



Measuring air quality in Matei Bals

A case study in an infection hospital in Romania

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Objectives

- Can the risk of infection in a naturally ventilated building be lowered using air purification units?
- Studying existing indoor air quality and ventilation status in the hospital
- Installing air purification units in the studied spaces
- Measuring the effect of this intervention on air quality
- Also: gathering supporting data for simulations and risk models
 - Verifying simulation results experimentally

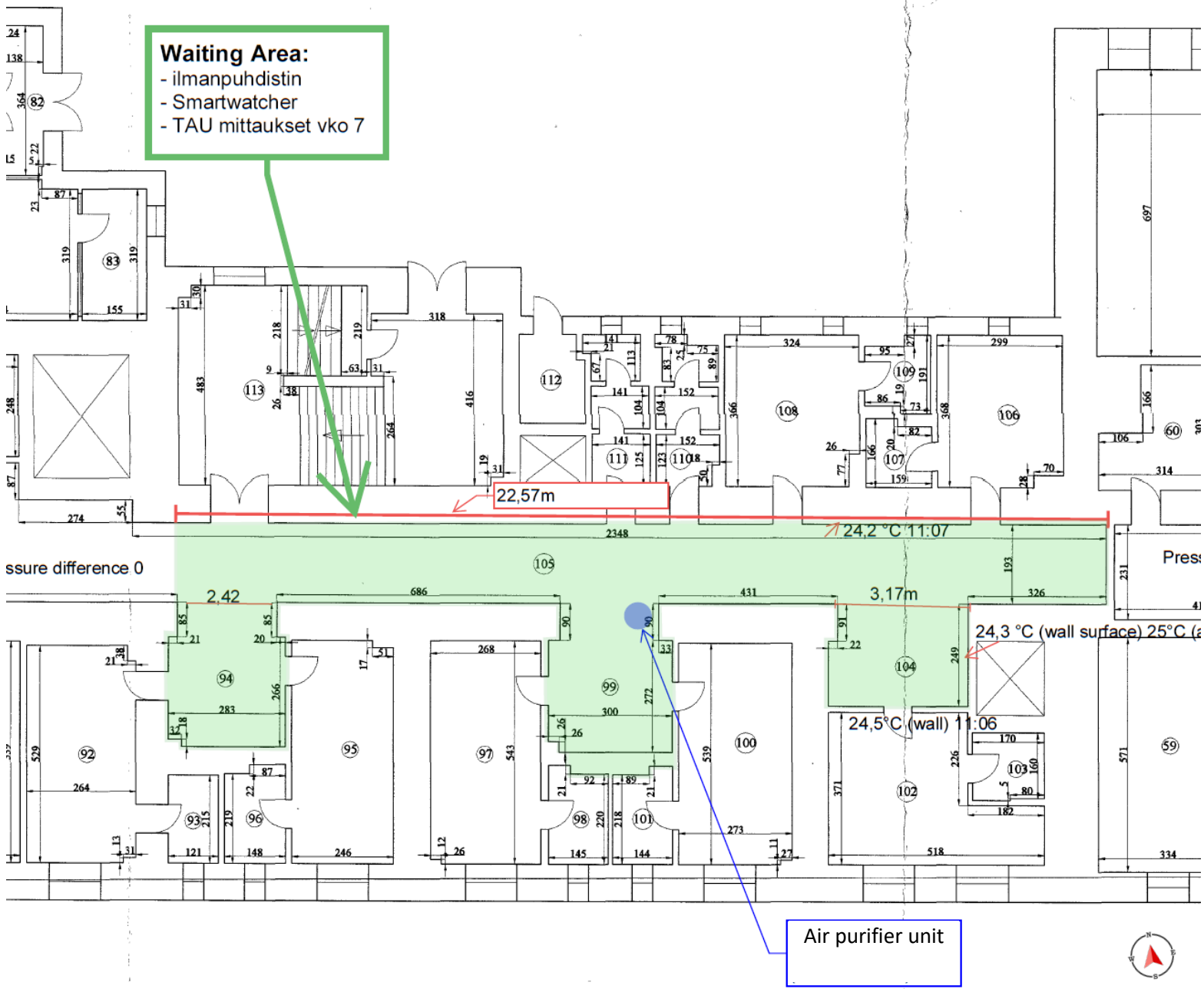
Risky spaces investigated in Matei Bals

Waiting area
ICU room
Covid room



Waiting area

- Located in the main hospital building on the first floor



Waiting area



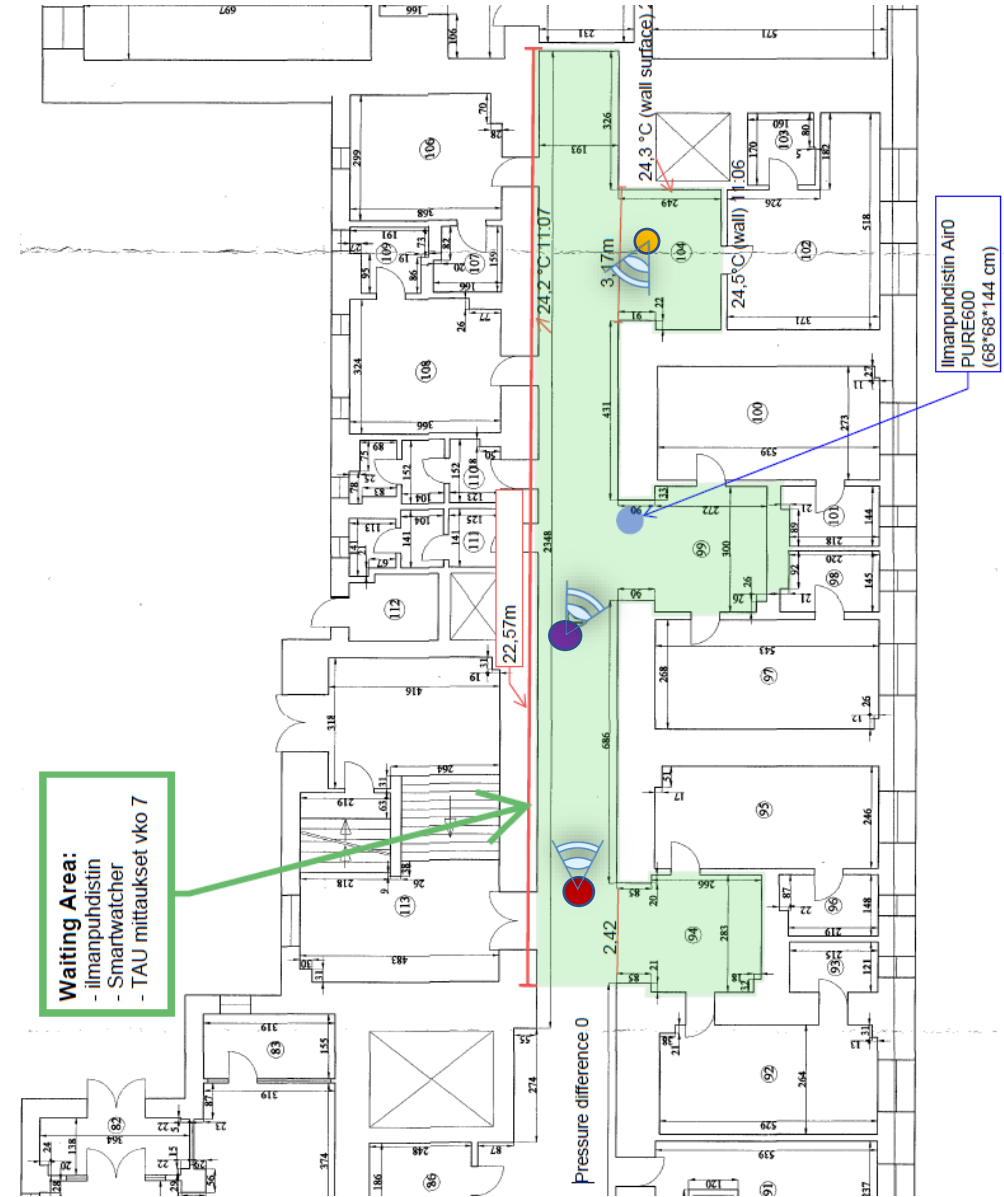
● Measurement instrument



