A Multidisciplinary Research Talk

The Unseen Airflow

Exploring the Impact of Portable Fans on Airborne Particle Dynamics in Healthcare.

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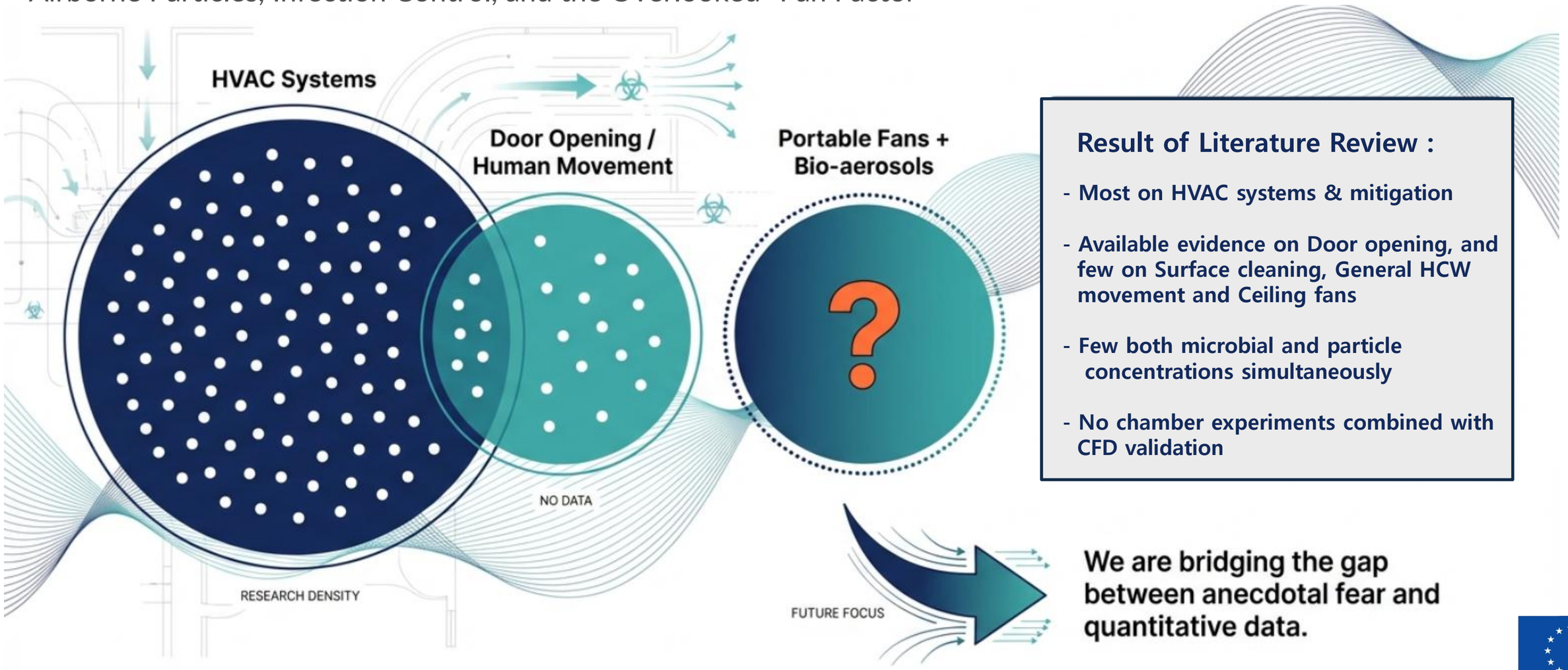
Research background and the Unexplored Gap

Airborne Particles, Infection Control, and the Overlooked "Fan Factor"



Result of Literature Review :

- Most on HVAC systems & mitigation
- Available evidence on Door opening, and few on Surface cleaning, General HCW movement and Ceiling fans
- Few both microbial and particle concentrations simultaneously
- No chamber experiments combined with CFD validation

HumanIC project has received funding from the European Union's Horizon Europe research and innovation program under the Marie Sklodowska-Curie (HORIZON-MSCA-2022-DN-01, project no 101119726

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Research background and the Unexplored Gap

