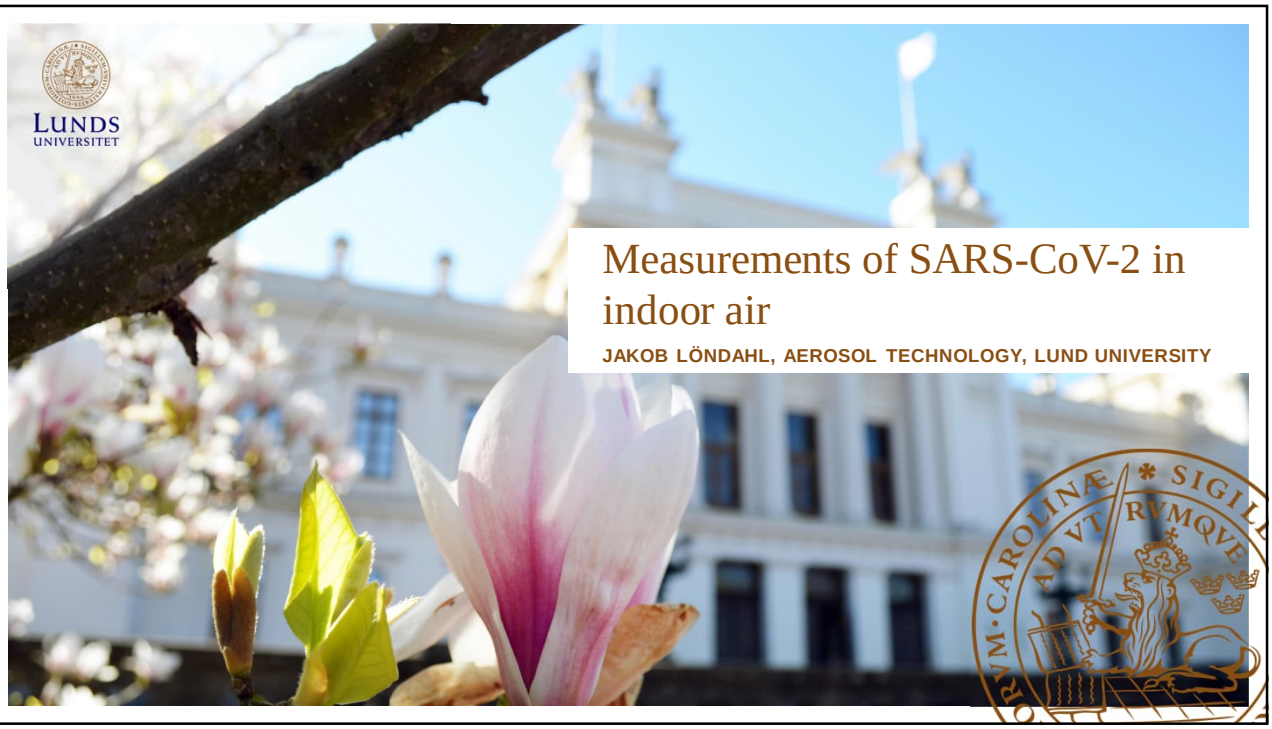


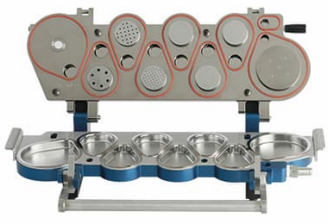
Measurements of SARS-CoV-2 in indoor air

JAKOB LÖNDAHL, AEROSOL TECHNOLOGY, LUND UNIVERSITY

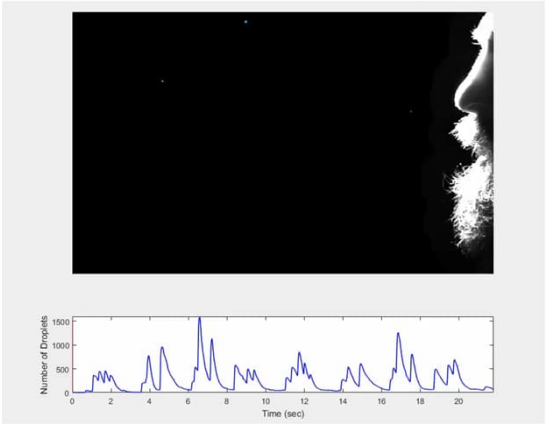
Questions

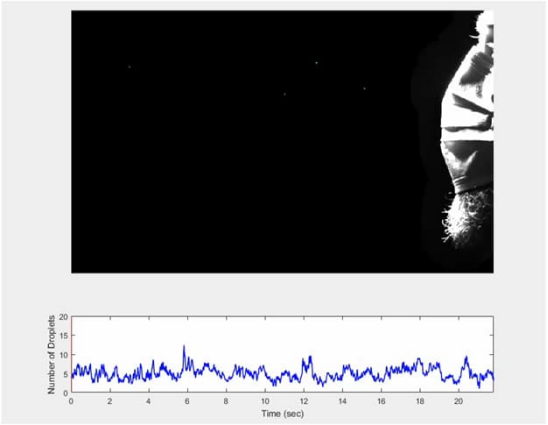
- When is SARS-CoV-2 emitted to the air?
- How far is it transported?
- Does it survive in air?
- Can airborne SARS-CoV-2 be associated with infection?

