



New findings from the VOICE respiratory aerosol emission study

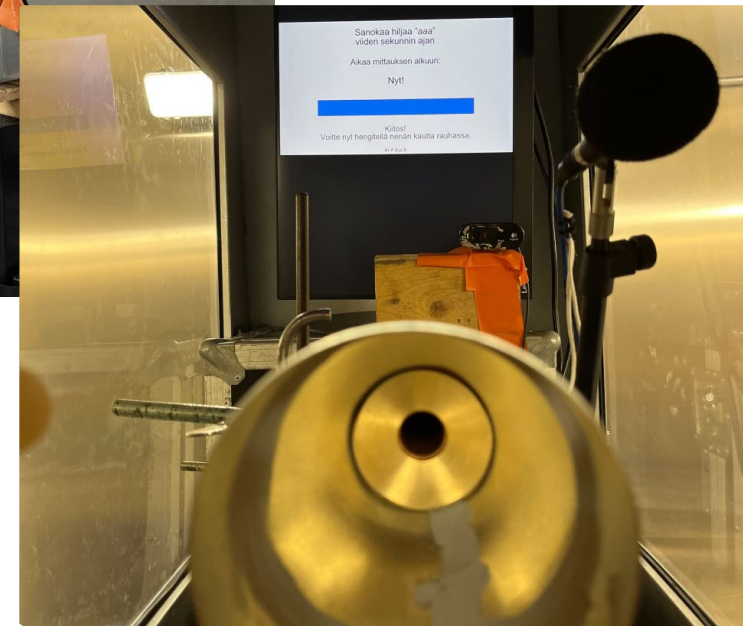
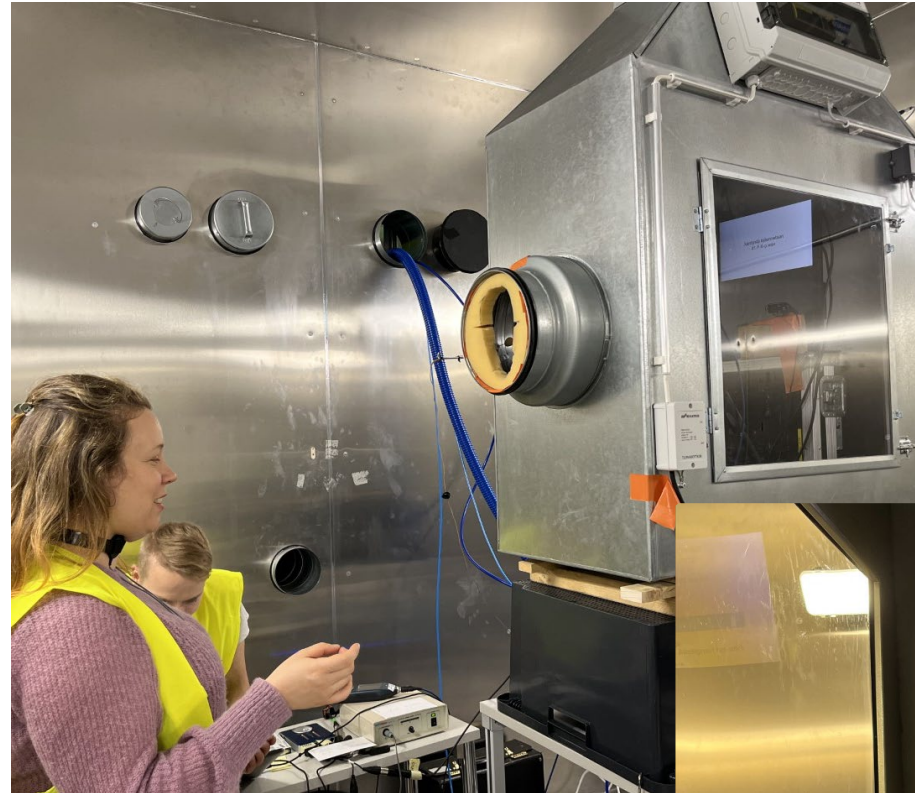
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VOICE Human aerosol measurements



- Introduction: Respiratory aerosol generation, emission and superemission
- Objectives of the study
- Experimental Setup