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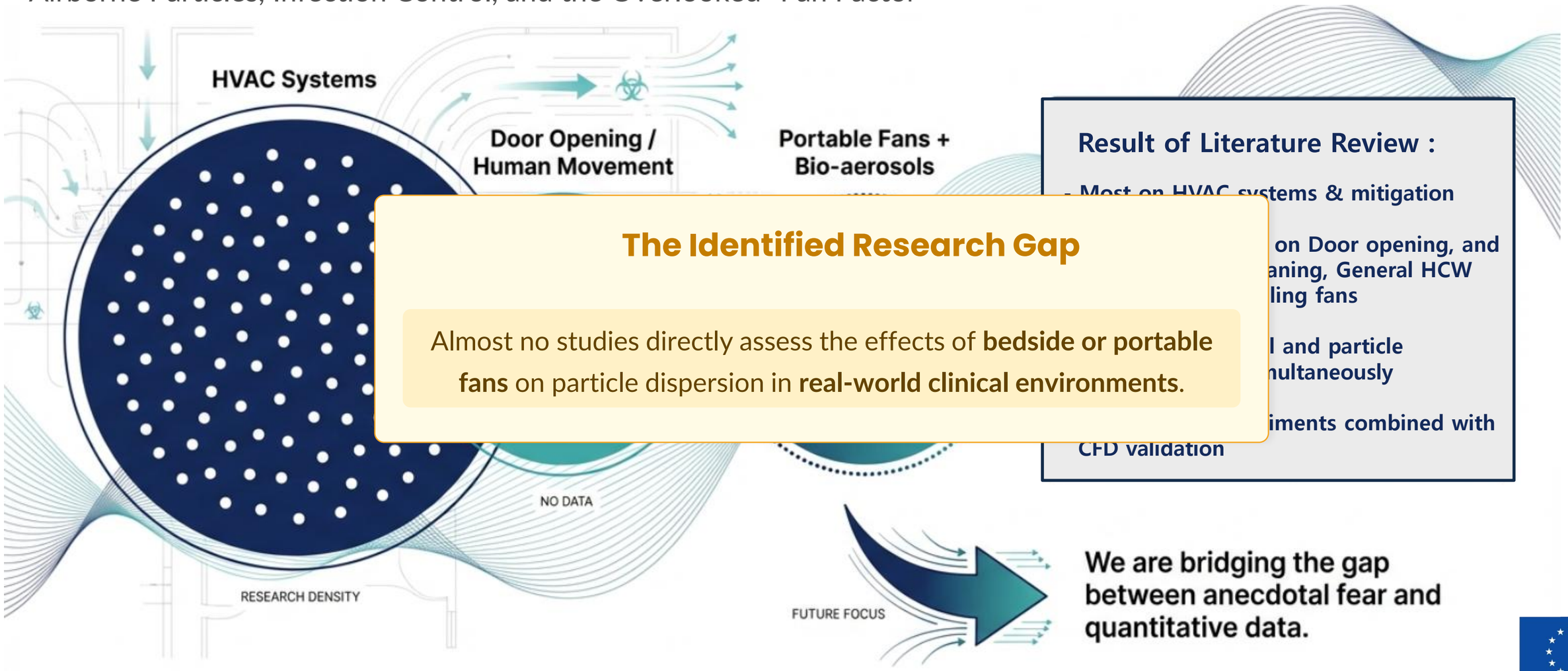

The Identified Research Gap

Almost no studies directly assess the effects of **bedside or portable fans** on particle dispersion in **real-world clinical environments**.

Result of Literature Review :

- Most on HVAC systems & mitigation
- on Door opening, and aning, General HCW ling fans
- l and particle ultaneously
- iments combined with CFD validation

We are bridging the gap between anecdotal fear and quantitative data.

