

# ← Thread

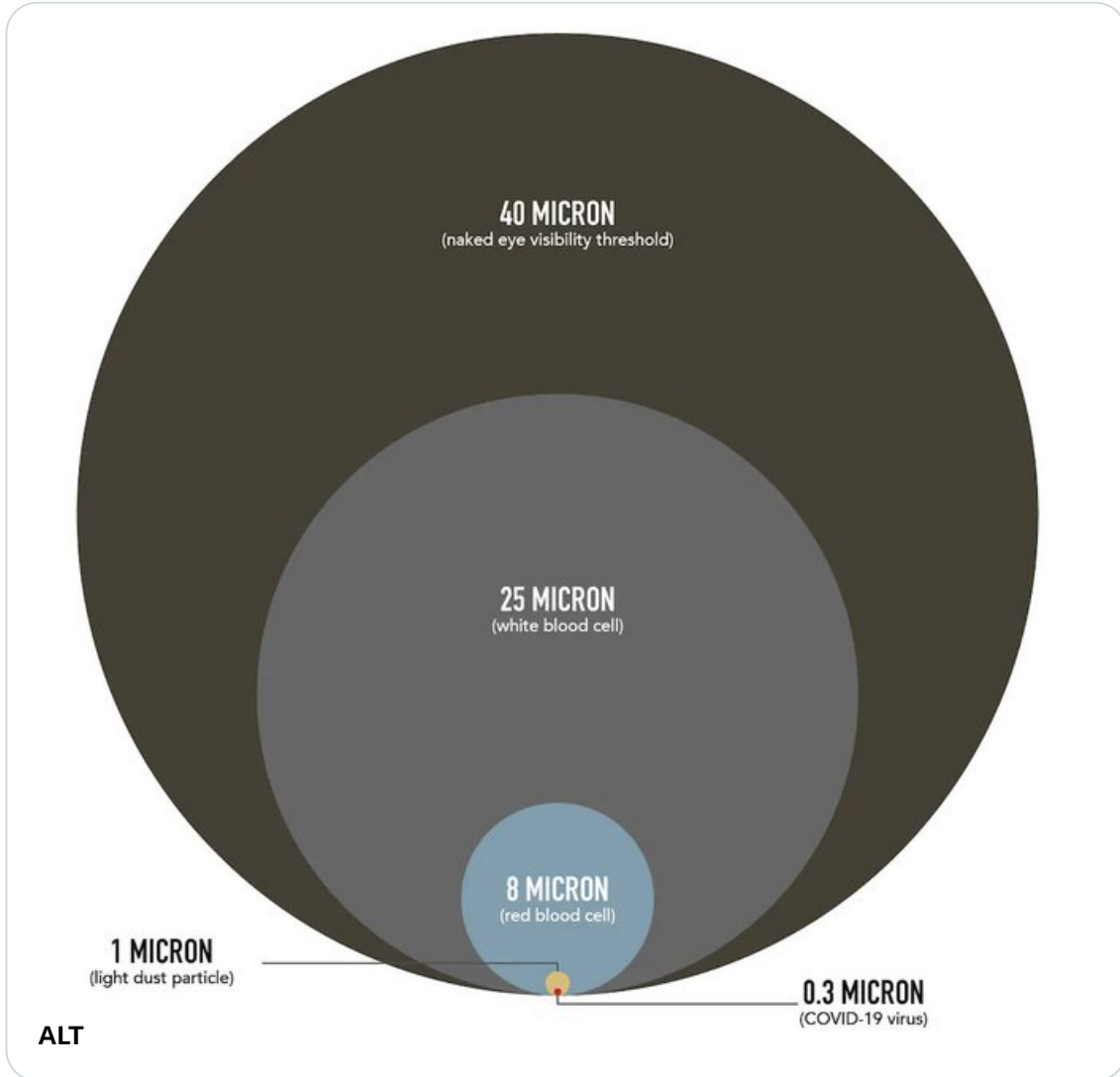


**Dr. Jeff Gilchrist**  
@jeffgilchrist



How [#respirators](#) actually work and which type is best?

I see many claims [#masks](#) don't work. This thread will explain \*how\* they block [#viruses](#) much smaller than the size of the holes in the [#filter](#) and why you can still smell nasty things while wearing effective masks. 🧵 1/



12:48 PM · Dec 14, 2022

2,003 Retweets   305 Quote Tweets   4,884 Likes



Tweet your reply

Reply



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022



Replying to @jeffgilchrist

This thread is long so if you would like an unrolled one page web view that is easier to read or share, look at this tweet to find the link more quickly ([twitter.com/jeffgilchrist/...](https://twitter.com/jeffgilchrist/)). 2/



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

The link for the unrolled one page version of the "How #respirators actually work and which type is best?" thread can be found in the next tweet. 📌

Show this thread



2



56



365



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022



One of the issues is that there are different types of masks that are designed for different purposes. Cloth masks and the common blue earloop procedure masks were never designed to protect people from airborne pathogens that hang in the air for extended periods of time. 3/



3



74



446



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022



#COVID and other respiratory viruses are transmitted via aerosols breathed, talked, coughed, sung, and sneezed into the air from an infected person. 4/



4



37



338



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022



Someone can enter a poorly ventilated room after the infected person has left and still breathe in enough aerosols to become infected themselves. You can learn more about transmission and multiple methods to protect yourself here ([twitter.com/jeffgilchrist/...](https://twitter.com/jeffgilchrist/)). 5/



**Dr. Jeff Gilchrist** @jeffgilchrist · Sep 27, 2022

COVID-19: Things everyone should know (Part 2: Transmission & Protection)

In part 2, I will highlight important things about how COVID-19 is transmitted and what variant-proof measures can be taken to reduce the risk of becoming infected or reinfected. 📖 1/

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2 85 410



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

Some masks, more commonly known as respirators, are designed to stop aerosols and other particulate matter are used not only in medical settings but also industrial, commercial, and construction sectors to protect against many different airborne hazards. 6/

2 34 324



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

These are usually certified by some regulatory body with designations like N95 or N99 (NIOSH) in USA ( [cdc.gov/niosh/npptl/to...](https://www.cdc.gov/niosh/npptl/to...) ), FFP2 or FFP3 (EN 149) in Europe ( [icc-iso.org/index.php/en/c...](https://www.icc-iso.org/index.php/en/c...) ), and CA-N95/N99/N100 (CSA Z94.4.1) in Canada ( [csagroup.org/store/product/...](https://www.csagroup.org/store/product/...) ). 7/



csagroup.org Product

2 38 304



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

The material these certified respirators are made from will be able to filter more than 95% of particles of a certain size, and often more than 98%/99% but that is only for air that passes through the filter. 8/

1 28 278



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

The most important part is how well the respirator fits on your face. If the fit is poor and there are gaps for air to go around, none of that air will be filtered. 9/