When is SARS-CoV-2 emitted to the air?



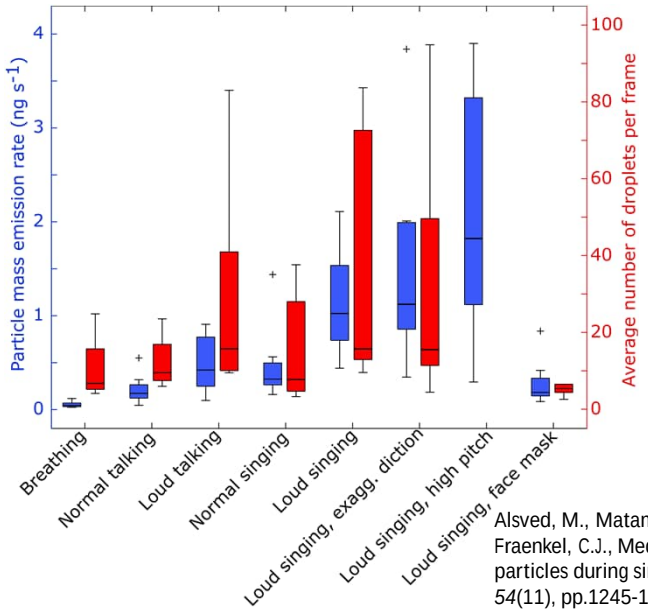
When is SARS-CoV-2 emitted to the air?





Alsved, M., Matamis, A., Bohlin, R., Richter, M., Bengtsson, P.E., Fraenkel, C.J., Medstrand, P. and Löndahl, J., 2020. Exhaled respiratory particles during singing and talking. *Aerosol Science and Technology*, *54*(11), pp.1245-1248.

When is SARS-CoV-2 emitted to the air?



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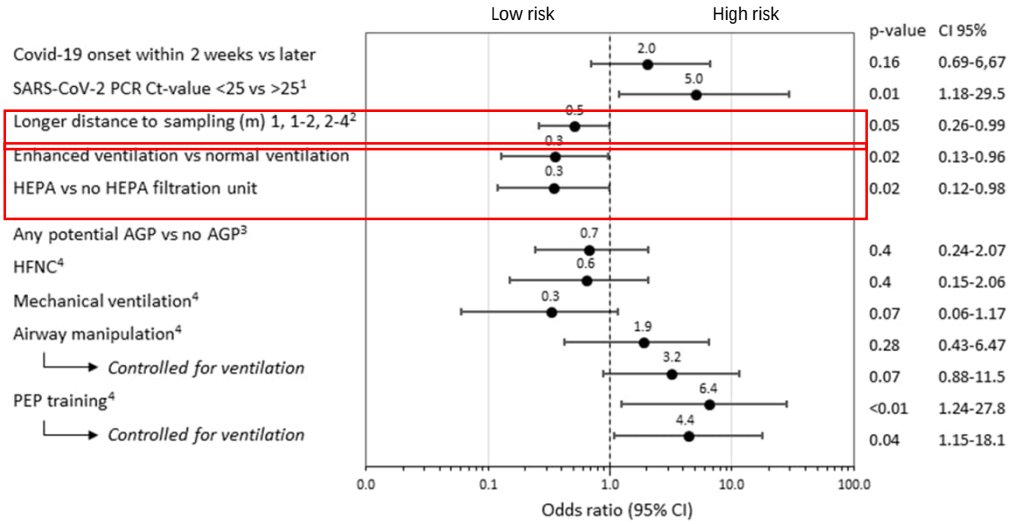
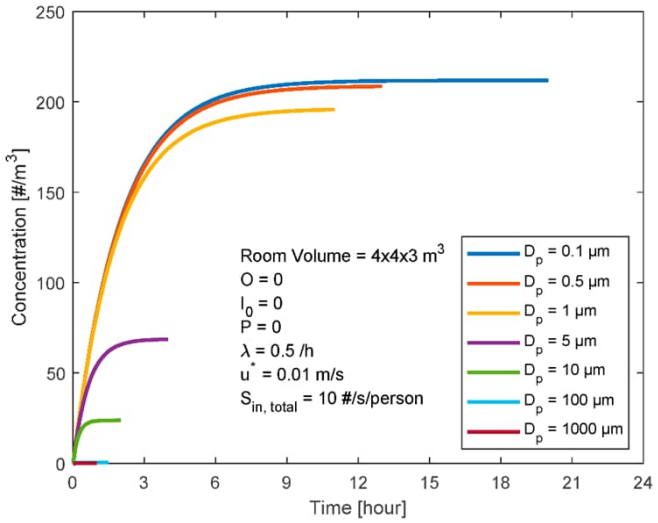
When is SARS-CoV-2 emitted to the air? How far is it transported?



