

## Twitter Thread by Matthew



**Matthew**

@Matthew94091812



### **COVID Masks: Mechanistic View: Part 2: Fine Aerosol Emissions:**

**Masks may increase fine aerosol emissions from: 1) nebulization of large droplets into fine aerosols, or 2) friability of certain mask materials creating "aerosolized fomites."**

**Please share:**

**Here are the studies:**

The question is whether facemasks are actually a source for viral aerosols by:

1) Masks get saturated by large "respiratory droplets" containing viral molecules. Air turbulence against trapped droplets may create aerosols that eventually diffuse around edges. Continued...

Trapped droplets potentially get pushed through the filter media of the mask, getting nebulized into aerosols.

Particles don't always stay in the mask:

Study: Ha'eri 1980

Title: The efficacy of standard surgical face masks: an investigation using "tracer particles"

Albumin tracer particles put inside a surgical mask were dispersed into the room by breathing.

<https://t.co/LI5CfBPVj6>

Viral molecules can get airborne from air turbulence.

Study: Liu 2020

Title: Aerodynamic analysis of SARS-CoV-2 in two Wuhan hospitals.

SARS-2-COV sub-micrometer aerosols not tightly bound to surfaces, get airborne when PPE is taken off.

<https://t.co/GK9SeOwgci>

Diagram of filter media becoming a nebulizer:

<https://t.co/qlzLK1N1Aw>

Do our masks stop large droplets or do they nebulize them into Aerosols? From my emulsion days, best way to get a monodispersed emulsion is to force H<sub>2</sub>O through a pore sized membrane that has a different phase (oil or air) on the other side of it. <https://t.co/Y9UCmWZ7uT> [pic.twitter.com/bGZBxl6lUT](https://t.co/bGZBxl6lUT)

— Kevin McKernan \U0001f642 (@Kevin\_McKernan) [October 24, 2020](#)

Another Possible source of Viral Aerosols:

2) "Aerosolized fomites" from the mask material itself (e.g. cotton or fabric) are shed during breathing. These tiny organic particles - fomites - are contaminated by even smaller viral molecules.

Study: Asadi 2020

Friability of mask materials: Cotton or fabric may emit fine particles < 1  $\mu$ m, possibly spreading viral contamination. This study found breathing through DIY masks of cotton or fabric increased forward emission of fine aerosols.

<https://t.co/nks9rCb6Ox>

Study: Asadi 2020 (continued)

Cotton or cloth releases tiny organic material - aerosolized fomites - that can potentially serve as a conduit for viral molecules.

Study: Asadi 2020

Limitations:

Only measured 2 minutes of emissions

Only measured forward emissions; not emissions around edges; may underestimate total emissions vs no mask

Could not tell if medical-grade masks also increased aerosols when fully contaminated with droplets

Study: Asadi 2020

Title: Influenza A virus is transmissible via aerosolized fomites

Found that non-respiratory "aerosolized fomites" (organic debris) contaminated with a virus can infect other animals. May play large role in viral transmission.

<https://t.co/p3lRxegOiA>

Conclusion:

So masks might capture some viral debris, but emissions might be in a more easily transported aerosol.

It's analogous to someone mistakenly power sanding lead paint to remove it. The total amount is reduced, but remaining portion is in a more hazardous form.

Additional Information Welcome:

Studies measuring fine viral aerosols from masks, ideally including:

- 1) Fine aerosols < 1µm
- 2) All directions, including leakage around mask
- 3) Enough time for full droplet contamination (e.g. 30 min)

Please reply or message me. Thank you.

End Of Thread: Thank you for reading.

Please share.

What follows are replies and duplicate posts.