Improving Hospital Design

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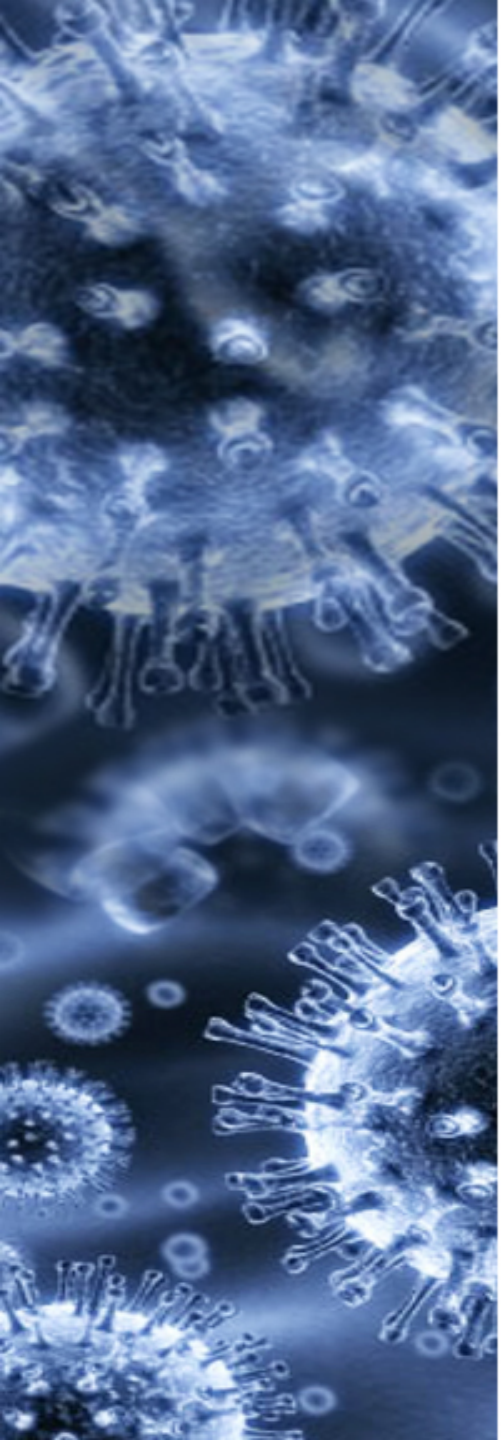
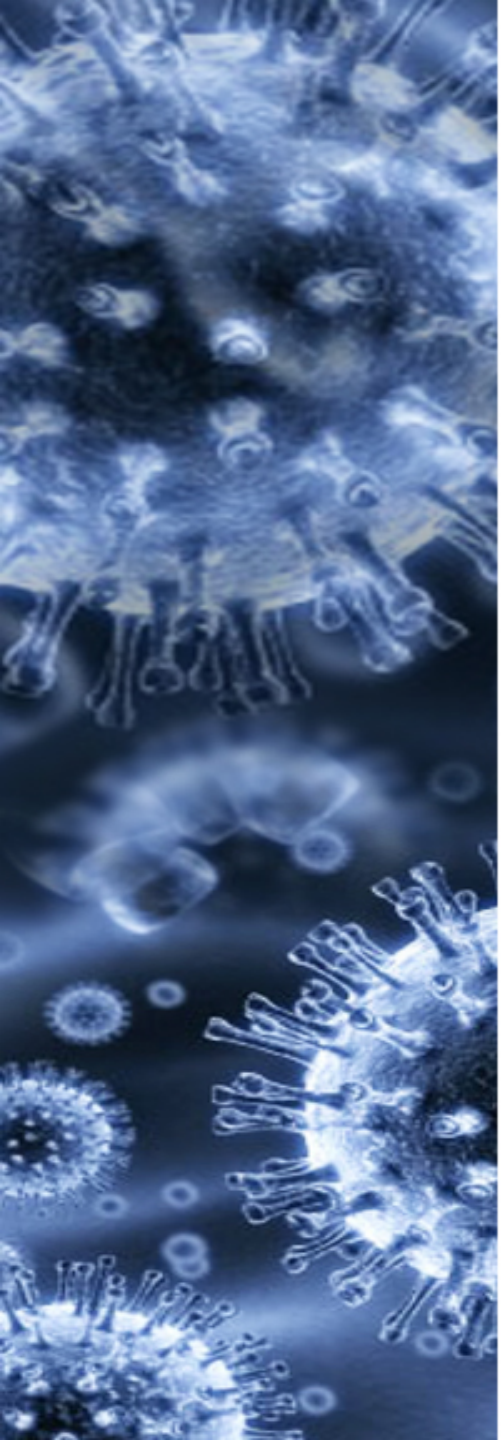