● Air purifier unit



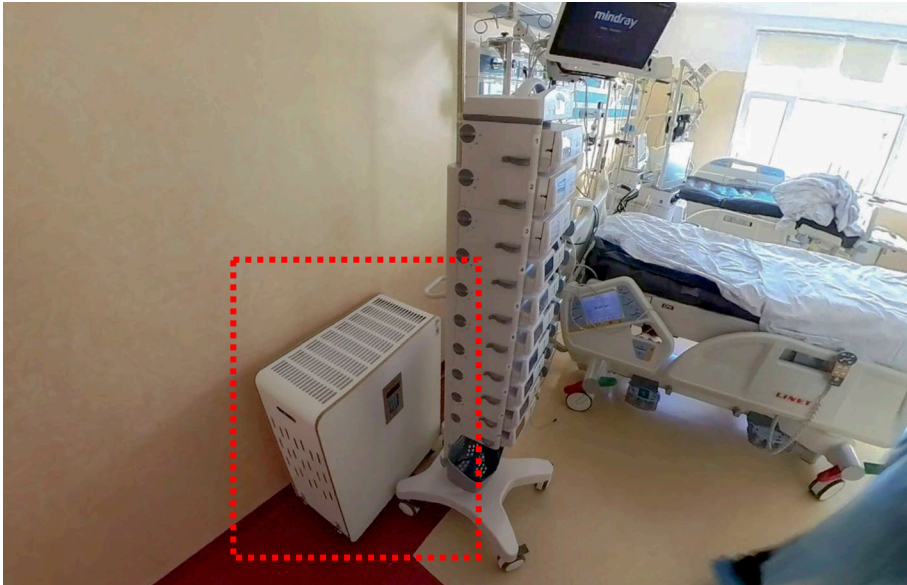
● Waiting area



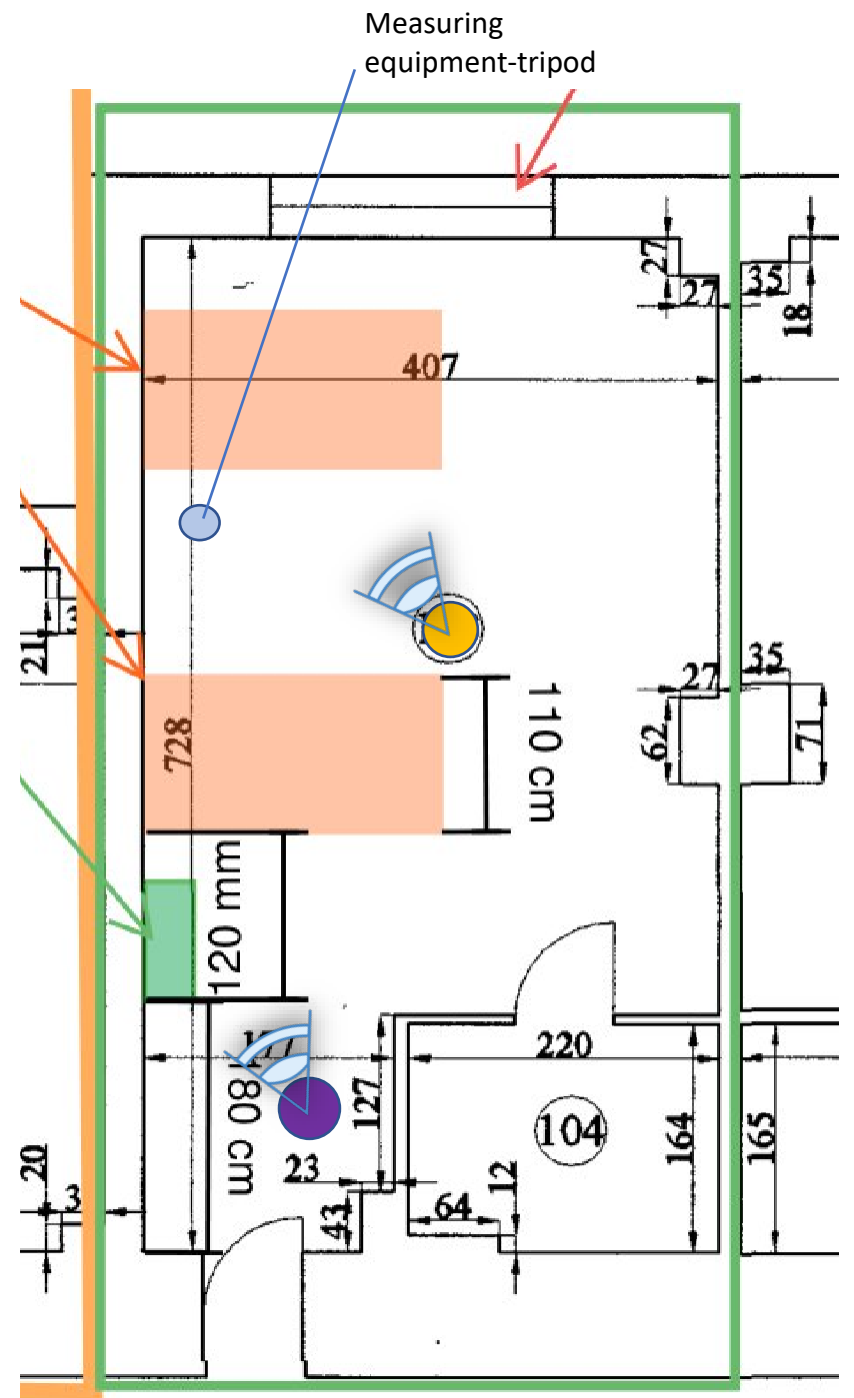
ICU room



● Measurement instrument



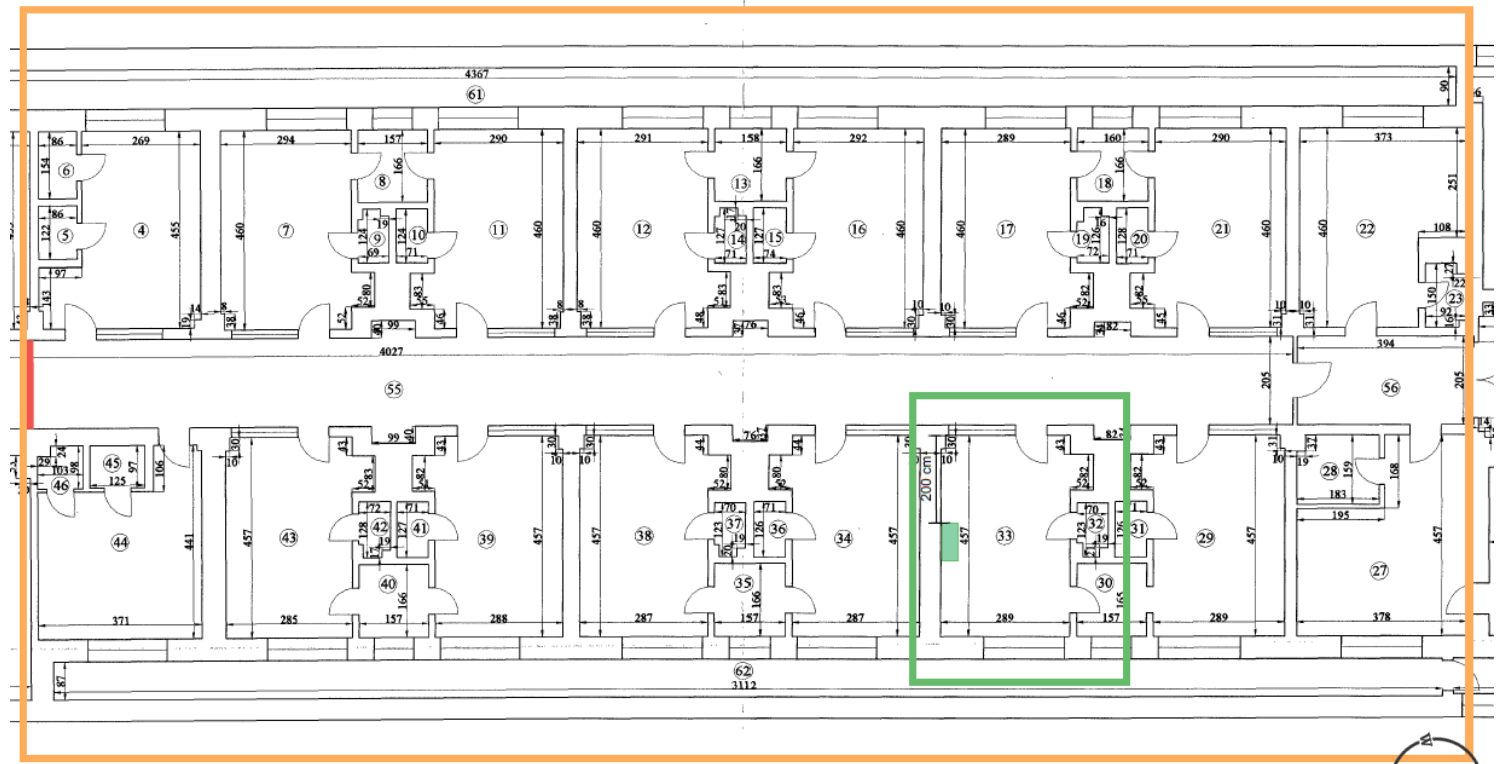
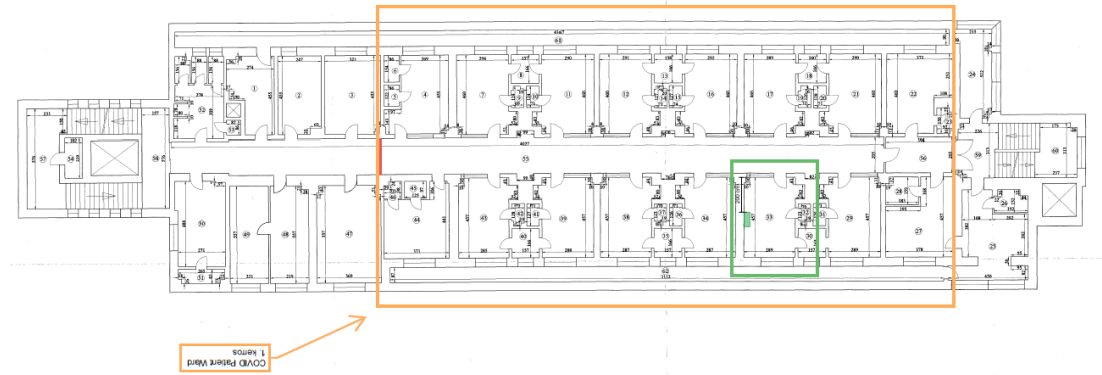
● Air purifier unit



