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HUMANIC CBT3 @Sweden Jan 19-23

Air Distribution Approaches for Reducing Infection Risk in Hospital Patient Rooms: A Chamber Study

PROJECT 101119726 — HumanIC — HORIZON-MSCA-2022-DN-01

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Funded by the European Union

Motivation & Objective

Research gap

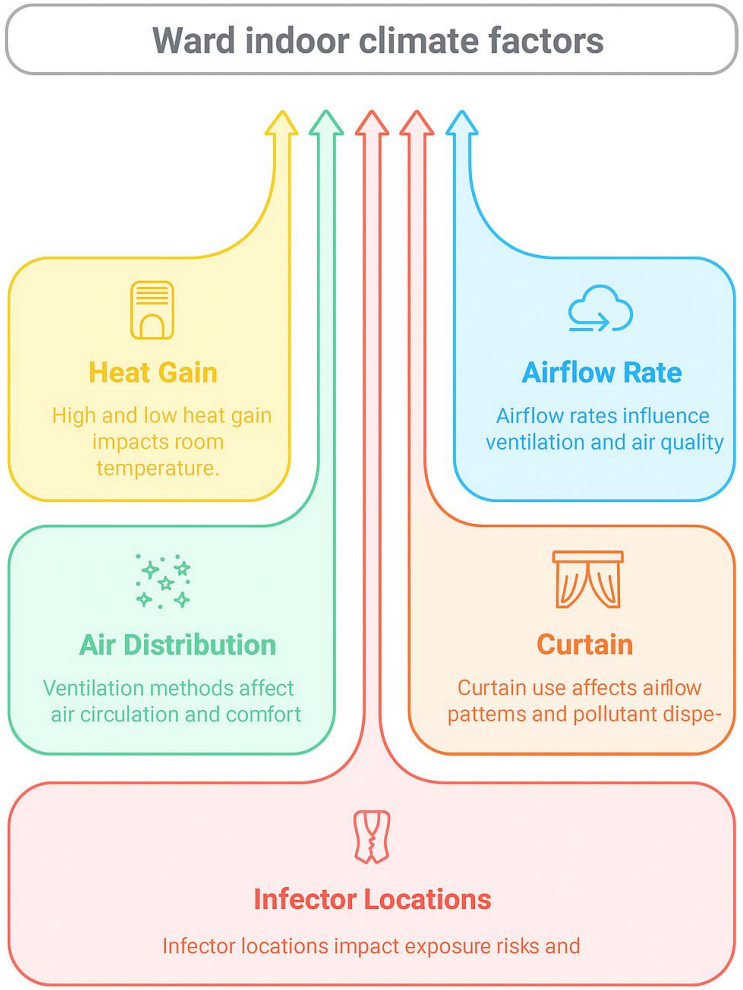
- Limited understanding of air distribution performance for **airborne transmission and exposure risk** under multifactor patient-room conditions

Objective

- Lab experiments in a mock-up **double-bed patient room** (Oulu University Hospital)