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Why This Gap Matters: The Clinical Context

Airborne Particles, Infection Control, and the Overlooked "Fan Factor"

THERMAL COMFORT

Climate Reality

Climate change increases ward **heat-illness risk** and highlights the need for **energy conservation**

Anecdotal Alerts

Fan-risk warnings rely on **sparse opinion/case reports**, not systematic evidence

Policy Vacuum

Major public health bodies (WHO, CDC) provide **no clear, evidence-based fan guidance**

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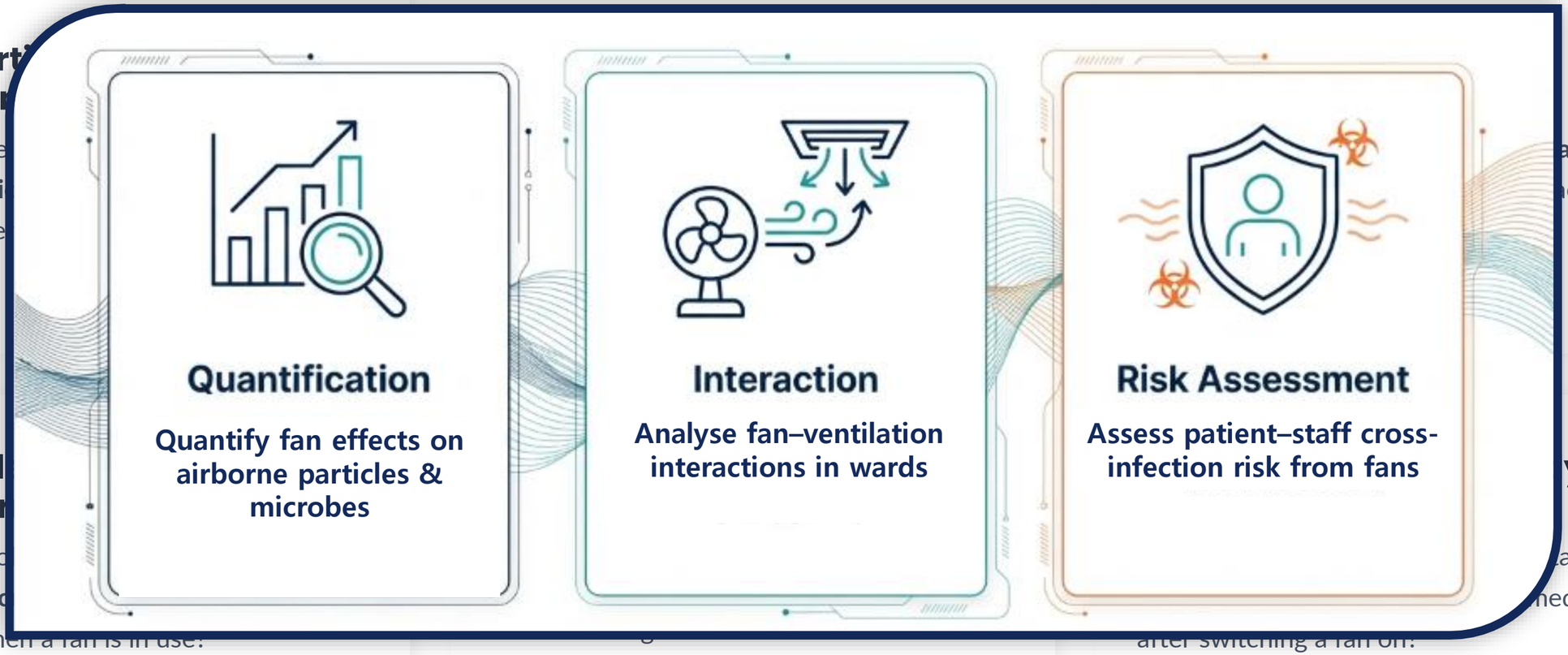
Key Research Objectives

Defining What We Need to Learn About Fans and Airborne Particles



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Planned Experimental Design

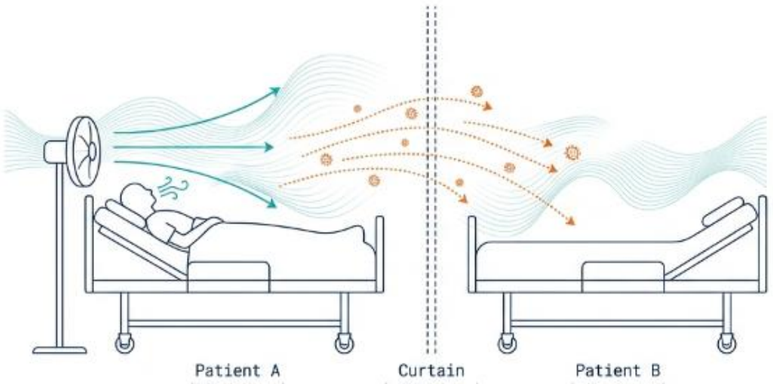
An integrated approach combining physical experiments and computational modeling.