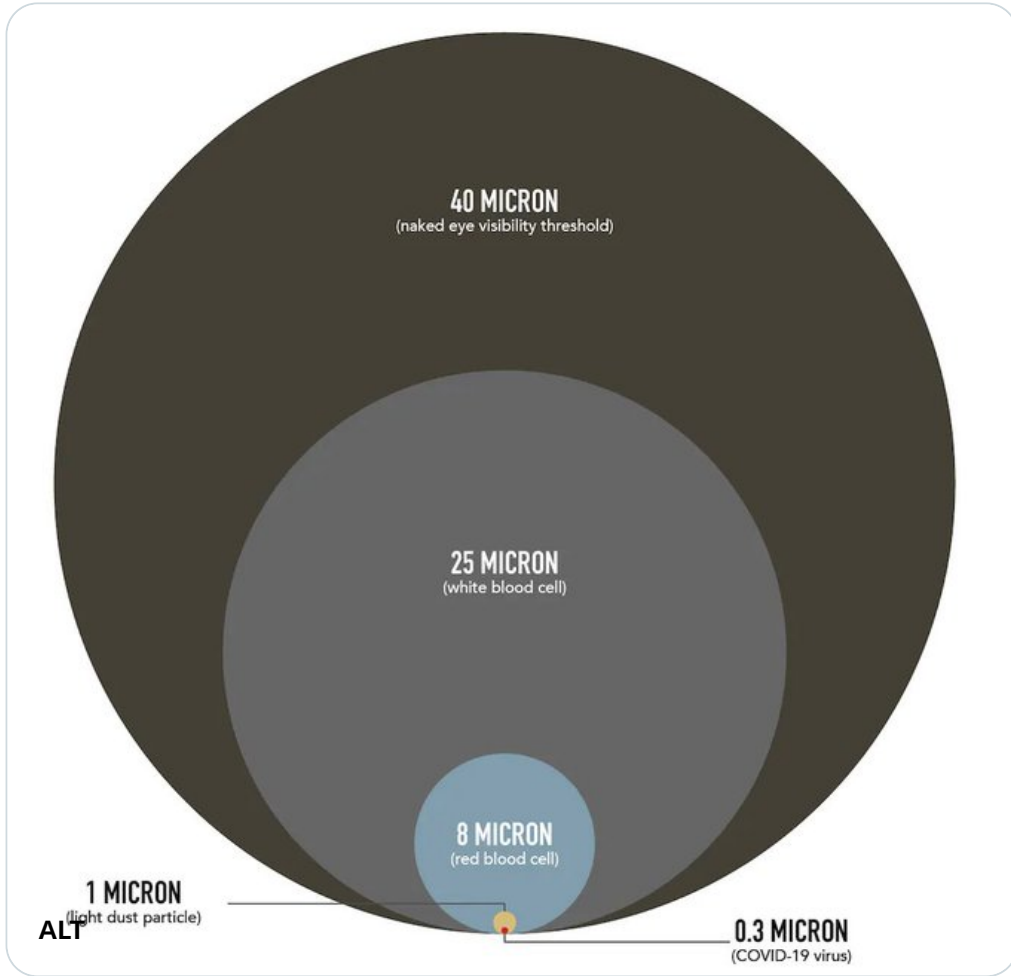
3 38 322



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

This image has been used as an example of how masks couldn't possibly work since the size of a single COVID-19 virus (virion) is 0.3 micron,

smaller than a light dust particle. Many don't understand how viruses travel through the air and how the physics of masks actually work.10/



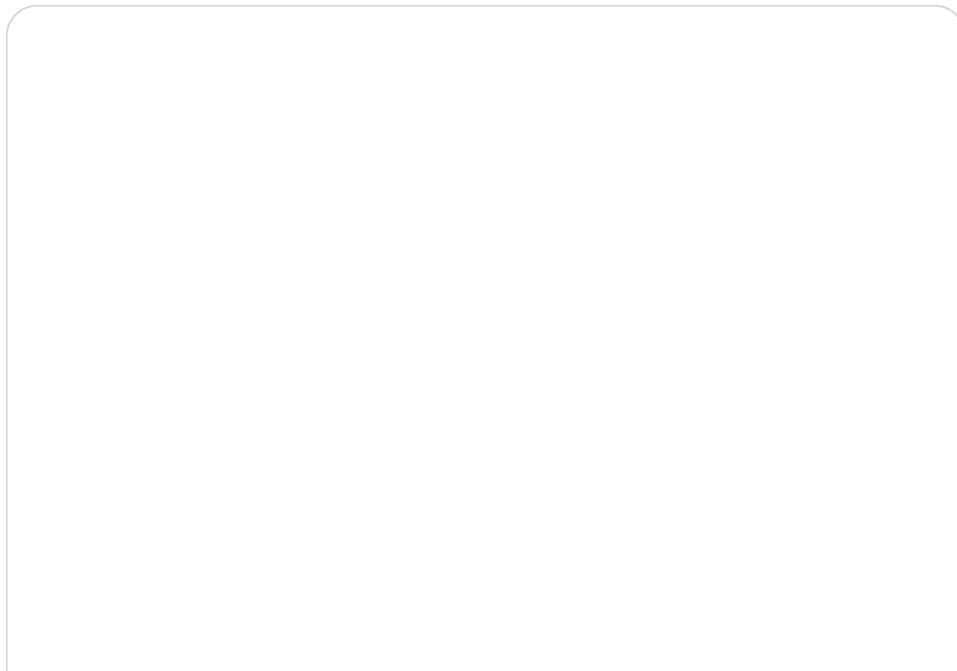
1 61 333

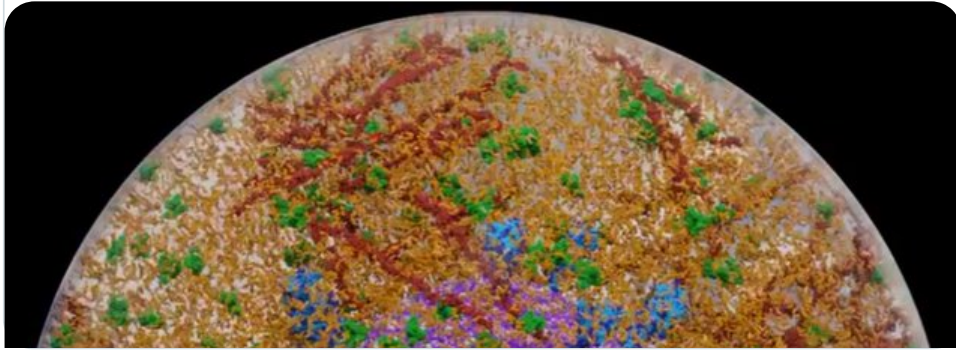


**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

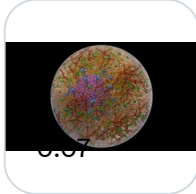


First, viruses don't travel on their own through the air, they catch a ride inside larger aerosols which also contain water, mucins from the lining of the lungs, deep lung fluid and surfactants to make up the complex blob you see in the image ( [twitter.com/jeffgilchrist/...](https://twitter.com/jeffgilchrist/) ). 11/