Covid Ward

- Located in the Covid ward building on the Second Floor

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Wielkość: 1:500	Projekt: 10.01.2020
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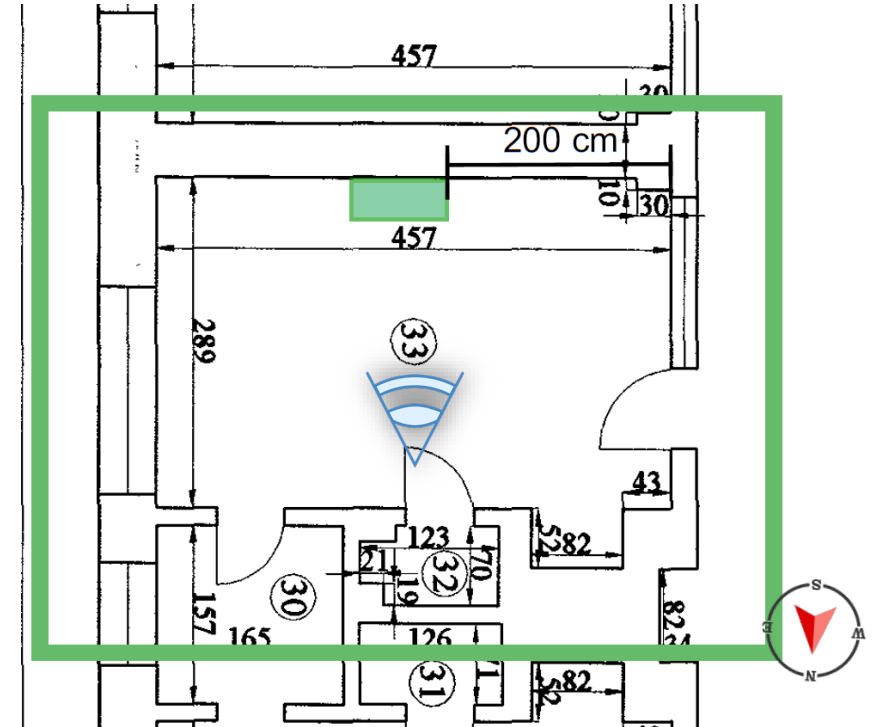