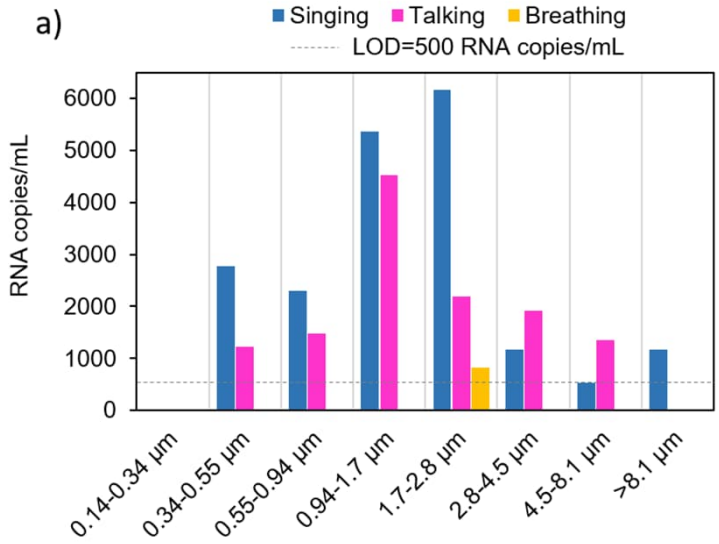
Thuresson, S., Fraenkel, C.J., Sasinovich, S., Soldemyr, J., Widell, A., Medstrand, P., Alsved, M. and Löndahl, J., 2022. Airborne SARS-CoV-2 in hospitals-effects of aerosol-generating procedures, HEPA-filtration units, patient viral load and physical distance. *Clinical infectious diseases*

How far is it transported?



Hussein, T., Löndahl, J., Thuresson, S., Alsved, M., Al-Hunaiti, A., Saksela, K., Aqel, H., Junninen, H., Mahura, A. and Kulmala, M., 2021. Indoor model simulation for covid-19 transport and exposure. *International Journal of Environmental Research and Public Health*, *18*(6), p.2927.

How far is it transported?

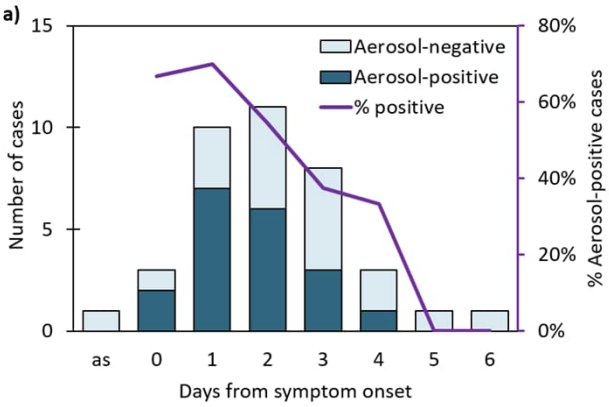


Manuscript under review

Does SARS-CoV-2 survive in air?

Alsved, M., Nygren, D., Thuresson, S., Medstrand, P., Fraenkel, C.J. and Löndahl, J., 2022. SARS-CoV-2 in exhaled aerosol particles from covid-19 cases and its association to household transmission. *Clinical Infectious Diseases*.

Exhaled virus



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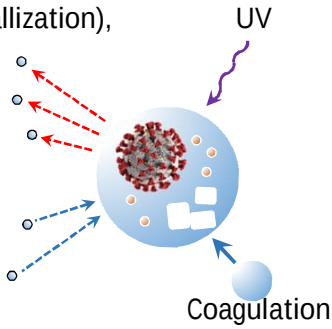
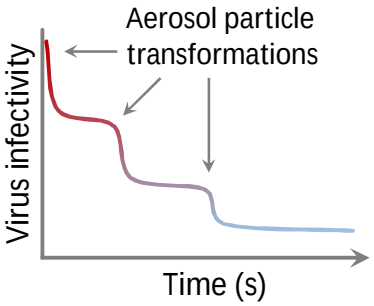
Does SARS-CoV-2 survive in air?

Evaporation of water (crystallization), CO_2 (pH change) and volatile components

Heating and cooling

Condensation of water and other material (OH, organics, ozone etc.)