**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 5, 2021



The researchers did not simulate the aerosol as a blob of pure water since it contains a number of other molecules from our body when they break away from our lungs. 10/

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4 128 539



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

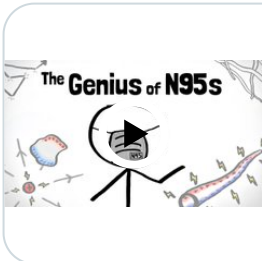
It is these aerosols that the respirator blocks and filters, and therefore stops the virus particles at the same time. 12/

2 40 355



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

But even with aerosols, some are still smaller than the holes within the N95 respirator material, so how can they effectively filter out such small aerosols? @minutephysics created an amazing animation showing the astounding physics of N95 masks ( [youtube.com/watch?v=eAdanP...](https://www.youtube.com/watch?v=eAdanP...) ). 13/



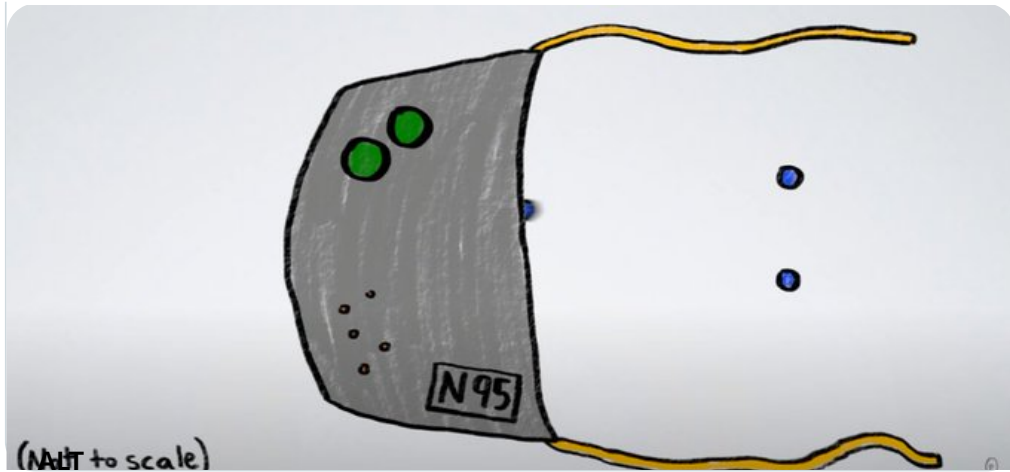
youtube.com  
The Astounding Physics of N95 Masks  
Head to <https://brilliant.org/MinutePhysics> to sign up for free and get 20% off a Premium subscrip...

5 277 834



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

N95 respirators are actually very good at blocking both the largest and smallest particles, while medium size particles are actually the hardest to block. 14/



2 36 315



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

It is not the fibres themselves but because the size of the particles are so small, everything is sticky at a microscopic scale. The van der Waals forces between molecules is more than enough to hold very small things in place. 15/



2 45 344

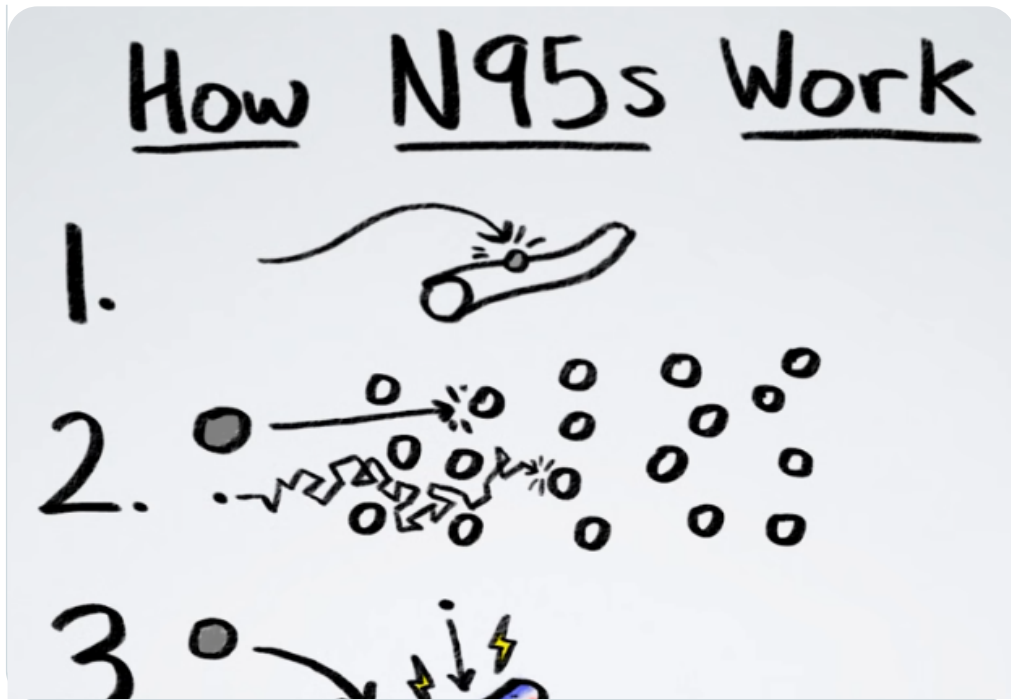


**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

N95 respirators use several tricks to get particles to touch their fibres:

1. Capture by inertial impaction
2. Capture by diffusion
3. Capture by interception
4. Capture by electrostatic attraction

16/



1 76 379



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

With multiple layers of fibres, particles larger than 1 micron typically travel in a straight line so are almost guaranteed to hit a fibre and stick. 17/

1 28 284



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

Particles smaller than 0.1 micron are so light that collisions with air molecules bounce them around so they move in a random zigzag pattern (Brownian motion) making it extremely likely the particle will bump into a fibre and get stuck. 18/

2 32 295



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

Particles in between those sizes (around 0.3 microns) don't travel in straight lines and also don't zigzag randomly but get carried along with the air as it flows around fibres and likely past fibres so can possibly sneak by respirators even with multiple layers. 19/

1 24 253



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

N95s use a final trick of capturing particles of all sizes using an electric field where even neutral particles will still be attracted (as you can see



from neutrally charged styrofoam sticking to a cat with static charged fur). 20/



4   141   594   [Bar Chart Icon]   [Share Icon]



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022 ...

N95s don't rely on static electricity, their fibres work like permanent magnets but for electricity called electrets. You can electrovize a piece of plastic to give it a permanent electric field which allows the fibres in N95s to capture 10x more particles than regular fibres. 21/

4   46   338   [Bar Chart Icon]   [Share Icon]



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022 ...

Respirators can block almost 100% of the smallest and largest particles and if more than 95% of the tricky medium size particles can be filtered out, the respirator is rated N95, and if it is 99% then is rated N99 and 99.97% is N100 ( [cdc.gov/niosh/npptl/to...](https://www.cdc.gov/niosh/npptl/to...) ). 22/

1   35   321   [Bar Chart Icon]   [Share Icon]



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022 ...