Covid Ward



● Measurement instrument

● Air purifier unit

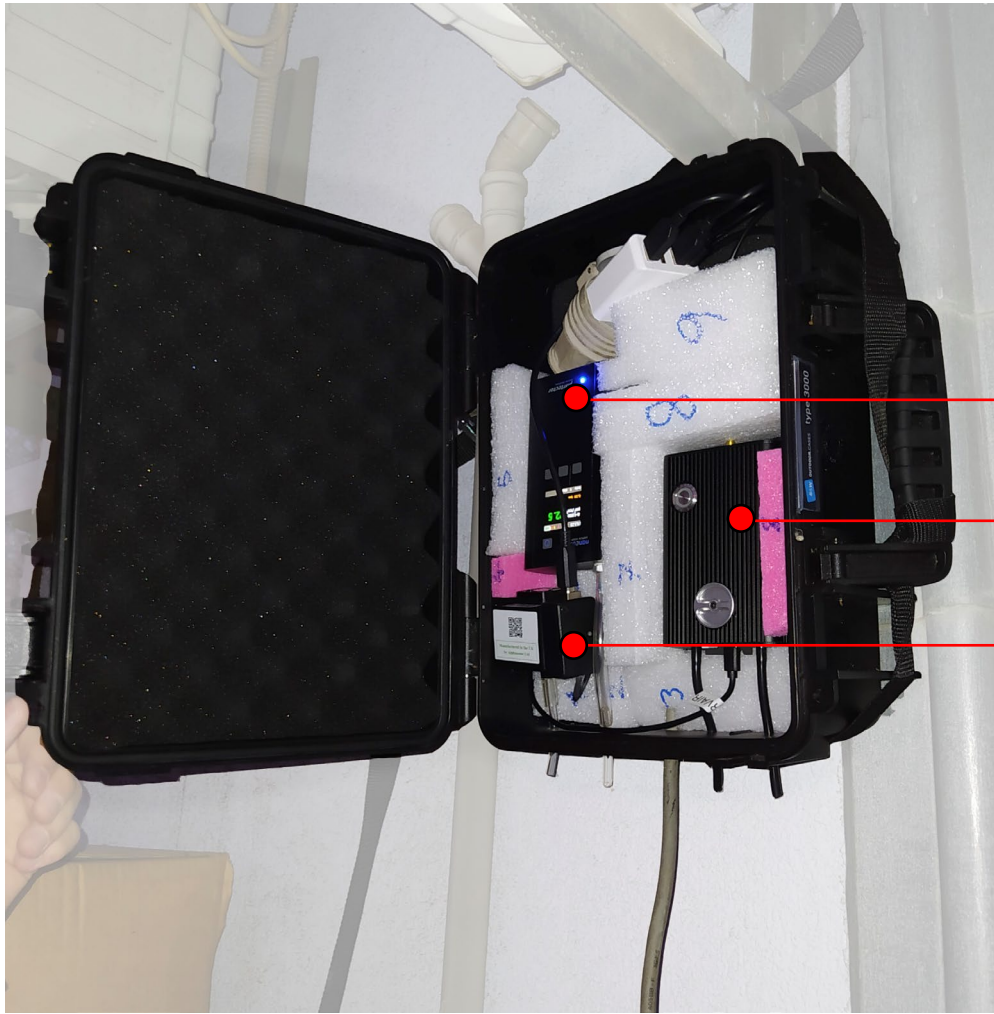


Parameters investigated

- Temperature (T) – (indoor and outdoor)
- Relative Humidity (RH) – (indoor and outdoor)
- Carbon Dioxide (CO₂).
- Particulate Matter (PM₁₀, PM_{2.5}, PM_{1.0}) – (indoor and outdoor)
- Total Volatile Organic Compounds (TVOC).
- Lung deposited surface area (LDSA) – (Indoor and outdoor)
- Black carbon (BC) pollution – (indoor and outdoor)
- Microbiological sampling.
- Airflow rates.
- Air and surface temperature.



Parameters investigated outdoors



Partector - (particle LDSA)

