

Progress Report-DC6

Airflow and contaminant real-time visualization with CFD simulation for the hospital operating rooms

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2026.01

Topic:

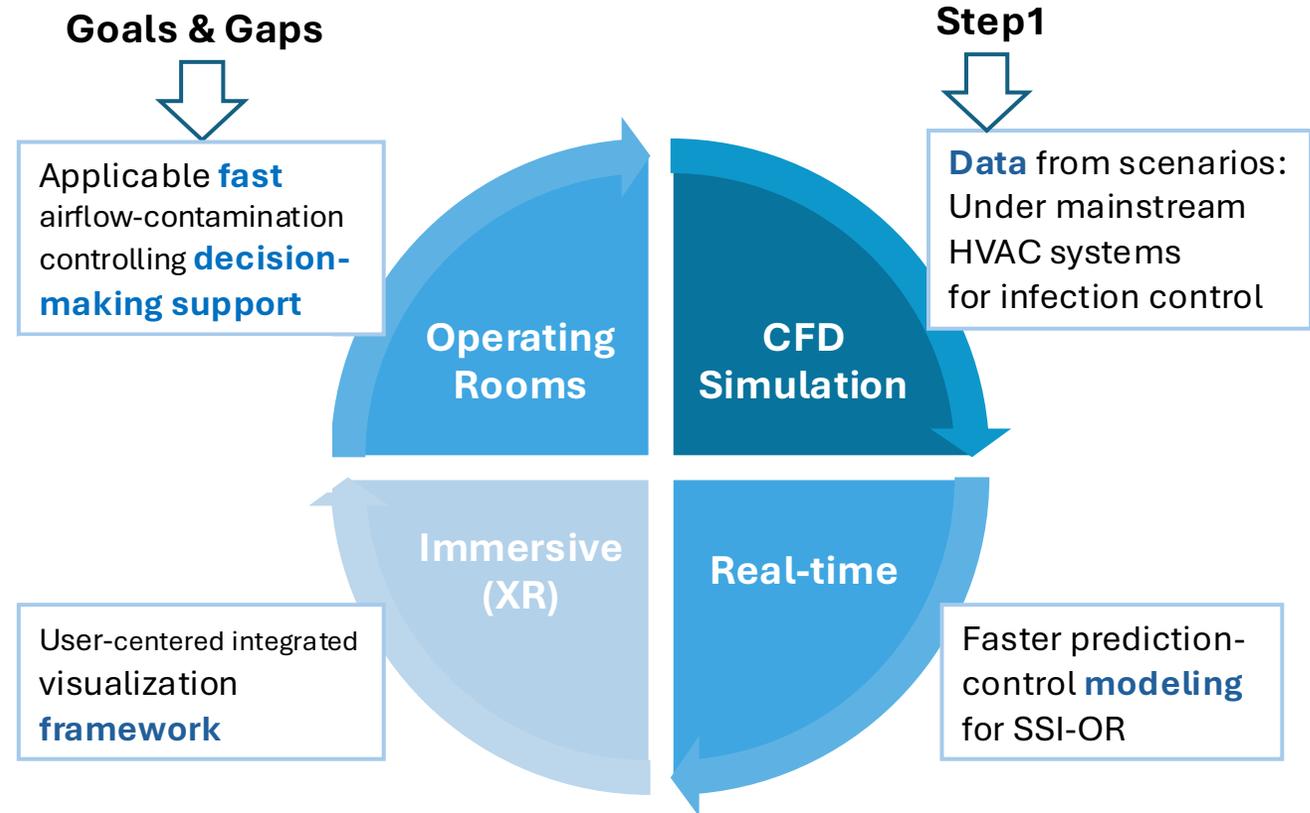
Airflow and contaminant real-time visualization with CFD simulation for the hospital operating rooms

Research Questions:

- **(Main)** Is there any possible method to speed up the simulation to support “real-time”(fast) control in operating rooms(OR) for surgical site infection(SSI)?
- **(Secondary)** How can the method be integrated into a user-friendly workflow for indoor air control in ORs?

Research status:

- Literature review for gaps/problems
- Solutions to gaps/problems

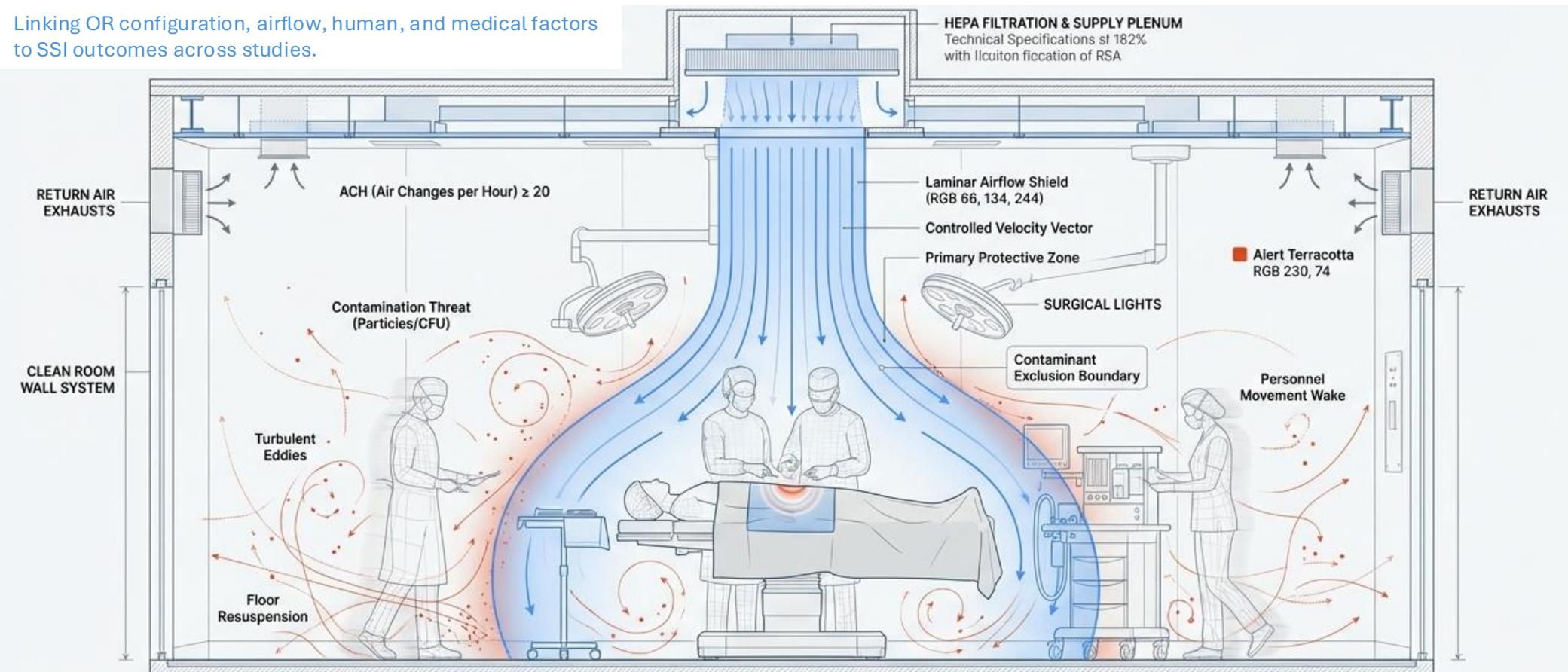


Step1: Data

For datasets preparation (Conference paper, Indoor Air 2026 in Singapore):

Quantitative assessment of key factors on infection risk for data-driven modelling in hospital operating rooms

Linking OR configuration, airflow, human, and medical factors to SSI outcomes across studies.



- **Configuration:** non-/SSI zones, dimension, doors
- **Airflow:** HVACs, filtration, ACH, velocity, flow style
- **Human:** patient(blankets), staff(gesture, number, movement, location)
- **Medical:** surgery devices/settings, sterile devices

