844024017651>

1 dose of Diphenhydramine (Benadryl) 15-30 minutes before bed

It is an H1 blocker antihistamine and a Sigma-1 agonist antiviral

Both show results in reducing acute symptom intensity and duration

Also potentially reducing risk of Long Covid sequelae

It treats nasal inflammation and itching

It is a sleep aid - avoid taking at times other than bedtime

<https://pmc.ncbi.nlm.nih.gov/articles/PMC10129342>

1 serving Pepeior Liposomal Lactoferrin supplement 15-30 minutes before bed & 2+ hours after eating

<https://amazon.com/dp/B0BY4WKYSB>

Broad immune support and antiviral properties especially against SARS-CoV-2

<https://pmc.ncbi.nlm.nih.gov/articles/PMC8535893>

Enhances antiviral effect of Sigma-1 agonists like Diphenhydramine

<https://mdpi.com/2076-0817/10/11/1514>

Lactoferrin is found in the milk of many mammals including humans

Bovine lactoferrin does not contain lactose and should not affect people with lactose intolerance

It may still bother people with other cow milk allergies or sensitivities

Except for Lactoferrin, limit this course of OTC medications to 10-14 days unless overseen by a doctor

Each of these medications carry increased risks of side effects if taken for prolonged periods

Lactoferrin's immune and gut support is still valuable long after acute infection - finish bottle

Test Sensitivity

No type of Covid test can successfully detect existing infections 100% of the time

However, false positives are not common

Less than 5% in PCR testing (aka molecular testing)

Less than 5% in NAAT testing (also a type of molecular testing)

Less than 1% in common drugstore Rapid Antigen Tests (RAT) (aka Lateral Flow)

Multiple tests taken 48 hours apart are the best way to increase accuracy

Only daily PCR/NAAT/molecular testing can track most of the overall duration of viral shedding

Even these molecular tests are not perfect with a detection sensitivity of about 90%

They can still miss infections and thus provide false negatives

Two tests taken 48 hours apart dramatically reduce false negatives

Metrix is the only remaining at-home NAAT/molecular test sold in the U.S.

Reader:

<https://amazon.com/dp/B0CFK97N8Y>

<https://fishersci.com/shop/products/metrix-reader/22321139>

Tests:

<https://amazon.com/dp/B0CFKBW278>

The RAT method is less sensitive and only detects about 40-60% of infections while symptomatic

This improves to 75-85% success when three tests are taken 48 hours apart across 5 days

Detection of infections while there are no symptoms is lower at about 15-25%

Taking multiple tests can still improve this, but it is not clear by how much

To improve accuracy on all test types:

Do not eat, drink, smoke, vape, chew gum, etc. for at least 30 minutes prior to testing

Blow nose prior to testing, as most tests do better with less loose mucus in the sample

Remember that the nasal passages being sampled are more straight back than upwards

Imagine trying to swab back over top of the teeth rather than up towards the eyes

Perform nasal swabbing then hold swab near back of mouth & cough 6 times

This adds aerosols from other potential viral reservoirs in the throat, lungs, and rest of airway

Contagiousness Duration

Most infections last 14+ days from initial exposure to end of virus shedding

The vast majority of people will stop being infectious by 21 days from initial exposure

Relatively rare cases have been documented of infections lasting over a month

This is more likely in people who are moderately to severely immunocompromised

This common 2-3 week infection timeline has held true through many variants

Incubation time from initial exposure to becoming infectious is generally 1-3 days

Incubation time from initial exposure to earliest possible positive test is generally 2-5 days

Molecular tests can usually detect infections earlier than RATs

Incubation time from initial exposure to onset of any symptoms varies widely from 1-10 days

Even entirely symptom-free infections are common, well documented, and last just as long

35-45% of all infections have no symptoms but are still contagious and risk Long Covid

Incubation and symptom onset times have been documented to change substantially between variants

Ideally, isolation time from first symptoms or first positive test should be at least 14 days

Take Covid tests on days 10, 12, and 14 unless fever is still present

If all are negative and there is no fever, contagiousness has likely passed

If fever is still present, wait until it abates, then test every 48 hours until 3 in a row are negative

If any are positive, keep testing every 48 hours until 3 in a row are negative

If fever or symptoms rebound, isolate again

When fever and symptoms abate, test every 48 hours until 3 in a row are negative

If not regularly masking, wear an N95 or comparable when around others for 1 month from onset

Tests can be mistaken, so it is best to take this cautious approach to protecting other people

Minimum recommendation is to follow CDC's isolation and testing guidance for healthcare professionals:

<https://cdc.gov/covid/hcp/infection-control/guidance-risk-assessment-hcp.html>

On the next pages are graphs with linked studies regarding contagiousness duration and its relationship to:

Symptom severity

Symptom duration

Rapid test positivity

PCR positivity

Expelling of viral particles into the surrounding area

Summary:

People can emit definitively infectious virus particles into their surroundings for 14+ days

It can be that long even if the person stopped having symptoms or if they never had any

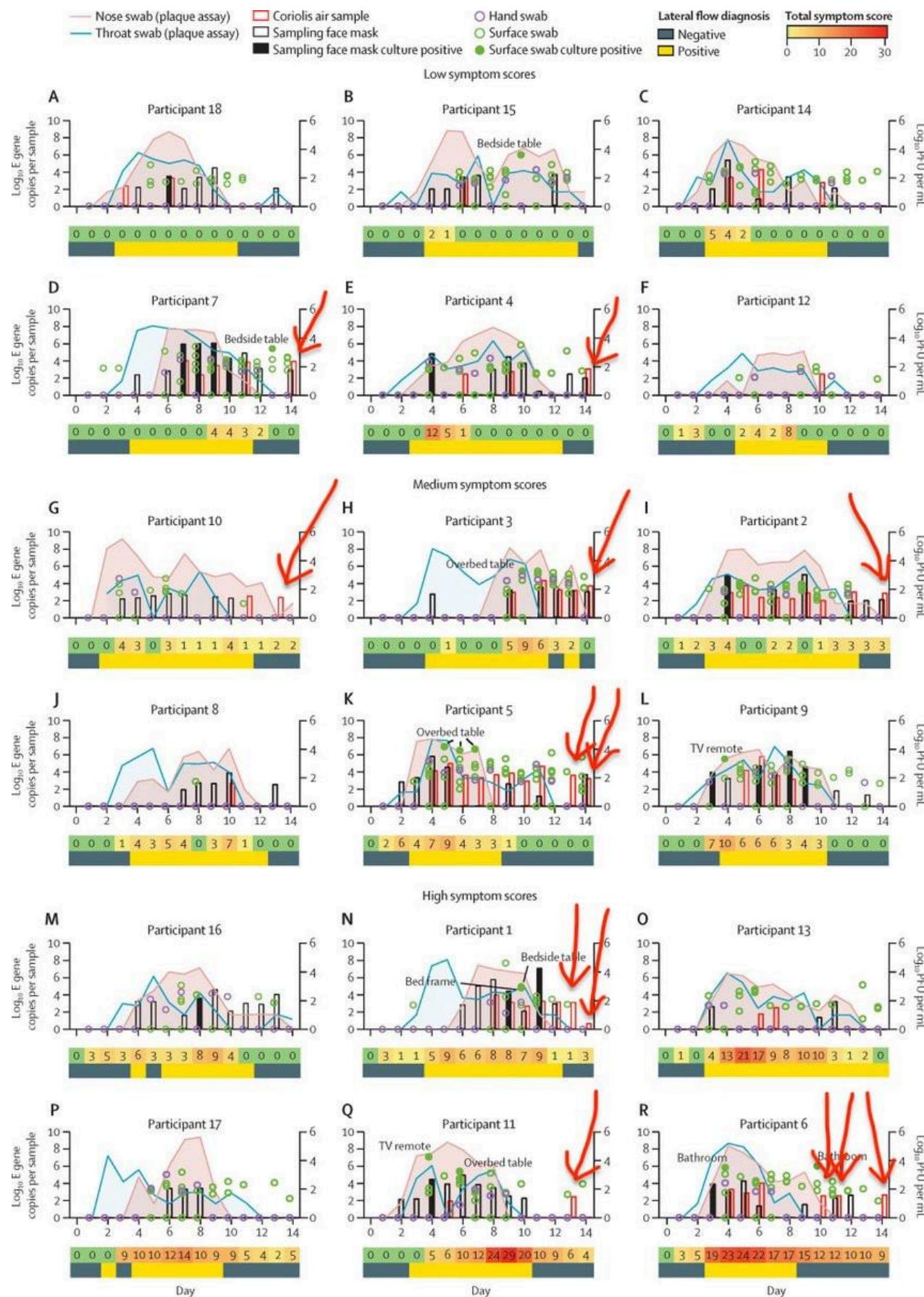
It can be that long even if they've stopped testing positive on rapid tests or if they never did

It can be that long even if they've stopped testing positive on molecular/PCR tests

The vast majority of people will both stop being contagious and stop testing positive by day 14-19

Original Omicron infections tended to last longer than Delta - may apply to modern Omicron variants

While vaccinations reduce risk of death and severe outcomes, they do not shorten infection duration