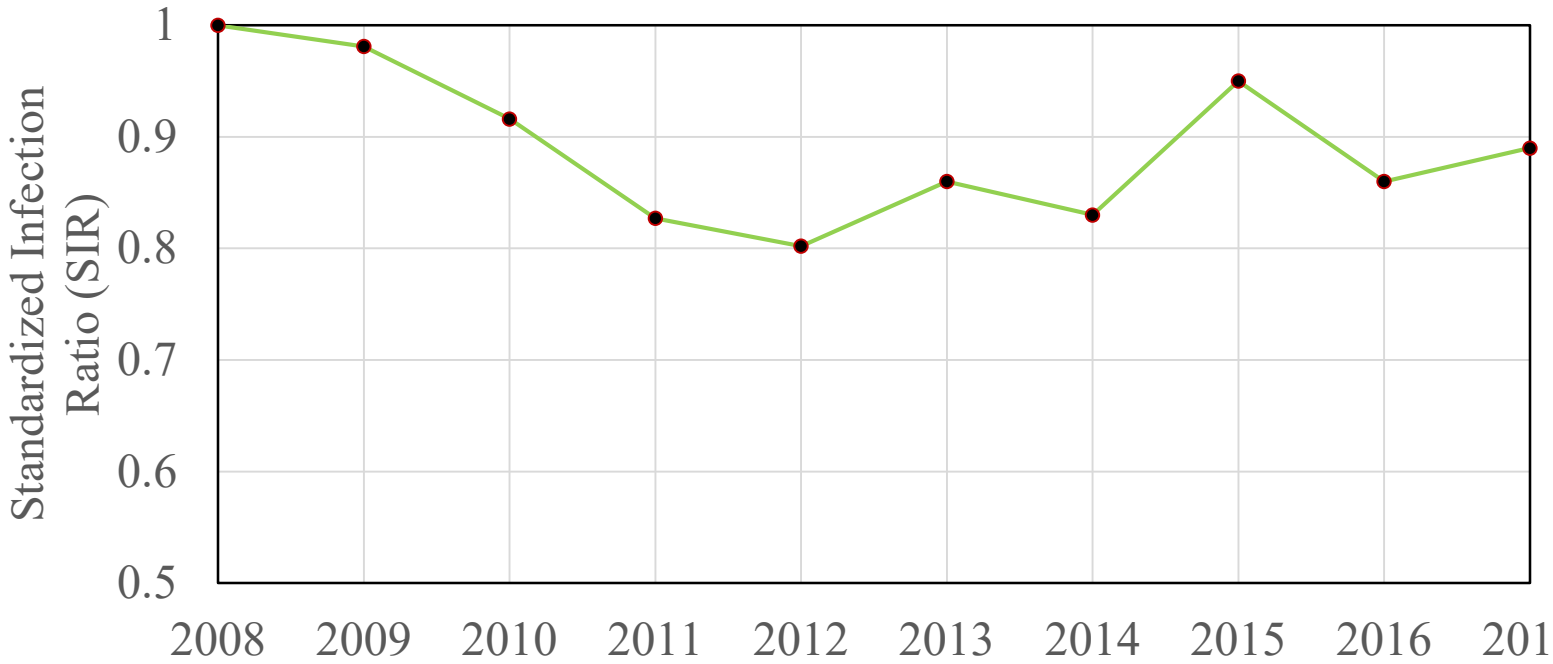
Outline

- Background and Motivation
- Smart Design
- Next Levels of Smart



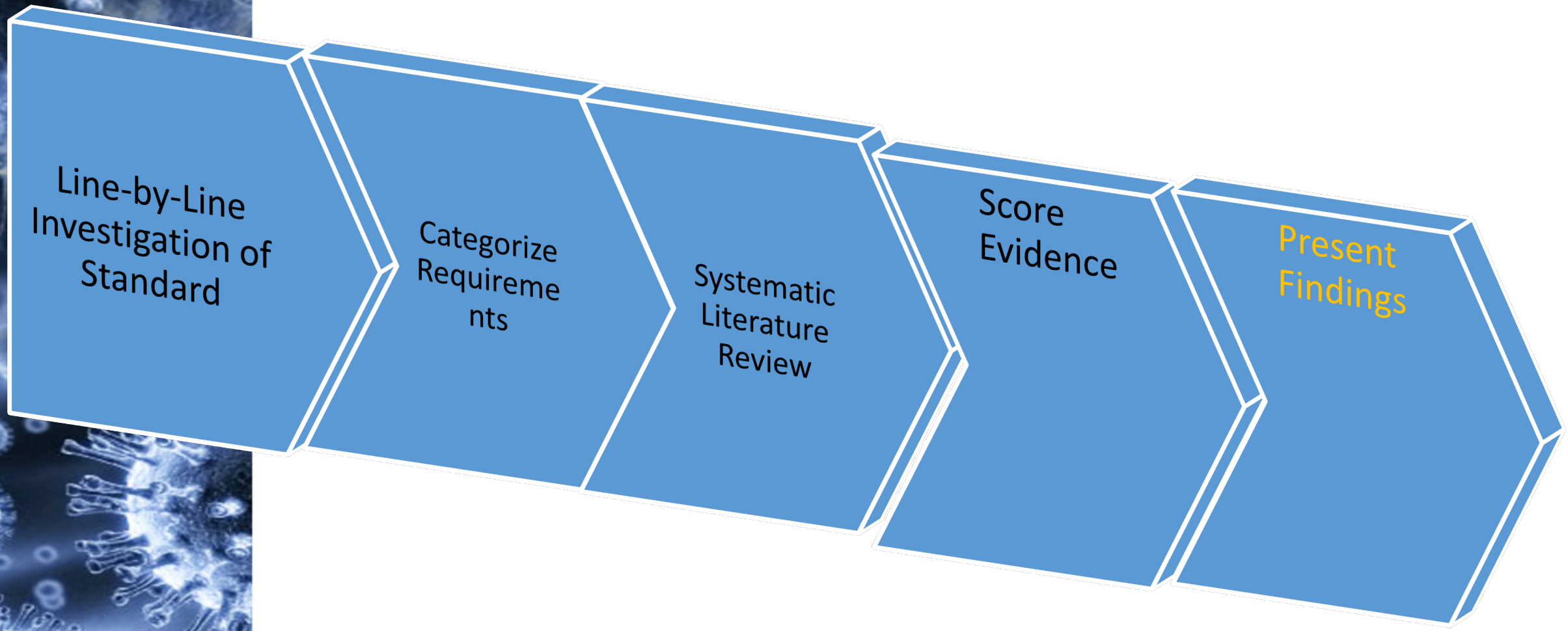
Background and Motivation

- Status-quo of Healthcare HVAC Design
  - HCF consume x5 office buildings
  - The design is generally not load driven
  - Infection transmission is not declining



