

CONTROLLING COVID-19 AIRBORNE EXPOSURE

PRACTICAL TOOLS TO PREVENT AIRBORNE TRANSMISSION RISKS

Yes, COVID-19 is airborne.

What is **airborne transmission**?



- Exhaled breath contains particles of varied size and mass which can carry virus: **aerosols** (microscopic and not readily visible) and **droplets** (large and visible).
- **Inhalation of aerosols:** Aerosols are light enough to travel, stay afloat, accumulate, and remain infectious in enclosed spaces for many hours.

Airborne transmission occurs when we inhale the breath exhaled by an infected person.

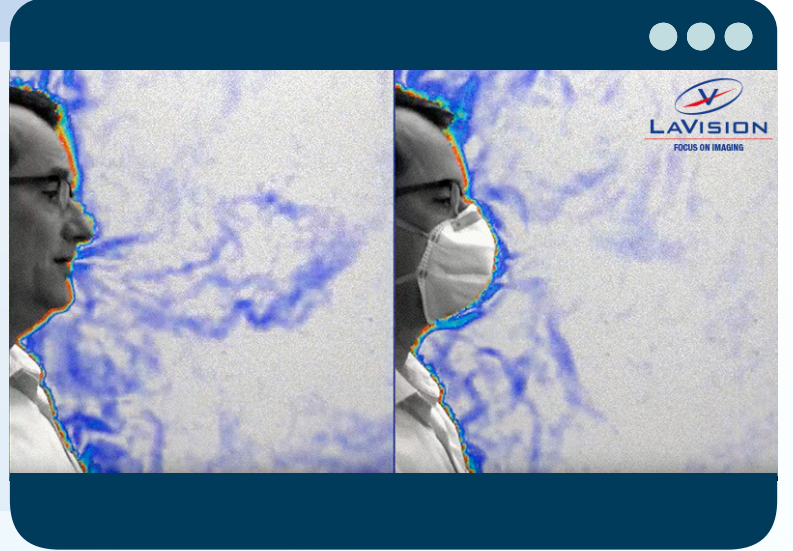


The image above shows a visualization of exhaled breath among unmasked individuals in a shared air space who are at increased risk of airborne transmission.

“As long as we are sharing an airspace with someone else, breathing in the air that they exhale, airborne transmission is possible.”

-Virologist Dr. Julian Tang,
University of Leicester, UK

- **Contact of mucus membranes by droplets:** Droplets may directly contact the eyes, nose, or mouth, rather than being inhaled. Droplets may also spread to these areas from our hands after touching a droplet-contaminated surface.



The image above shows how masks are effective at trapping particles.

Close-range transmission

Virus-laden particles are most concentrated near the infected person breathing or speaking. These particles disperse over longer distances.

Ways to prevent close-range transmission, the more the better!

- Wear a well-fitted mask
- Maintain physical distance and limit crowding
- If possible, move outside. If not, limit time spent in shared air spaces
- Refresh, filter, or humidify shared air indoors (see tips below!)

How **effective** is my mask?



It's all about **filtration** and **fit**:

- ✓ Effective **mask filtration** reduces the amount of particles released into a shared space, assuming a snug fit.
- ✓ To achieve a **snug fit**, make sure your mask does not leak air from the top or sides.

Mask filtration: Top 5

1. N95
2. KF94 or FFP2
3. KN95 (if NIOSH Certified)
4. Double-mask (e.g. cloth over surgical)
5. Surgical mask (best fit achieved with a brace)

So is **wearing a mask** and **physical distancing** enough?

No!

But wait, there's more:

Room-scale transmission

With time, an infected person's virus-laden exhaled breath stays afloat in the air, permeates the room, and becomes more concentrated.

Control room air conditions with:



Ventilation by adding outdoor air to dilute the concentration of virus-laden particles indoors



Filtration by filtering out virus-laden particles with a high-efficiency filter



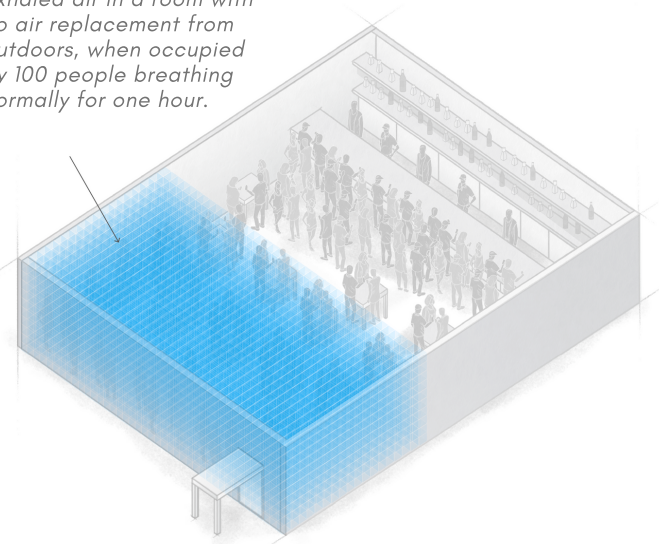
Humidification by achieving 40-60% relative humidity with a germ-free humidifier, reducing the time aerosols stay afloat and furthering the decay of the virus

Ways to prevent room-scale transmission, the more the better!

- Limit occupancy and time spent in shared air spaces
- Open doors and windows where possible to let in outside air and let out exhaled breath
- Set HVAC system to bring in as much outside air as possible
- Measure carbon dioxide levels to ensure shared air space is well ventilated (below 700 ppm is ideal to reduce COVID-19 risk)
- Use a HEPA air cleaner (DIY or purchased), sized appropriately for the room, to supplement ventilation

The image below shows room-scale aerosol exposure. Assuming the room lacks adequate air circulation, people inside can become infected with COVID-19 without being near an infected person.

The blue shading shows exhaled air in a room with no air replacement from outdoors, when occupied by 100 people breathing normally for one hour.



Do-it-Yourself (DIY) ideas

1. [COVID Straight Talk: Hacks That Really Work](#)
2. [Ask This Old House: How to Make a DIY Air Filter](#)

Where can I **learn more**?



- [The COVID-19 virus travels in the air and collects indoors.](#) City & County of San Francisco.
- [Good ventilation is important to prevent COVID-19 transmission.](#) City & County of San Francisco
- [COVID-19 and Air Quality.](#) City & County of San Francisco
- [Fix The Mask: Get the most out of your surgical mask.](#)
- [CO2 Sensors: Which Type Should You Be Looking For?](#)
- [The Best Humidifiers with UV Light For Germ Protection](#)
- [Why Buy an Air Cleaner? AHAM Verifide.](#)



This infographic is interactive!

All sources are linked in each section for more information. For a full list of references, click [here](#).