Observair- black carbon

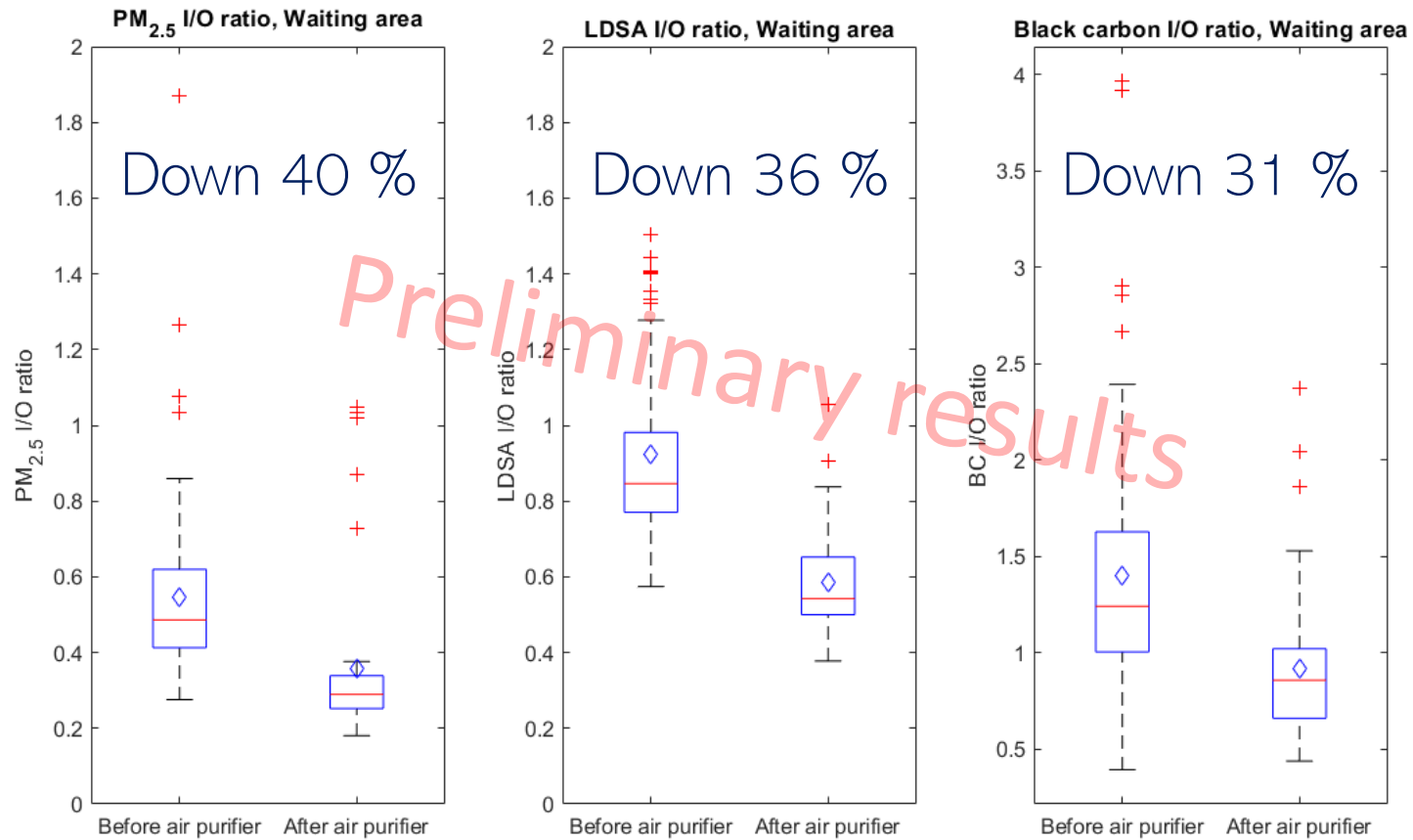
Alphasense - PM1, PM2.5 and PM10

Outdoor HOBO sensor for Temp. and RH



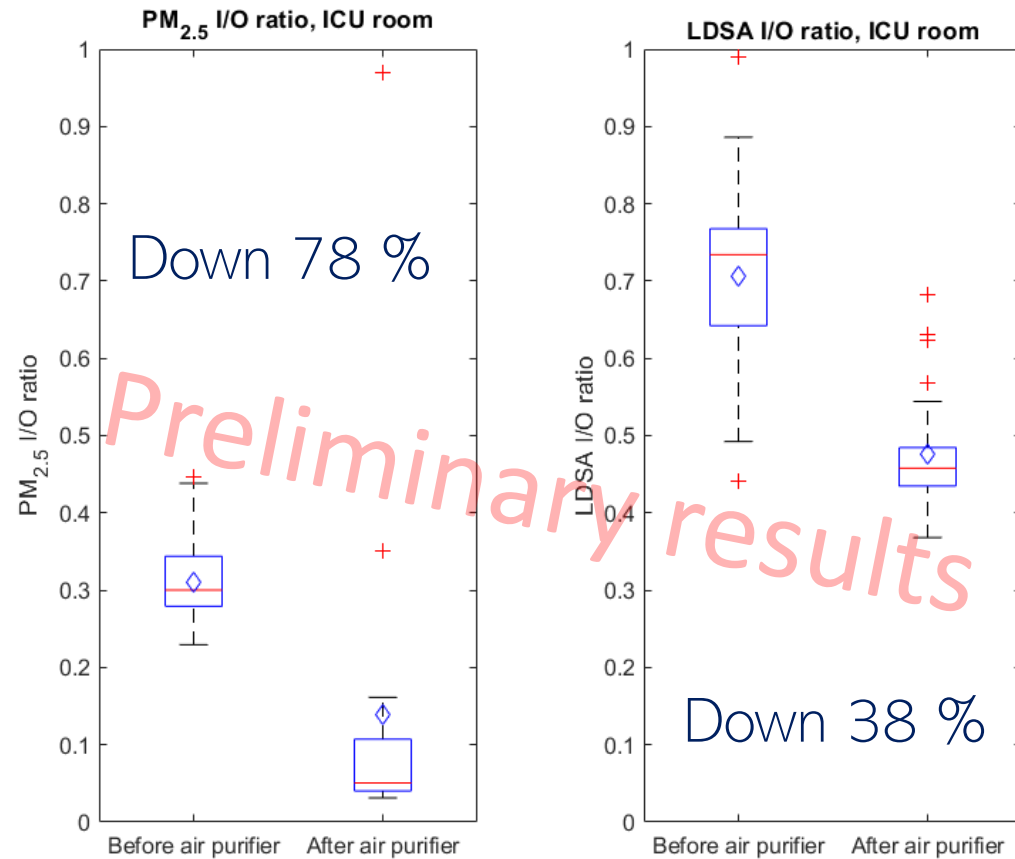
Mounted to a wall in the balcony – 2nd floor – covid section