You may have also seen R95 or P100 ratings where N represents filtering of non-oily particles while R is somewhat resistant to oil and P represents strongly resistant to oily particles. 23/

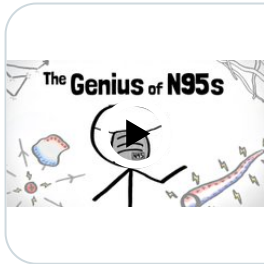
1   19   233   [Bar Chart Icon]   [Share Icon]

**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022 ...





Remember that even if the material in an N95 can filter >95-99% of particles, they need to go through the mask to work so fit is super important which Henry Reich (@minutephysics) highlights in the caveats part of his video ( [youtu.be/eAdanPfQdCA?t=...](https://youtu.be/eAdanPfQdCA?t=...) ). 24/



youtube.com  
The Astounding Physics of N95 Masks  
Head to <https://brilliant.org/MinutePhysics> to sign up for free and get 20% off a Premium subscrip...

1 42 280



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022 ...  
If N95s can block all these tiny particles, how come you can still smell some nasty things like farts while wearing a fit tested N95 respirator and does this mean the respirator isn't working? 25/

1 38 268



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022 ...  
Thankfully @Wikisteff has done some awesome calculations to explain why you can still smell through respirators ( [twitter.com/Wikisteff/stat...](https://twitter.com/Wikisteff/stat...) ). 26/



**Stef @wikisteff@mastodon.social** Chris... @Wiki... · Dec 4, 2022

The smell of farts comes from hydrogen sulfide (34 daltons), methanethiol (48 daltons), dimethyl sulfide (62 daltons), indole (117 daltons), and skatole (131 daltons).

A SARS-CoV-2 virion masses 6,000,000,000 daltons (Sender et al., 2021), and an aerosol droplet 160 billion. [twitter.com/josreimer/sta...](https://twitter.com/josreimer/sta...)

Show this thread

3 72 356



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022 ...  
A dalton (Da) or unified atomic mass unit (u) is commonly used in physics and chemistry to express the mass of atomic-scale objects such as atoms, molecules, and elementary particles ( [en.wikipedia.org/wiki/Dalton\\_\(u...](https://en.wikipedia.org/wiki/Dalton_(u...) ). 27/



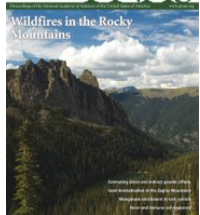
en.wikipedia.org  
Dalton (unit) - Wikipedia

1 17 213



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

As @Wikisteff points out, the smell of a fart comes from multiple molecules that range between 34 Da and 131 Da while a single COVID-19 virion is 6 billion Da and an aerosol droplet 160 billion Da, both monstrous sizes in comparison ( [pnas.org/doi/10.1073/pn...](https://pnas.org/doi/10.1073/pn...) ). 28/



pnas.org  
The total number and mass of SARS-CoV-2 virio...  
Quantitatively describing the time course of the severe acute respiratory syndrome coronavirus 2 ...

1 54 289



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

The atomic mass of these molecules you can smell are more than a billion times less than the aerosols that COVID-19 virions catch a ride in. 29/

1 39 287



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

That is why molecules like oxygen (16 Da) can get in through respirators to you and exhaled carbon dioxide (44 Da) can get out so you don't suffocate. It is estimated that a COVID-19 infected person carries between 1 billion and 100 billion virions during peak infection. 30/

3 52 313



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

It is nice to know science and engineering have provided respirators that use the laws of physics to help protect people from all those virions doing damage to your body. 31/ Click "Show replies" 👇 to continue.

4 29 366

Show replies



**Scrolldy** @DaniAndree9 · Dec 14, 2022

Replying to @jeffgilchrist

This is great, thank you! So if you're reusing N95 respirators (rotating them) - the van der waals forces between captured particles keep them in place stuck to the fibres?

🗨️ 2    ↻    ❤️ 12    📊    ⬆️



**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

...

Replying to @DaniAndree9

That would be my guess. @minutephysics? @masknerd? After several days I would also expect any captured virus in the filter to be no longer viable anyway.

🗨️ 1    ↻    ❤️ 28    📊    ⬆️

Show replies



**DavisLiuMD** 劉德偉 🇨🇦 🇹🇼 🇺🇸 🇨🇦 @davisliumd · Dec 15, 2022

...

Replying to @jeffgilchrist

This is fabulous. Thank you!

🗨️    ↻    ❤️ 1    📊    ⬆️



**Brandy Reese for AZ** 🇺🇸 @ReeseForAZ · Dec 15, 2022

...

Replying to @jeffgilchrist

Thank you @jeffgilchrist for this explanation. People claiming masks don't work because they can smell their own flatulence while wearing them is the epitome of 'tell me you don't know how things (like atoms, molecules, particle size, etc.) work'.

🗨️    ↻    ❤️ 15    📊    ⬆️



**Mona** 🇩🇪 🇮🇹 777 @RamonaRd3 · Dec 14, 2022

...

Replying to @jeffgilchrist

They definitely work. My husband was with an infected person (tested positive the same evening) in the car, both wearing n95 and he didn't get infected. People who claim masks don't work, either wear them wrong or wear inferior masks like cloth masks etc.

🗨️ 3    ↻ 1    ❤️ 25    📊    ⬆️



**Tsu Dho Nimh** @TsuDhoNimh@mindl... @TsuDho... · Dec 15, 2022

...

Replying to @jeffgilchrist

This is how snow fences work too. They aren't to stop snowflakes - the gaps are a couple inches minimum - they are to disrupt air flow and make flakes slow down and land where they won't be a problem.





 16
 




**Elongated MuskoX**  maybe/not parod... @thedarkredw... · Jan 1 ...

Replying to @jeffgilchrist and @jennylehman121  
 I've explained that a virus doesn't crawl through a mask but hitches a ride on a water droplet from your mouth or nose which is bigger and the moisture gets trapped on the fabric in one of the layers

 1
 
 3
  128
 



**Freia Winn / Lee S. Harper** @sharperlee · Dec 14, 2022 ...

Replying to @jeffgilchrist  
 to show my kid how aerosols travel, i sat near a sunny window and inhaled & exhaled a marijuana vape while maskless. clouds were everywhere for a minute. then repeated exhaling wearing n95 ... nothing. she got it.

 1
  4
  37
 




**Jos Quinten** @TaranQ · Dec 14, 2022 ...

Replying to @jeffgilchrist  
 I still think they don't work a bit! Sorry just my common sense overruling the science, that happens sometimes 😊

 2
 
 3
 


**Norma 'l Bürgerin** @LooftSabine · Dec 14, 2022 ...

Replying to @jeffgilchrist



**@threadreaderapp** please unroll



1



1



**JVN** @JennJVN · Dec 14, 2022



Replying to @jeffgilchrist  
Great thread, thank you!



3



**David** @uniondesign · Dec 14, 2022



Replying to @jeffgilchrist  
I knew all of this except for the bit about farts. Very interesting.