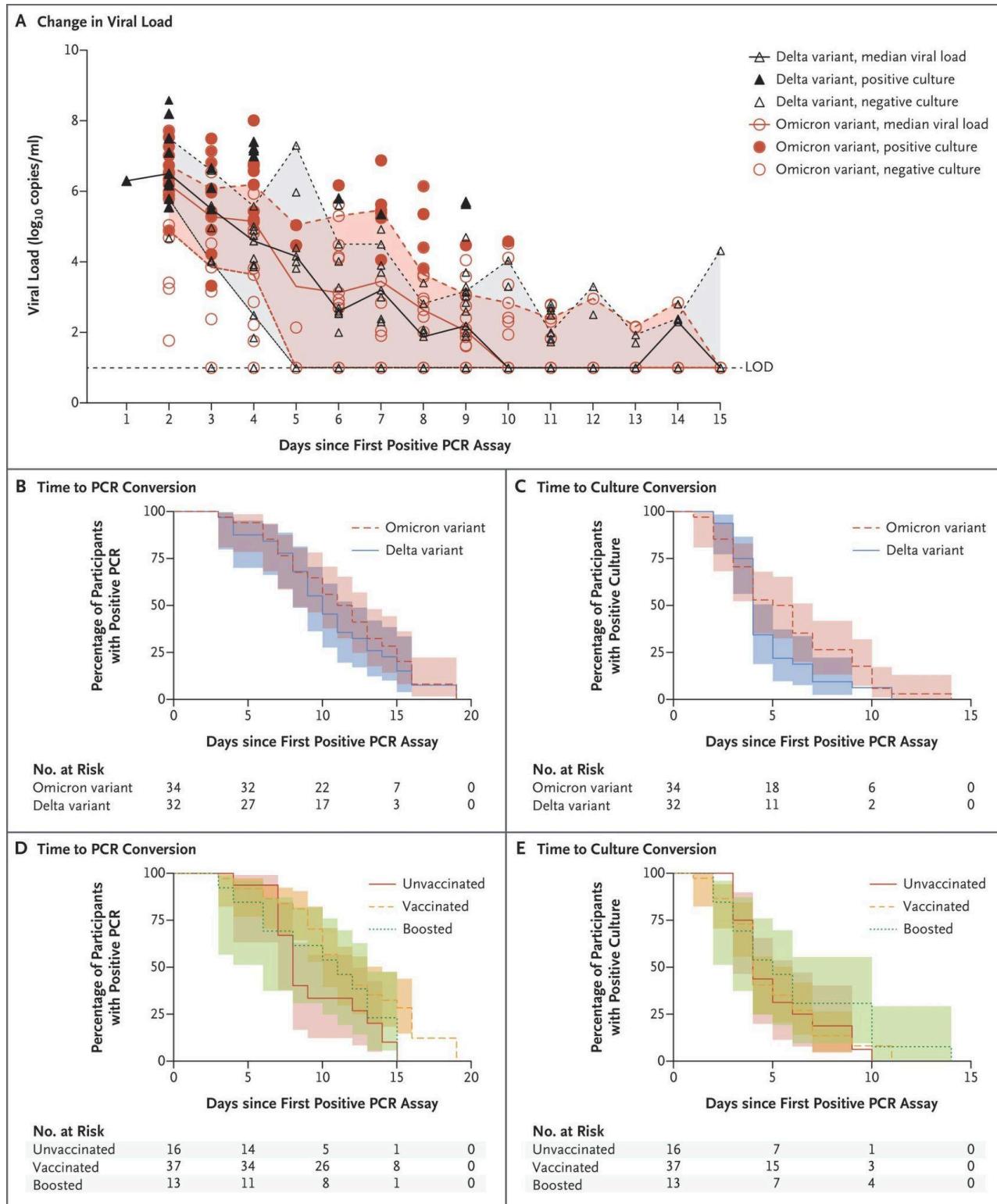


(Days with negative rapid testing but positive air samples are annotated)

Credit: @antiviral_mkng on Twitter, now @antiviral.bsky.social

https://xcancel.com/antiviral_mkng/status/1764739594031964544

Original study: [https://thelancet.com/journals/lanmic/article/PIIS2666-5247\(23\)00101-5/fulltext](https://thelancet.com/journals/lanmic/article/PIIS2666-5247(23)00101-5/fulltext)



Credit: @antiviral_mktng on Twitter, now @antiviral.bsky.social

https://xcancel.com/antiviral_mktng/status/1762278354172993685

Original study: <https://nejm.org/doi/full/10.1056/NEJMc2202092>

Bonus info: driving with an active Covid infection increases the risk of being involved in a crash by 25%

That risk is equivalent to driving with a blood alcohol content of 0.08% - right at the legal limit

<https://doi.org/10.1371/journal.pgph.0004420>