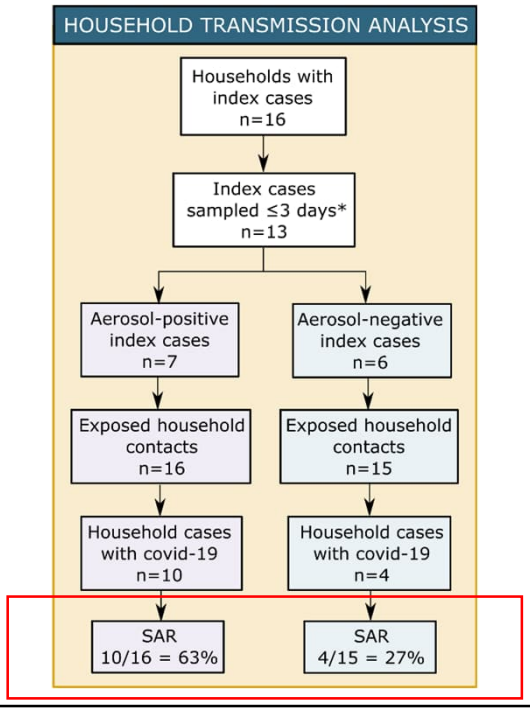
Löndahl, J. and Alsved, M., 2022. Abrupt decreases in infectivity of SARS-CoV-2 in aerosols. *PNAS, Proceedings of the National Academy of Sciences*, *119*(29), p.e2208742119.

Does SARS-CoV-2 survive in air?

Yes! But primarily over time scales of a few minutes.

We have cultured virus sampled in air from 3 patients

Can airborne SARS-CoV-2 be associated with infection?



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Summary

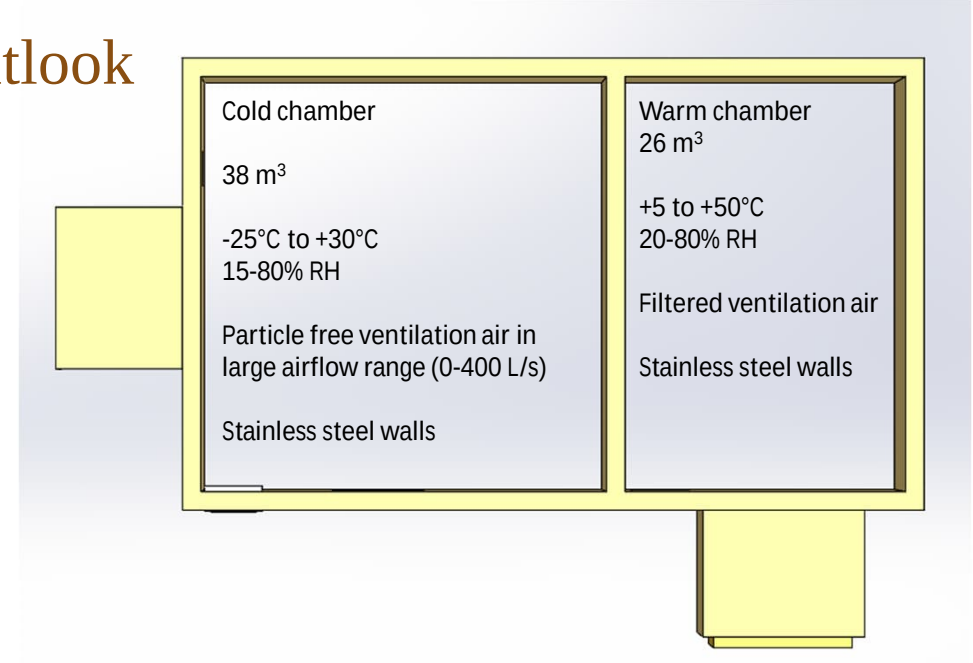
- When is SARS-CoV-2 emitted to the air?
  - Primarily exhaled air during use of voice
- How far is it transported?
  - Many meters
- Does it survive in air?
  - Yes, for minutes
- Can airborne SARS-CoV-2 be associated with infection?
  - Yes

Outlook

- Longitudinal study of covid in air – variants and particle sizes
- Emissions in delivery wards
- Lab studies (rhinovirus and norovirus) to understand seasonal variability
- AiDA measurements on postcovid patients?

Outlook

Outlook



Research collaboration on inhaled infectious disease

Aerosol Technology
Jakob Löndahl, *Assoc Prof*
Malin Alsved, *Postdoc*
Sara Thuresson, *PhD student*

Clinical Virology and Clinical Microbiology
Patrik Medstrand, *Prof*
Sviataslau Sasinovich, *Postdoc*
Anders Widell, *Assoc. Prof. / MD*
Erik Sennerby, *PhD /MD*

Infection Medicine
Carl-Johan Fraenkel, *PhD / MD*
David Nygren, *PhD student / MD*