1



1



**Leah Dwyer** 🐼🇨🇦 @KarenLeahDwyer2 · Dec 14, 2022



Replying to @jeffgilchrist  
Great thread. Great comments. Except for the ones I blocked.



4



**KayDee** @DeeWokeHuman · Dec 14, 2022



Replying to @jeffgilchrist  
How many times can you use an N95 for short periods of time ( about 1 hour in market)?



4



**cornsaladjewish** @cornsaladjewish · Dec 15, 2022



Replying to @jeffgilchrist  
What sucks is that fitting masks of any time has been an absolute nightmare for me because of my glasses.



1



1



361



**Cash - Clearly Parody** @AnotherUserNom · Dec 14, 2022



Replying to @jeffgilchrist  
Why are we still discussing efficacy of masks? People that aren't convinced about need to wear masks after 2 years of covid aren't gonna be convinced by a Twitter thread.  
Thank you for trying though!



6      ↻      18      📊      ↗



**It's Not Cricket** 🇺🇦🌻 @ATP1A3 · Dec 16, 2022

...

Replying to @jeffgilchrist

A great explanation of the physics of filtering. Thank you.

🗨      ↻      3      📊 196      ↗



**Ryan O'Brien** @ryanobrien · Dec 14, 2022

...

Replying to @jeffgilchrist

They work so well against viruses that doctors never recommended we wear them when we're sick until 2020. Even then it was like "might as well!" Masks were a band-aid, not a permanent solution for how to live your life

🗨 5      ↻ 1      3      📊      ↗



**toastywoods** 🍷 @toastywoods · Dec 14, 2022

...

Replying to @jeffgilchrist

How do you keep the mask sealed at the bridge of the nose so the glasses don't fog?

🗨 5      ↻      5      📊      ↗

**Nancy Prendergast** @NancyJPM · Dec 14, 2022

...





Replying to @jeffgilchrist

Many, many thanks for this clear and informative explanation. 🥰🙏

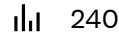


**mokshasoma** @mokshasoma · Dec 29, 2022



Replying to @jeffgilchrist and @angryhacademic

I wish someone would share SEM photos of viral particles on a PE fiber of a mask. Anyone seen a good one?



**Jim Gleeson** @JimGleeson · Feb 2



Replying to @jeffgilchrist

It's not merely claims they don't work, but real world examples of how they don't work. I have a friend, wore N95's exclusively. He's had Covid multiple times.



**Jos Quinten** @TaranQ · Dec 14, 2022



Replying to @jeffgilchrist

Isn't sigarette smoke or parfum smell transported by aerosols? I mean I smell them, which means they get in my nose, no matter what mask I wear? 🤔🤔🤔



**Nunya Biznis** @NunyaBi63595412 · Dec 14, 2022



Replying to @jeffgilchrist

If they work then you can ofc see the effect of mask mandates on infection rates which really didn't change throughout the entirety of the plandemic



**Micheal OLainn** @micheal\_olainn · Dec 14, 2022



Replying to @jeffgilchrist

That is a truly superbly explanatory thread. It explains the how and the why of capture.

My takeaway is that respirator masks need to fit very closely so that you breath through the mask, not around the edges of the mask.

The mask needs to fit the facial contours and seal.

1 2 50



**Ryan O'Brien** @ryanobrien · Dec 14, 2022

Replying to @jeffgilchrist



**John W. DeFeo** @johndefeo · Jun 12, 2022

In the video clips below, spanning 2009 to 2020, infectious disease experts laugh at the idea of mask mandates or mask-wearing to prevent illness (alluding to crime, ineffectiveness, loss of dignity and annoyance).

Did "the science" change in April 2020? It did not.

4/31

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2:15 29.9K views

1 2

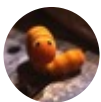


**Biki** @bikig19 · Dec 14, 2022

Replying to @jeffgilchrist

This is so interesting! When we were house hunting I realized I couldn't smell musty basements with my kn95 on. My realtor had to point it out. I guess it was really working!

13



**Mister Worms** @mister\_worms · Dec 14, 2022

Replying to @jeffgilchrist

This is a great thread, thank you! Love the detail on what aerosols are composed of (ew) and the particle weight comparisons. 😊

🗨️ ↻ ❤️ 2 📊 ⬆️



**hugo fernandes** @hugopakau · Dec 30, 2022

...

Replying to @jeffgilchrist

Well, they don't... In China everyone wears it and still 90% infection rate

🗨️ ↻ ❤️ 2 📊 61 ⬆️



**Laura RN Child** 🥰❤️ @Laura\_Guest1 · Dec 14, 2022

...

Replying to @jeffgilchrist and @ClareRayner6

[@threadreaderapp](#) please unroll

🗨️ 1 ↻ ❤️ 📊 ⬆️



**Shannon** 🐰 @hvact3ch · Dec 14, 2022

...

Replying to @jeffgilchrist

Concepts like Brownian motion and the electrostatic nature of P2 respirators all play a role in their effectiveness.

As well as many other traits.

🗨️ ↻ ❤️ 1 📊 ⬆️



**NB1975** @NB19752 · Dec 15, 2022

...

Replying to @jeffgilchrist

This is amazing. Thank you for taking the time to assemble all of this information in one place and explaining it so well. I've been looking for a resource like this.

🗨️ ↻ ❤️ 1 📊 ⬆️



**Buy Sarms** @BuySarms · Jan 7

...

Replying to @jeffgilchrist

but the problem is they don't fit especially if the user is unshaven.

🗨️ ↻ ❤️ 📊 36 ⬆️



**Bad\_Driver98** @BruceStearman · Dec 15, 2022

...

Replying to @jeffgilchrist and @gilmcgowan

Simplest explanation I heard, imagine 2 big, fully equipped football players trying to fit through a narrow door side by side. That's the simple version.



**L / 🐘** @ahLeonora · Dec 22, 2022



Replying to @jeffgilchrist and @safe\_breathe  
[@threadreaderapp](#) Unroll please



**DAVID THOMAS** @DAVIDTH76538792 · Dec 15, 2022



Replying to @jeffgilchrist  
[@threadreaderapp](#) please unroll




**maty ||** @nauscopio@qoto.org @nauscopio · Dec 15, 2022



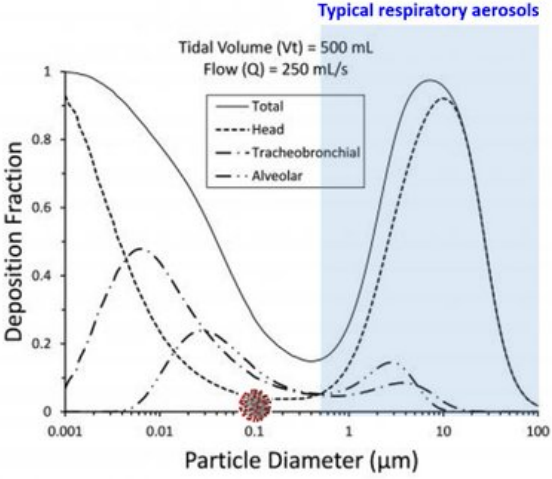
Replying to @jeffgilchrist

**Smart Air** @SmartAirFilters · Dec 14, 2022  
Save this chart for the next pandemic! @jljcolorado



### Aerosol Deposition in Resp. Tract

- Studied extensively for cold war biowarfare, pollution, occupational health, tobacco smoke, drug delivery to the lungs etc.
- Only aerosols < 100 μm can be inhaled  
→ If it can be inhaled, it can reach > 1 m beyond a person!
- Only aerosols ~< 5 μm can reach deep lung
  - E.g. tuberculosis
- But most aerosols at 5 μm deposited in head region