Key factors

- Heat gain, airflow rate, air distribution, curtain, infector locations



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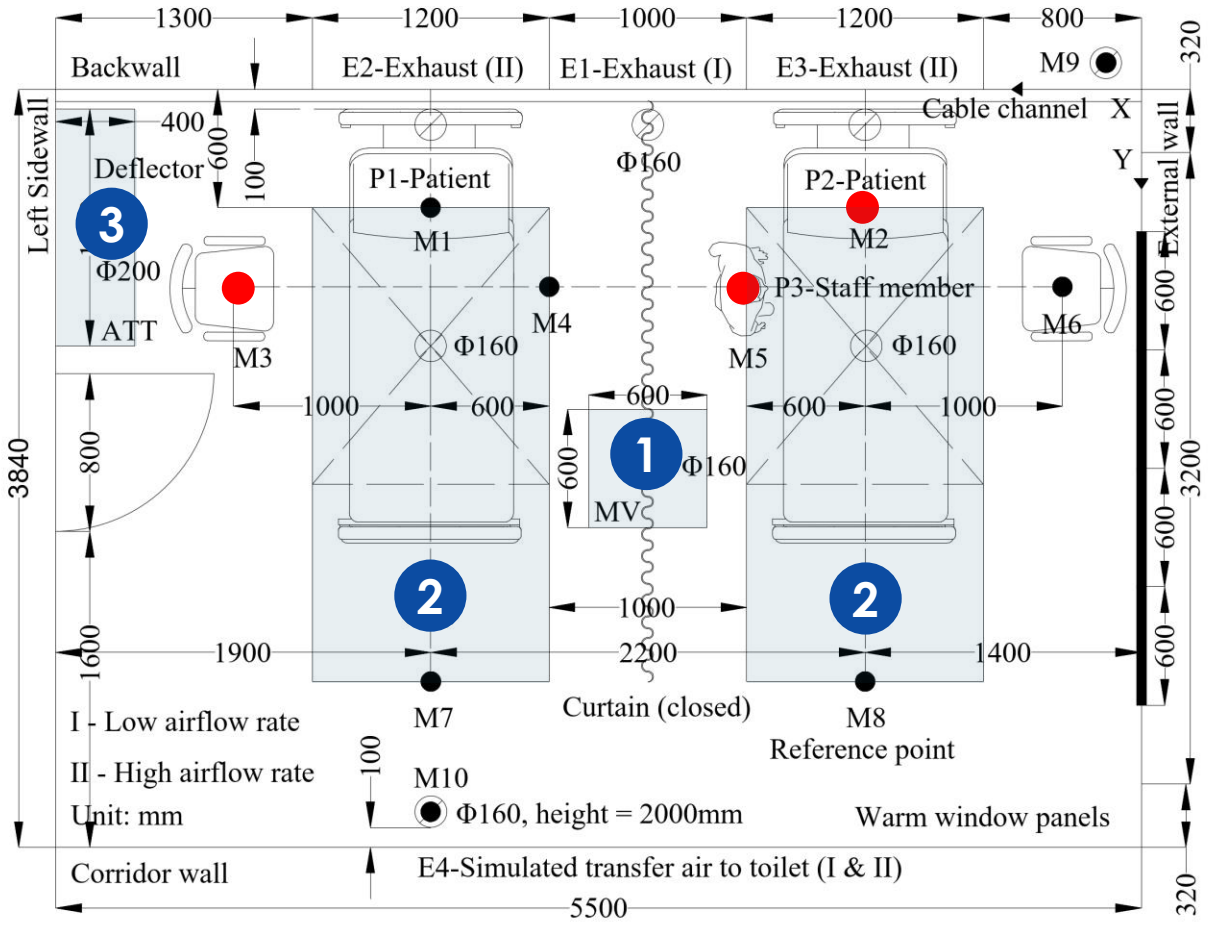
Novelty

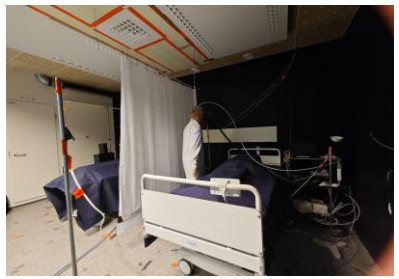


● Infectors' location (manikin) ● Diffusers' location

Room layout

- Linking airflow patterns to three infector locations (lying patient, standing staff, sitting visitor).
- Three air distribution methods: Mixing ventilation (**MV**), Occupant-targeted ventilation (**OTV**), and Attachment ventilation (**ATT**)
- Three diffusers (1-multi-nozzle diffuser; 2-protective airflow panel; 3-perforated duct & plate) applied in occupied zones.