Human aerosol emission

- Generated all the time
- Can float in air for hours
- Can be inhaled

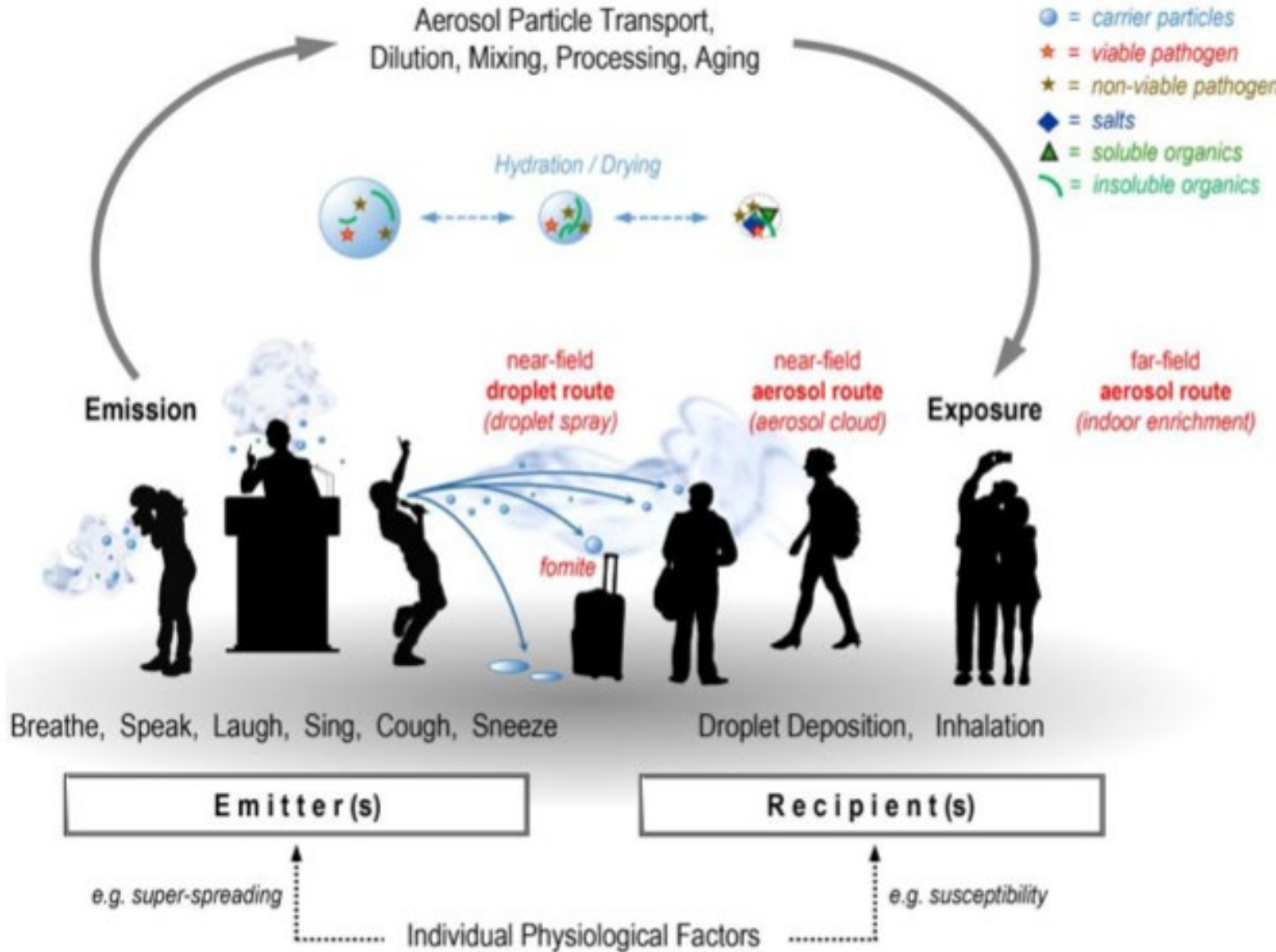
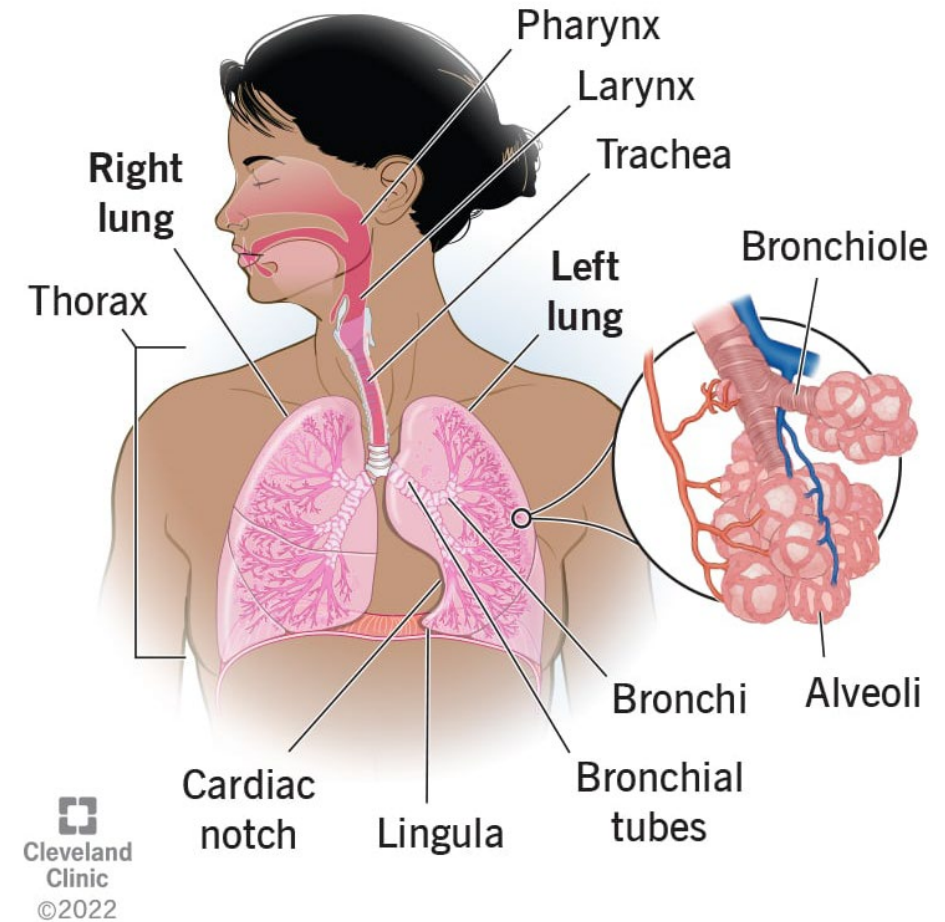
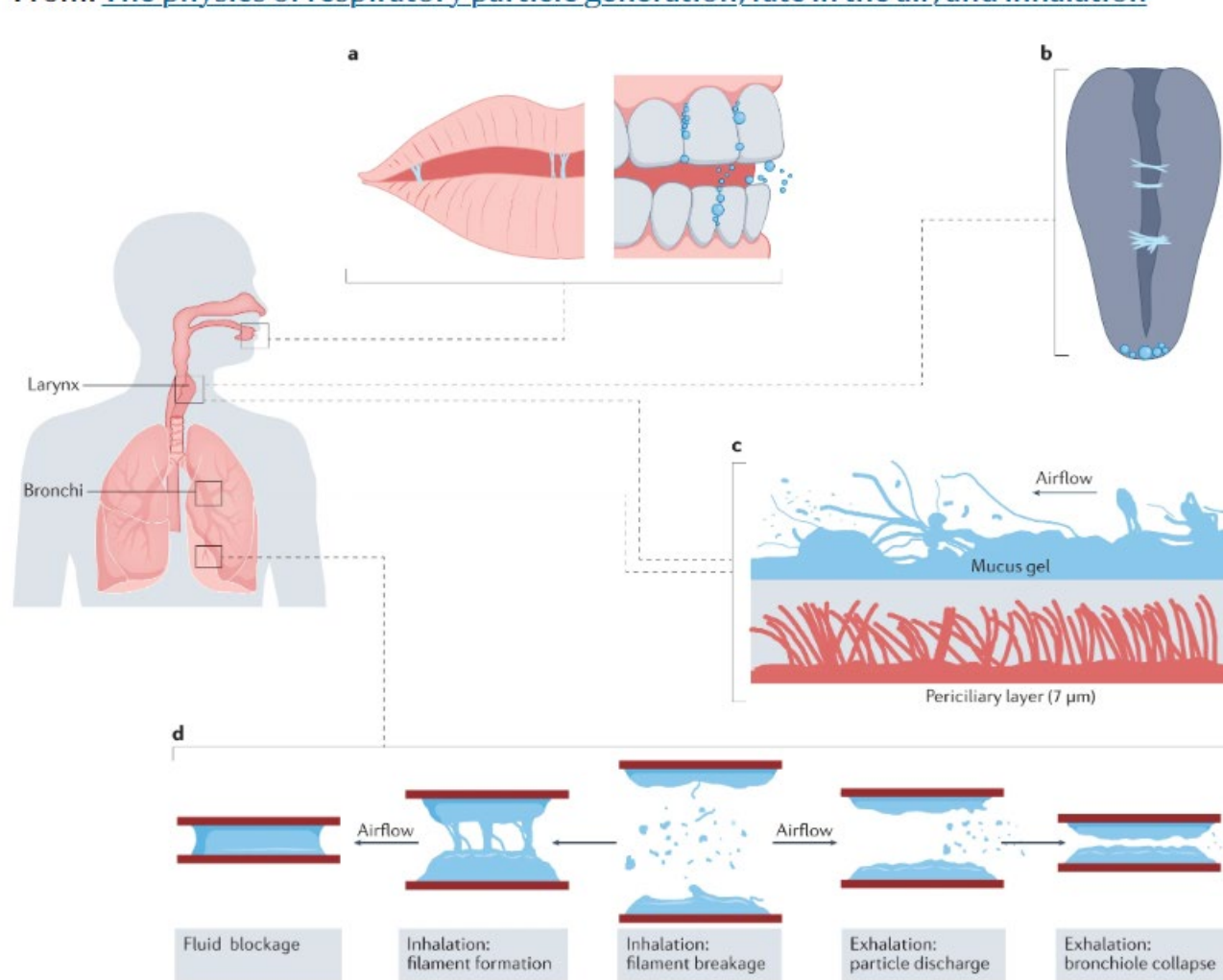