**Typical respiratory aerosols**  
Tidal Volume (Vt) = 500 mL  
Flow (Q) = 250 mL/s

<https://www.epa.gov/pmcourse/particle-pollution-exposure>



**JustMe** @just\_me\_gi@mastodon.cloud @Just\_Me\_Gi · Dec 15, 2022



Replying to @jeffgilchrist and @DecolonialBlack  
[@savetonotion](#) #thread

1 1



**Evesbeads** @Evesbeads · Dec 15, 2022

...

Replying to @jeffgilchrist

If a P2 or P3 is strongly resistant to oily particles are they effective at filtering out Covid which would be on non oily particles?

1 1



**Anche** @AnnieBokova · Dec 15, 2022

...

Replying to @jeffgilchrist and @OhCasavant

[@threadreaderapp](#) unroll please

1 1



**Anja Beinroth** @AnjaBeinroth · Jan 20

...

Replying to @jeffgilchrist

[@threadreaderapp](#) [@jeffgilchrist](#) unroll

1 57 1



**maggie smith** @sryslismibuch · Dec 15, 2022

...

Replying to @jeffgilchrist and @LaNaranjaMala

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1 1



**Markus** @appcoders · Dec 14, 2022

...

Replying to @jeffgilchrist

[@threadreaderapp](#) unroll

1 1



**The Agora is a Federated Knowledge Co...** @an\_a... · Dec 15, 2022

...

Replying to @jeffgilchrist and @ankostis

[anagora.org/respirators](https://anagora.org/respirators)

[anagora.org/masks](https://anagora.org/masks)

1 1

**Tomaz Vianna** @ViannaTomaz · Dec 16, 2022

...



Replying to @jeffgilchrist and @PeteUK7

Be sincere: WHEN did you FIRST explain that??



80



**I Never Guess** @I\_never\_guess · Dec 15, 2022



Replying to @jeffgilchrist

Thank you so much for this. Been doing it all along, but it gives a much clearer picture for us not-aerosol-scientist types.



**Compassion Is Always In Fashi...** @CompassionIs... · Dec 18, 2022



Replying to @jeffgilchrist

@D\_Bone



90

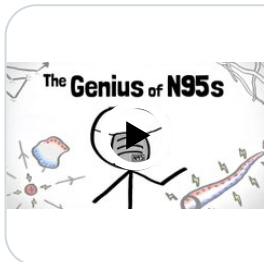


**Adam** @\_J\_McPherson · Dec 15, 2022



Replying to @jeffgilchrist

I like this 'splainer video.



youtube.com

The Astounding Physics of N95 Masks

Head to <https://brilliant.org/MinutePhysics> to sign up for free and get 20% off a Premium subscrip...



**maty** || @nauscopio@qoto.org @nauscopio · Dec 15, 2022



Replying to @jeffgilchrist



**maty** || @nauscopio@qoto.org @nauscopio · Dec 15, 2022




Por eso las mascarillas "quirúrgicas" que se utilizan en Europa, Asia... tienen menor eficacia (además del pésimo ajuste habitual).

Las quirúrgicas de verdad son las que siguen la normativa USA. Las otras, una lotería.

[twitter.com/SmartAirFilter...](https://twitter.com/SmartAirFilter...)

Show this thread



Mask Type	Standards	Filtration Effectiveness		
 Single Use Face Mask	China: YY/T0969	BFE: ≥95% PFE: ✗		
 Surgical Mask	China: YY 0469	BFE: ≥95% PFE: ≥30%		
	USA: ASTM F2100	Level 1	Level 2	Level 3
		BFE: ≥95% PFE: ≥95%	BFE: ≥98% PFE: ≥98%	BFE: ≥98% PFE: ≥98%
	Europe: EN 14683	Type I	Type II	Type III
BFE: ≥95% PFE: ✗		BFE: ≥98% PFE: ✗	BFE: ≥98% PFE: ✗	
 Respirator Mask	USA: NIOSH (42 CFR 84)	N95 / KN95	N99 / KN99	N100 / KN100
	China: GB2626	0.3 μm: ≥95%	0.3 μm ≥ 99%	0.3 μm ≥ 99.97%
	Europe: EN 149:2001	FFP1	FFP2	FFP3
		0.3 μm: ≥ 80%	0.3 μm: ≥ 94%	0.3 μm: 95%



**Open\_ERV** @open\_erv · Dec 26, 2022

Replying to @jeffgilchrist

There appears to be a baffling assumption that we are trying to filter out actual individual viral particles. That's not really sensible. They will be glommed together with protiens etc. from saliva, after the water from the droplet has evaporated.



**Katrina M Shipley** @KatrinaMartling · Dec 15, 2022

Replying to @jeffgilchrist

40 micron filters are used to let RBCs through in some blood product services if that helps folks visualize further

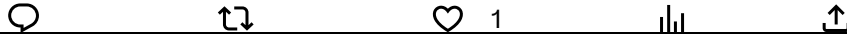


**马安娜** @1T3BjQRxT06bWeR · Dec 15, 2022

Replying to @jeffgilchrist and @AussieSteve6

I actually always wanted to know this. I'm extremely hyper vigilant and wonder why I can smell tobacco smoke, food stall smells, and cleaning

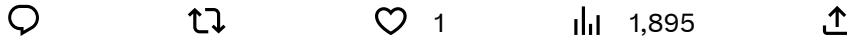
products without catching it. Will read carefully and inform myself.  
Thanks for posting!!!



**SoMuchWeirdness** @somuchweirdness · Dec 16, 2022



Replying to @jeffgilchrist  
[@threadreaderapp](#) unroll



**Jarrod Hardage** @Jarrod1989 · Dec 15, 2022



Replying to @jeffgilchrist  
Hey [@RepMTG](#) this is for you!



**Arbab Imran Khan** **افغان مټه خيل** @ArbabImranKhan3 · Dec 15, 2022



Replying to @jeffgilchrist  
[@shahid4real](#)



**Jos Quinten** @TaranQ · Dec 14, 2022



Replying to @jeffgilchrist  
Nice but



**Jos Quinten** @TaranQ · Dec 14, 2022

Replying to @DavidBu11318078 @AaronTeasdale and @jeffgilchrist  
May 2021

Mask mandate and use efficacy for COVID-19 containment in US States.