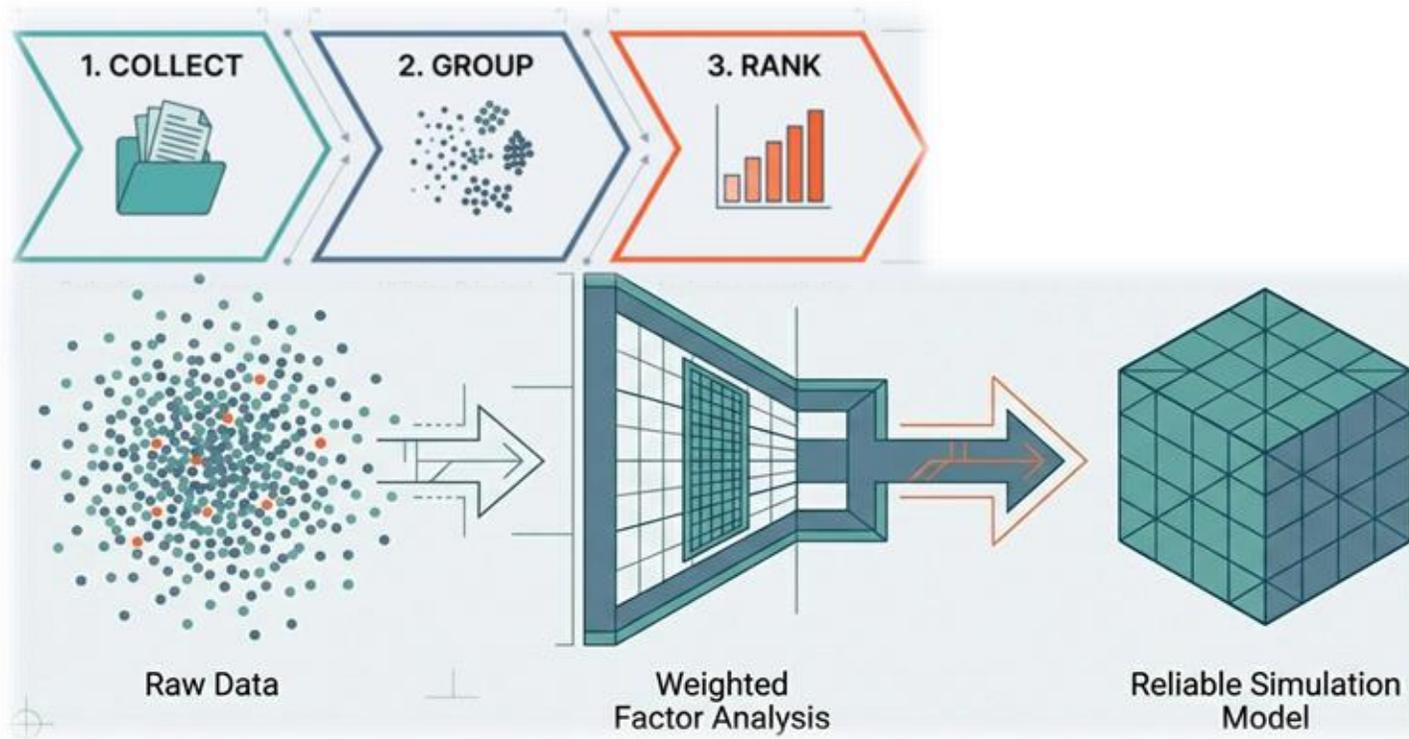
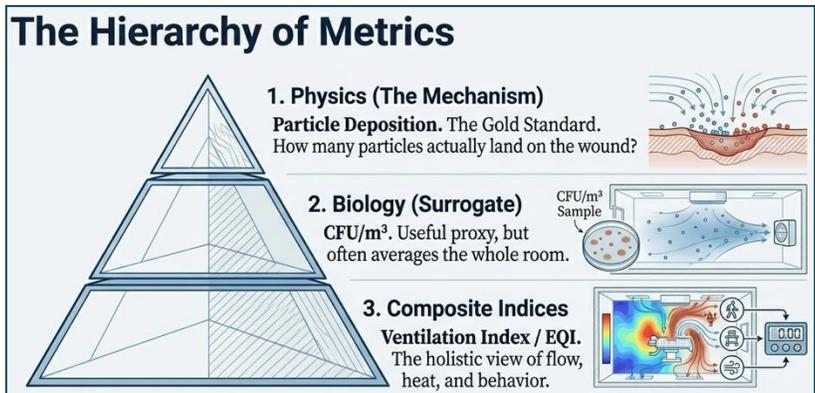
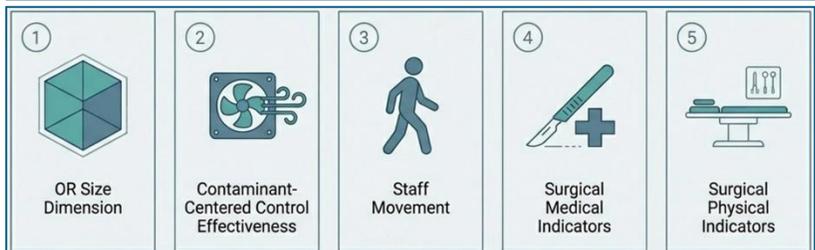
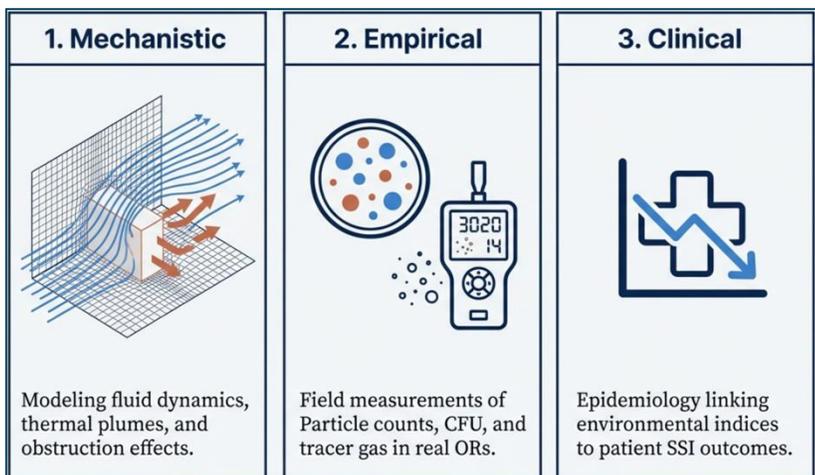
Source Serif Pro
A synthesis of Computational Fluid Dynamics (CFD),
Field Experiments, and Epidemiological Data.

Air Velocity: 0.2-0.4 m/s at Table Level
Positive Pressure Differential: +2.5 Pa

Reference

(Fang, IA2026)
Quantitative assessment of key factors on infection risk
for data-driven modelling in hospital operating rooms)

Step1: Data



Step 1 (IA 2026 conference paper) confirms the influence of specific factors, providing a 'reliable quantitative reference' for preparing CFD simulation-based datasets. It serves as a practical guide for the modelling process.

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