Fig. 1: Sites and mechanisms of particle generation.

From: [The physics of respiratory particle generation, fate in the air, and inhalation](#)



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WHAT MAKES A SUPEREMITTER?

WHAT
HOW
WHO

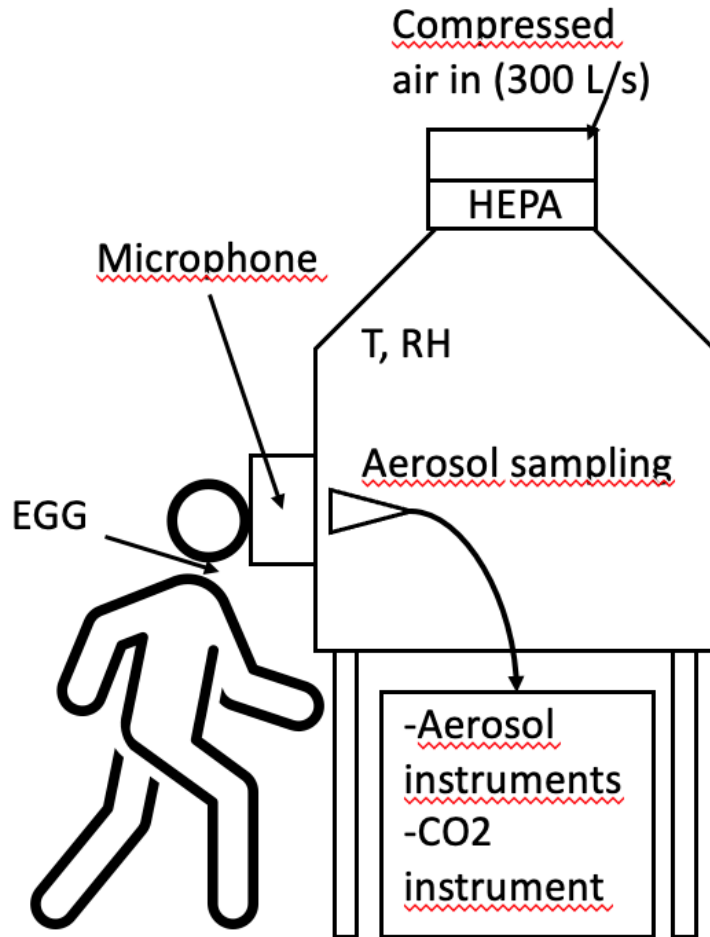
→ breathing, speaking, singing, whispering, coughing

→ voice pitch, volume, vocal fold contact

→ age, gender, BMI, pulmonary function, saliva generation, anatomical variations



Experimental setup



Aerosol instruments and particle size ranges:

- TSI APS 3021 (0.5 – 10 μm)
- Palas Fidas Frog (0.2 – 10 μm)
- Airmodus CPC A23 (> 23 nm)
- TSI CPC 3775 (> 4 nm)



- Subjects: 41 Amateur and professional singers
- Aerosol chamber: Aerosols, CO₂, Sound pressure

Summary

- New experimental setup combines aerosol and voice emission measurements
 - breathing, coughing, speaking, whispering, singing in various sound pressure and pitch
- Also small particles measured
- High variability in the particle emissions between individuals in previous studies – why?
- Emission parameters can be used in **infection risk models**, in different situations

- Results will be published

Thank you for your attention!

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