Masks have not slowed the spread of COVID.

[medrxiv.org/content/10.110...](https://medrxiv.org/content/10.110...)



**Jim Gleeson** @JimGleeson · Feb 2



Replying to @jeffgilchrist  
I have seen this information before. Yet, we know, and anyone working with respirators knows that after even a small period of time in a toxic environment, these small visible particles make their way into the mask.



**Jim Gleeson** @JimGleeson · Feb 2



Replying to @jeffgilchrist

I'd be the first to tell you that in the great state of Georgia we don't wear masks all the time, but if they worked...we would see a dip, a reduction in the rate of cases. Something. But we don't.



**LA Skeeto** @perki66 · Feb 1



Replying to @jeffgilchrist

Study showing they aren't effective. And, clearly, China shows the virus spread just like everywhere else, even with their population being some of the most obedient of masking. But you do you, leave the rest of us alone

Cochrane Database of Systematic Reviews | **Review - Intervention** New search

**Physical interventions to interrupt or reduce the spread of respiratory viruses**

Tom Jefferson, Liz Dooley, Eliana Ferroni, Lubna A Al-Ansary, Mieke L van Driel, Ghada A Bawazeer, Mark A Jones, Tammy C Hoffmann, Justin Clark, Elaine M Beller, Paul P Glasziou, John M Conly  
Authors' declarations of interest

Version published: 30 January 2023 [Version history](#)  
<https://doi.org/10.1002/14651858.CD006207.pub6>

**Main results**

We included 11 new RCTs and cluster-RCTs (610,872 participants) in this update, bringing the total number of RCTs to 78. Six of the new trials were conducted during the COVID-19 pandemic; two

<p><i>Medical or surgical masks</i></p> <p>Ten studies took place in the community, and two studies in healthcare workers. Compared with wearing no mask in the community studies only, wearing a mask may make <b>little to no difference</b> in how many people caught a flu-like illness/COVID-like illness (9 studies; 276,917 people); and probably makes little or no difference in how many people have flu/COVID confirmed by a laboratory test (6 studies; 13,919 people). Unwanted effects were rarely reported; discomfort was mentioned.</p>	<p><i>N95/P2 respirators</i></p> <p>Four studies were in healthcare workers, and one small study was in the community. Compared with wearing medical or surgical masks, wearing N95/P2 respirators probably makes <b>little to no difference</b> in how many people have confirmed flu (5 studies; 8407 people); and may make <b>little to no difference</b> in how many people catch a flu-like illness (5 studies; 8407 people), or respiratory illness (3 studies; 7799* people). Unwanted effects were not well-reported; discomfort was mentioned.</p>
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**Marsha Kantor** @mskantor@mastod... @FractalG... · Dec 17, 2022



Replying to @jeffgilchrist

[@threadreaderapp](#) unroll please

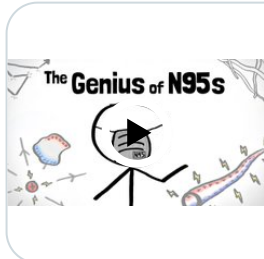
1       100  



**ocnj** @ocnj3 · Dec 14, 2022



Replying to @jeffgilchrist



youtube.com

The Astounding Physics of N95 Masks

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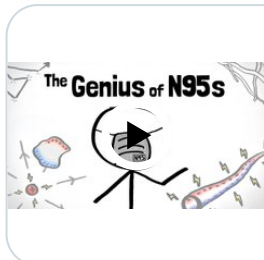
    1    



**Scott Squires** @scott\_squires · Dec 15, 2022



Replying to @jeffgilchrist



youtube.com

The Astounding Physics of N95 Masks

Head to <https://brilliant.org/MinutePhysics> to sign up for free and get 20% off a Premium subscrip...

    1   195  



**Rohan Gala** @rhngla · Jan 2



Replying to @jeffgilchrist and @ShivenTaneja

Cool thread! I had thought about it from the perspective of mask reuse and wrote a summary here: [rhngla.substack.com/p/understandin...](https://rhngla.substack.com/p/understandin...)

      52  



**Jos Quinten** @TaranQ · Dec 14, 2022



Replying to @jeffgilchrist

Nice but



**Jos Quinten** @TaranQ · Dec 14, 2022

Replying to @DavidBu11318078 @AaronTeasdale and @jeffgilchrist

Over 50 international studies that show that masks don't work. [wir.zwitschern.net/2020/10/25/sch...](https://wir.zwitschern.net/2020/10/25/sch...)



**Robbo** @RobboGB1 · Jan 7



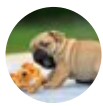
Replying to @jeffgilchrist

Very useful analysis

Of course 95%+ of people didn't wear respirators &/or have them fitted &/or replaced them regularly

This also doesn't address the negative effects & most importantly, why wear a mask to protect yourself from a virus no more dangerous than common flu?

Madness!

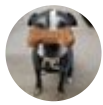


**Brian Austray** @BrianAustray · Dec 15, 2022



Replying to @jeffgilchrist

Nice graphic, but they still didn't work.



**Tim** @Tim39469023 · Dec 15, 2022



Replying to @jeffgilchrist

My wife has been making me masks since we ran out of N95s in 5/20.

She started with 1 layer of Merv 13 furnace filter, between layers of cotton. Since Delta, she's been using 2 layers of furnace filter. In between layers of cotton. Have I just been lucky, to not catch Covid?

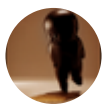


**Such A Time** @SuchMusicNet · Dec 14, 2022



Replying to @jeffgilchrist

Interesting stuff. The problem I have is over the past 2/3 years, when mask were introduced, nothing changed. I've never seen any significant change in cases other than seasonal and a massive increase when Vax were introduced.



**Underbite** @underbite · Dec 15, 2022



Replying to @jeffgilchrist

THIS THREAD. For anyone still clinging to the FALSE belief that 'masks don't work' but who still needs some convincing. "How masks work"





🗨️ ↻ 2 ❤️ 4 📊 ⬆️



**Margo Berg** @MargoBerg2 · Dec 31, 2022

...

Replying to @jeffgilchrist

Thanks !!!❤️

🗨️ ↻ ❤️ 📊 27 ⬆️



**qwe** @qwe\_700 · Jan 13

...

Replying to @jeffgilchrist

Very good cut and paster, thanks

🗨️ ↻ ❤️ 📊 18 ⬆️



**Freedom2B** @Freedom22BB · Dec 18, 2022

...

Replying to @jeffgilchrist

Aerosolised Condensation Droplets.

God save us all, if people would just science, we wouldn't be in this dumpster fire of a hellhole.