Preliminary results

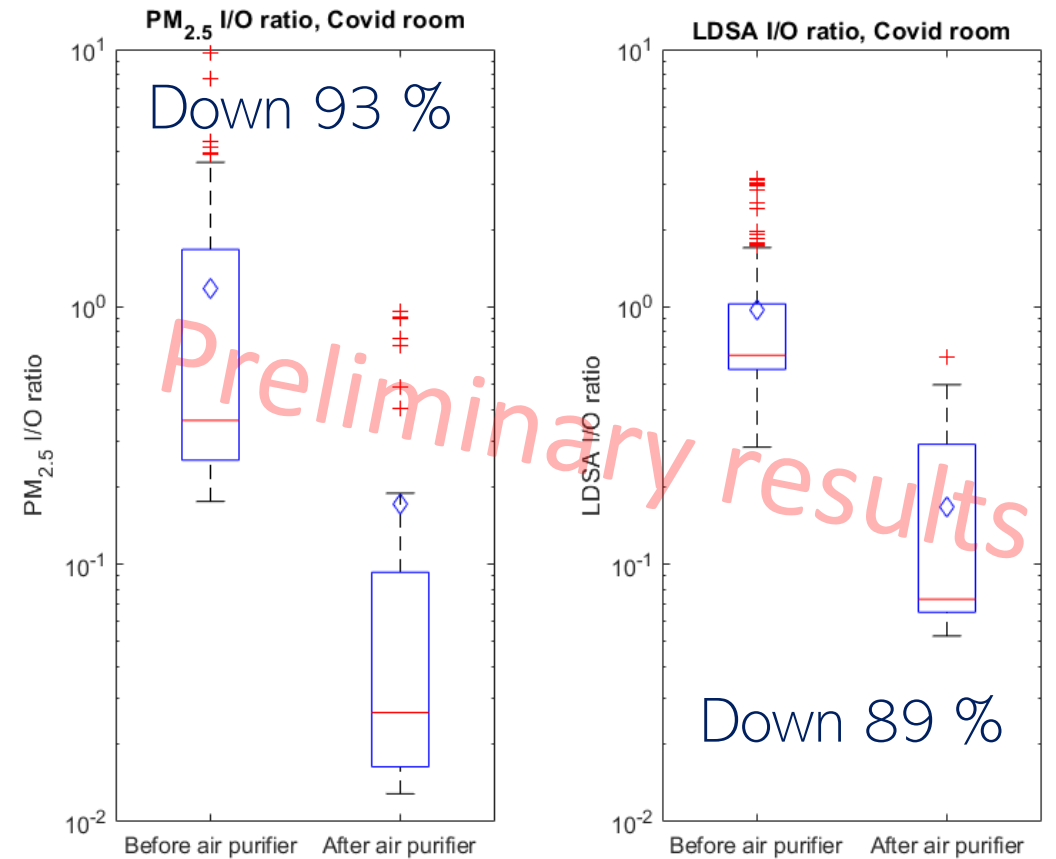


I/O-ratio in the waiting area before and after installing the air purifier. Results are preliminary.

Preliminary results



I/O-ratio in the ICU room before and after installing the air purifier. Results are preliminary.



I/O-ratio in the Covid room before and after installing the air purifier. Results are preliminary.

Conclusions

- Air purifiers were efficient in reducing airborne particulate matter in the naturally ventilated hospital
- Measurements are in a key role when we search for methods to tackle pandemics
 - Learning to know the aerosol means we can develop ways to identify certain parts of it
- We can verify and compare data with simulations, bringing us towards a more complete understanding



Contributors

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Finnish Meteorological Institute: Sami Harni, Hilikka Timonen

Special thanks to:



Thank you to all the partners!