lying patient



standing staff

sitting visitor

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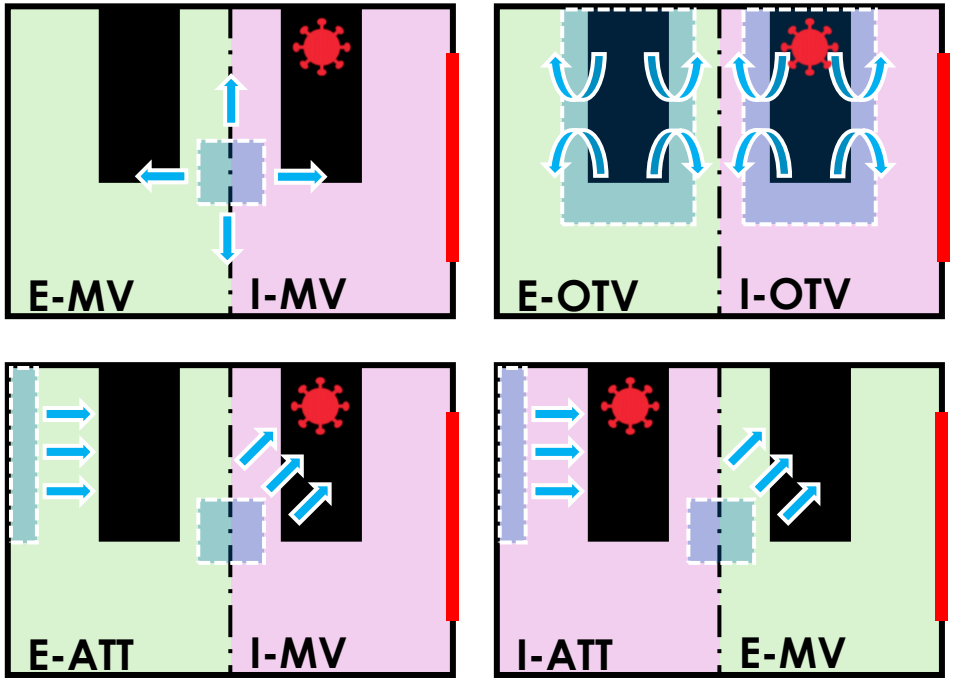
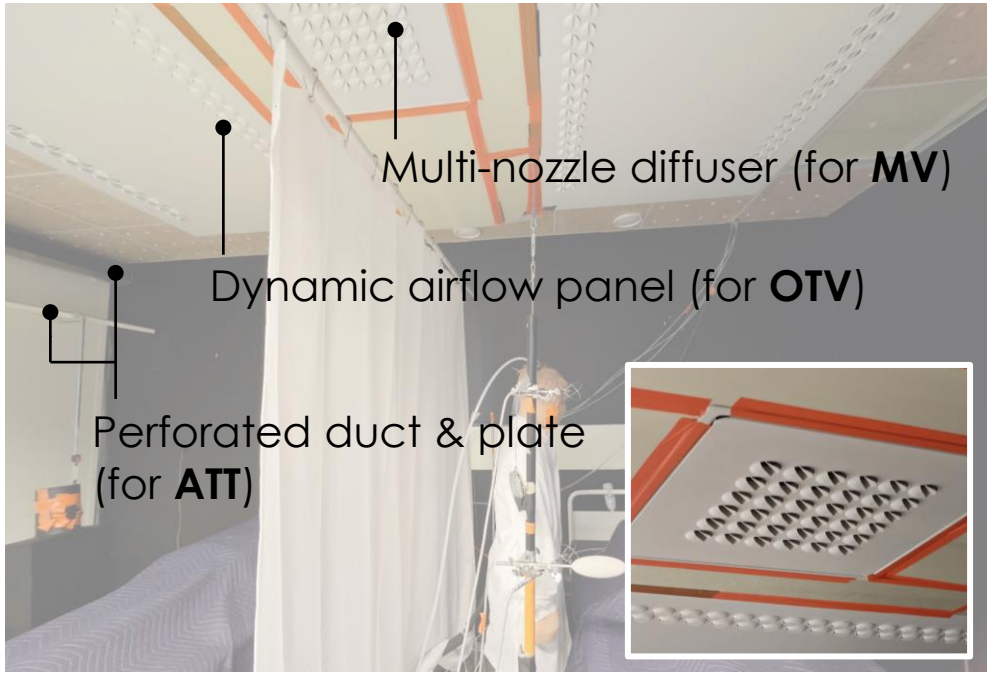
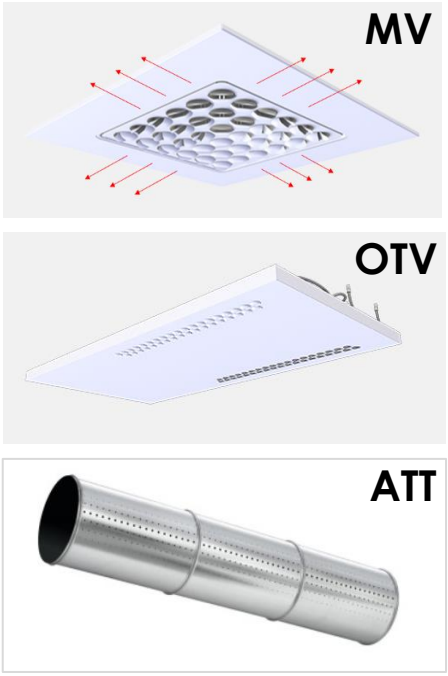
Novelty