1. Experimental setup (Leeds)

Mock patient room

Key variables

- **Existence & type of fan** (bladed/bladeless)
- **Location of fan**
- **Curtain existence**
- **ACH**



2. Aerosol experiments & Data collection

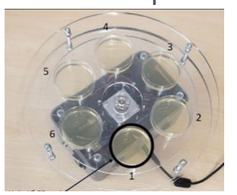
Set 1: Particle concentration

Salt aerosol
Optical Particle Counter

Set 2: Bioaerosol concentration

Assessment of infection risk and surface deposition using surrogate bioaerosols

AMPAS : surface deposition
MB2: air concentration



Quantitative Microbial Risk Assessment(QMRA)

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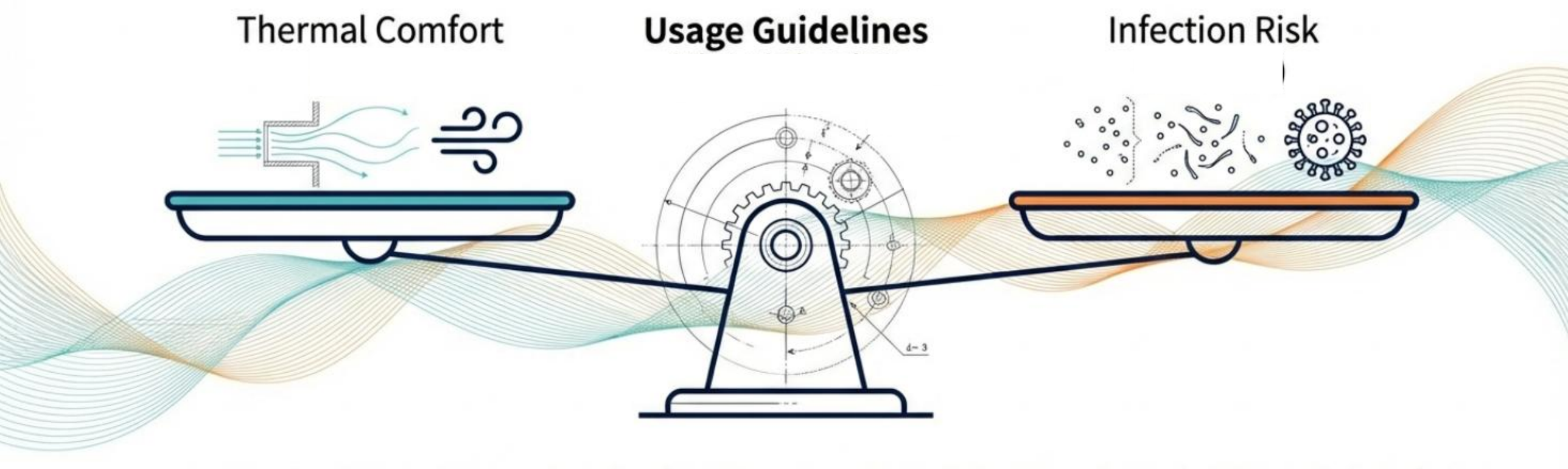
Expected Research Results

Why This Research Matters: Pioneering Insights for Safer Healthcare



Collect: particle & microbe concentrations · local fan airflow · transmission risk estimates

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Expected Impact and Broader Relevance

Why This Research Matters: Pioneering Insights for Safer Healthcare

Global Standards

Evidence-based foundation for guidelines on the use of portable fans in hospital settings

Climate-Ready Hospitals

Inform the development of climate-adaptive hospital policies (Type of fan, placement)

Stakeholder Safety

Actionable safety protocols for patients, caregivers, and healthcare workers

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Closing Summary and Q&A

Key Takeaways and Opportunity for Collaboration

My Research Solution

This research will directly address the gap by:

Measuring: Quantifying airflow and airborne particle dispersal from fans in realistic hospital settings.
Modeling: Developing computational models to predict infection risk under various conditions (e.g., single vs. double rooms, ventilation rates).
Guiding: Producing clear, data-driven recommendations for safer fan use in healthcare environments.

Let's Connect

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Questions?

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