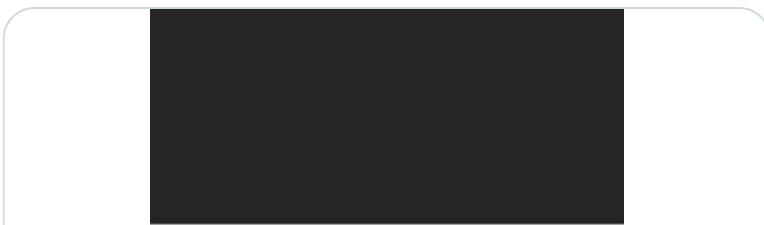
🗨️ ↻ ❤️ 4 📊 92 ⬆️



**MrBoomstick** @MrBoomstick420 · Dec 14, 2022


...

Replying to @jeffgilchrist






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**Josie** @Josie49224315 · Dec 15, 2022      ...  
 Replying to @jeffgilchrist  
 Interesting. I have read probably all the RCT's on this subject....none have convinced me masks work. Which ones convinced otherwise?

1      ↻      1      📊 50      ⬆


**Civilized Warrior** @CivilizedWarrior1 · Dec 23, 2022      ...  
 Replying to @jeffgilchrist  
 But you actually say the blue and cloth masks don't stop viruses. You also say that its likely that the virus attached to a larger particle gets stuck in the mask. I use this analogy. Would one use a dirty napkin all day long like that filthy mask?

 **The Common Sense Populist** @comsenspop · Dec 16, 2022      ...  
 Replying to @jeffgilchrist  
 Wearing a mask is like trying to keep a fart in your trousers.

3      ↻      111      ⬆

 **Paul Newbon** @Enbrok · Jan 18      ...  
 Replying to @jeffgilchrist  
 Even if a mask actually stops covid particles people touch their masks, mouth and nose too often and the vast majority of people do not wear masks correctly. Some wear the same mask for days on end! Masks are not much more than a glorified spit guard!

2      📊 27      ⬆

 **Baaaaaaaaa** @allahs\_goat · Dec 15, 2022      ...  
 Replying to @jeffgilchrist  
 I love my N95 eye respirator. Nothing can enter my body through my eyes. I have had Covid six times and am thankful for my 4 boosters

1      ↻      3      📊      ⬆

**fpodsf** @Zammsan · Dec 15, 2022      ...



Replying to @jeffgilchrist

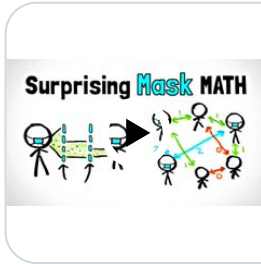
Now add the fact that most people can't afford to do proper fittings, can get the virus on their clothes, etc etc. Also the nasty germ environment you create inside the mask if worn for too long. Look up Sweden and group immunity.



**Scott Squires** @scott\_squires · Dec 15, 2022



Replying to @jeffgilchrist



youtube.com

Why Masks Work BETTER Than You'd Think

Thanks to the Heising-Simons foundation for their support: <https://www.hsfoundation.org> (their ...



**Matthew Blackburn** @RigMatthew · Feb 2



Replying to @jeffgilchrist

That's odd. My Industrial Hygienist said even the N95s are not worth it.



**Bartosz Es** @Bartnick81 · Dec 16, 2022



Replying to @jeffgilchrist

Thanks for thread



**Richard Shana** @RichardCShama · Dec 15, 2022



Replying to @jeffgilchrist

Great thread thanks. There's still a massive but. But thanks anyway



**max123** @max123\_eth · Dec 15, 2022



Replying to @jeffgilchrist



**max123** @max123\_eth · Dec 15, 2022

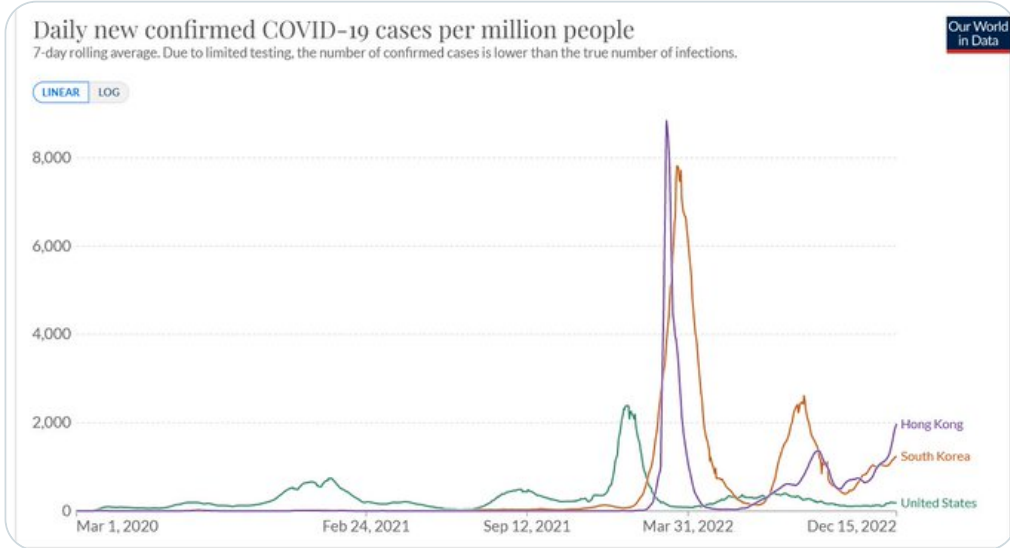
the mask saves from the virus in the same way as panties from diarrhea



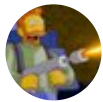
**Huw Chaffe** @ChaffeHuw · Dec 16, 2022

Replying to @jeffgilchrist

Maybe chaotic behavior defeats even the best intentions, even when culturally ingrained. But anybody who watched each wave in Japan get successively worse, knew that 18 months ago.



68



**DBH** @castlerock22 · Dec 14, 2022

Replying to @jeffgilchrist

No one cares

1



**NeverVoteConservative** @FireFordNow · Dec 23, 2022

Replying to @jeffgilchrist and @CraigMcNair9

Thank you for this detailed explanation.

2 81

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**Dr. Jeff Gilchrist** @jeffgilchrist · Dec 14, 2022

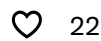
Do you actually need the protection from oily aerosols because there are some very breathable N95/99 rated ones. I believe you can get P100

filters for this valveless elastomeric though:



dentecsafety.com

Comfort-air® Nx Nxmd Series | Dentec Safety Specialists | Canada  
Comfort-air®Nx SeriesNIOSH Approved Reusable N95/P100  
Elastomeric RespiratorsSEE OUR PRODUCTS Our Reusable ...



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**Rattibha** رتيها @rattibha · Dec 26, 2022



Automated

Replying to @MAXIMIILIAN

Hallo, Unroll has been successful. 🤗 [en.rattibha.com/thread/1602994...](https://en.rattibha.com/thread/1602994...)

Peaceful reading! 📖

**Rattibha**

**How #respirators actually work and which type is best? I see many claims #masks don't work...**



**Dr. Jeff Gilchrist**  
PhD Biomedical researcher, data scientist, and

Read Thread

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10 MICRON

75 MICRON

5 MICRON

0.3 MICRON (COVID-19 virus)

en.rattibha.com



46