Air distribution methods







- Mixing ventilation (**MV**)
- Occupant-targeted ventilation (**OTV**)
- Attachment ventilation (**ATT**)

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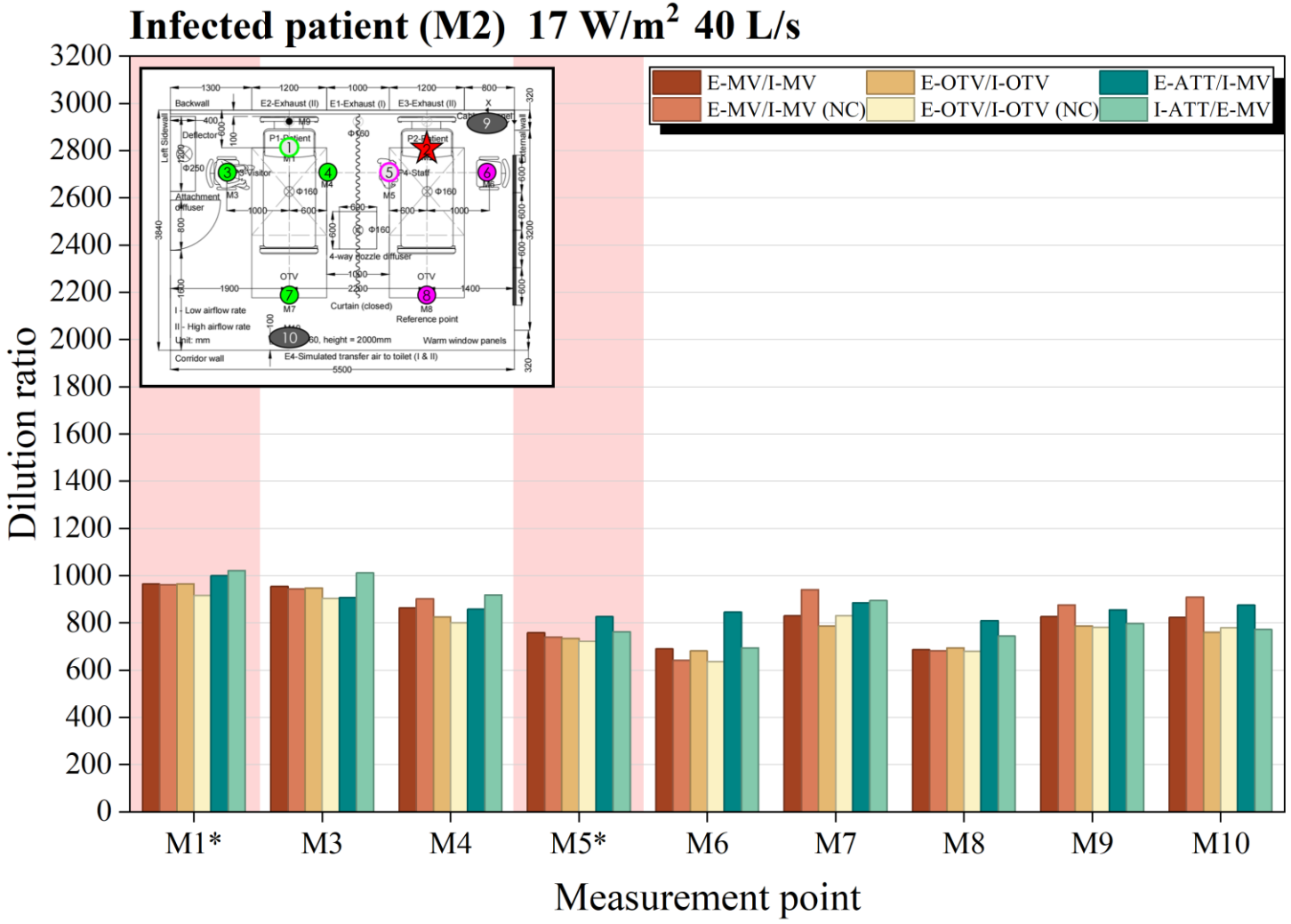
Key Findings



- At a low airflow rate (40 L/s), the **dilution ratio** remained constant across measurement points.
- Air distribution showed similar performance at each measurement point.

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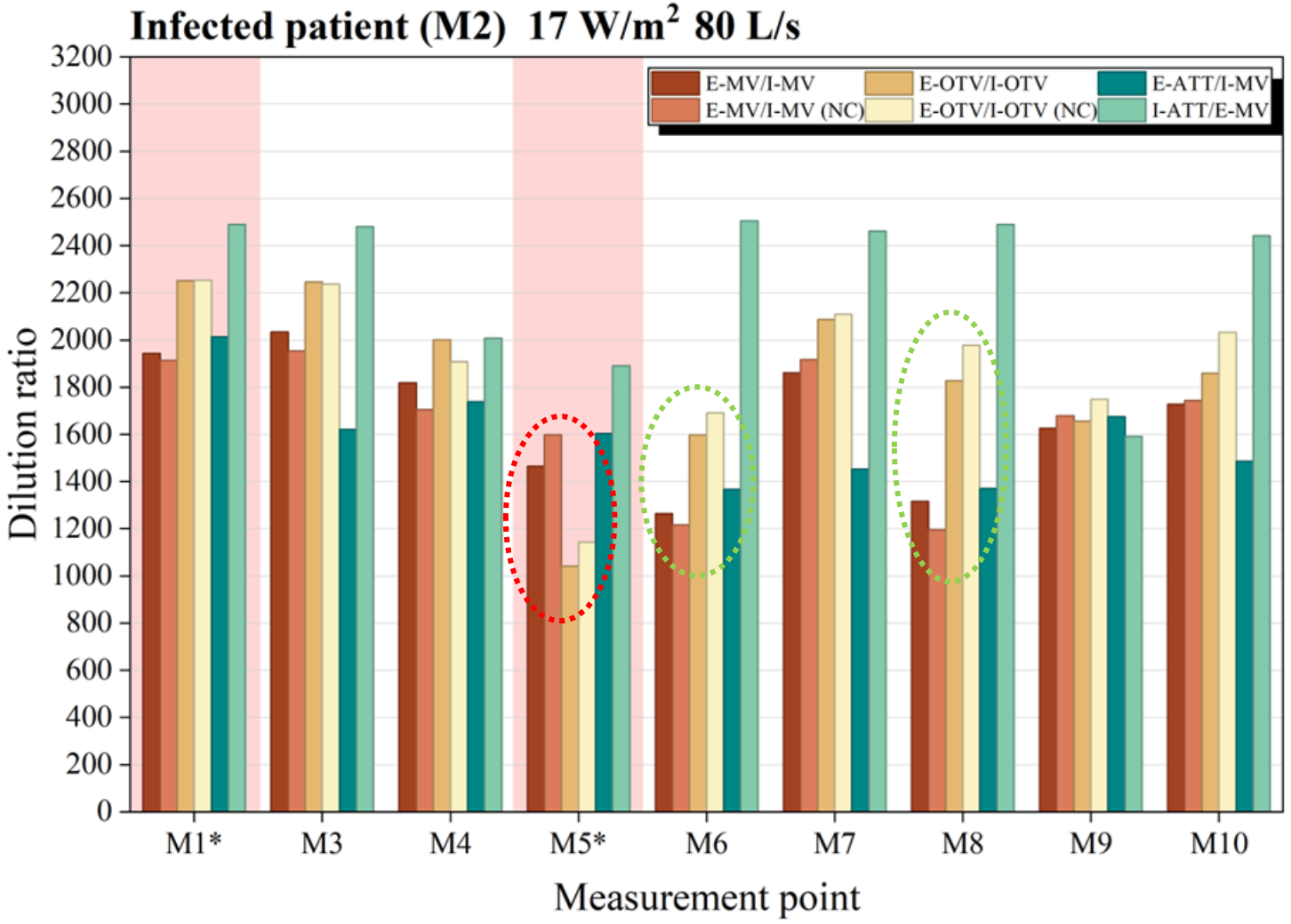
Key Findings



- Higher airflow rates (80 L/s) significantly increased dilution ratios across measurement points.
- Attachment ventilation (**ATT**) using I-ATT/E-MV achieved the highest dilution at M1 and M5 (dummies).
- Occupant-targeted ventilation (**OTV**) generally outperformed mixing ventilation (**MV**), with M5 affected by space.

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Thank you! *@Sweden Jan 19-23*

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