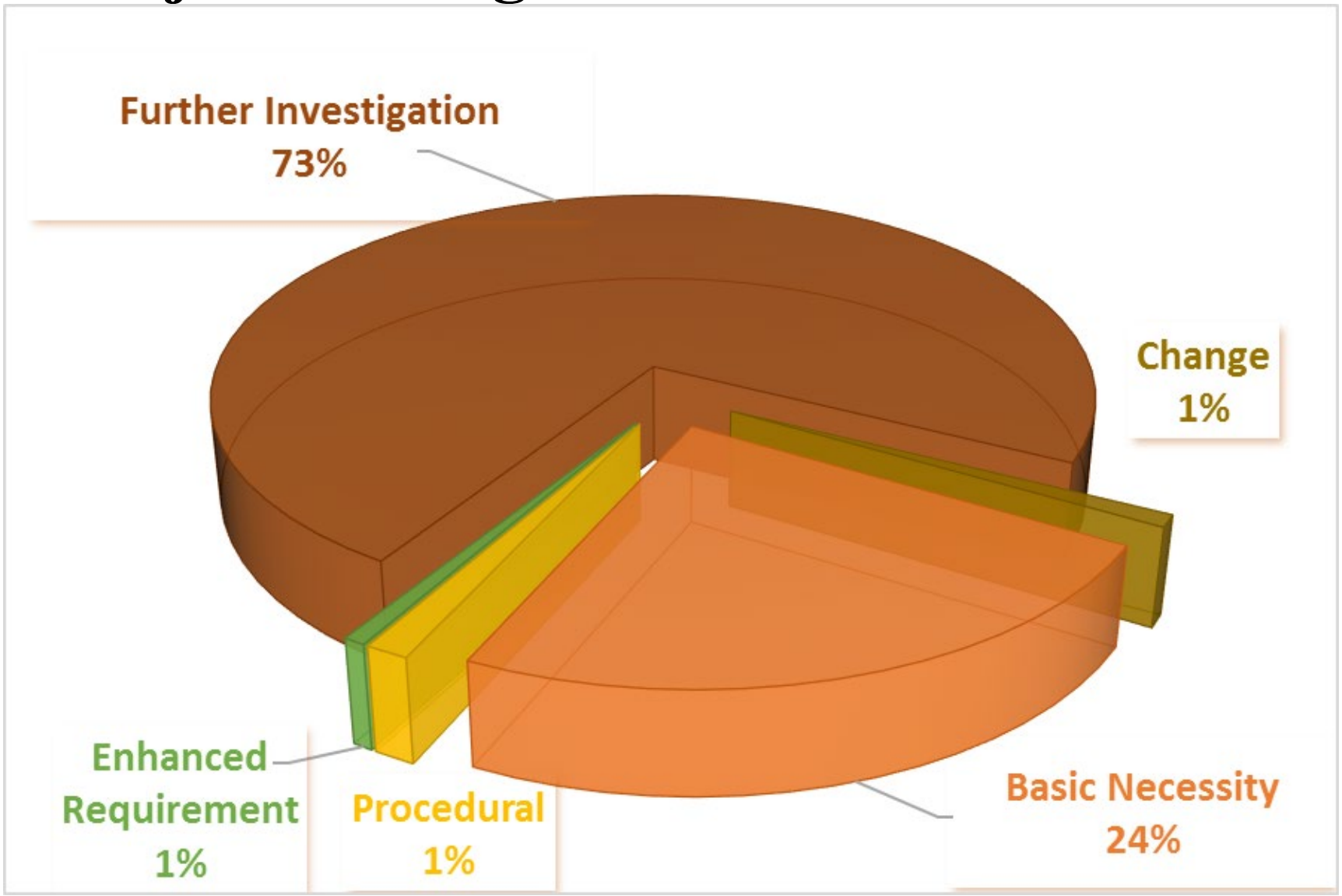
National and State Associated Infections Progress Report, CDC, 2008 thru 2017

ASHRAE Research Project



Mousavi, Betz, Lautz, Review of ASHRAE Standard 170, (2019) ASHE Monograph

Major Finding



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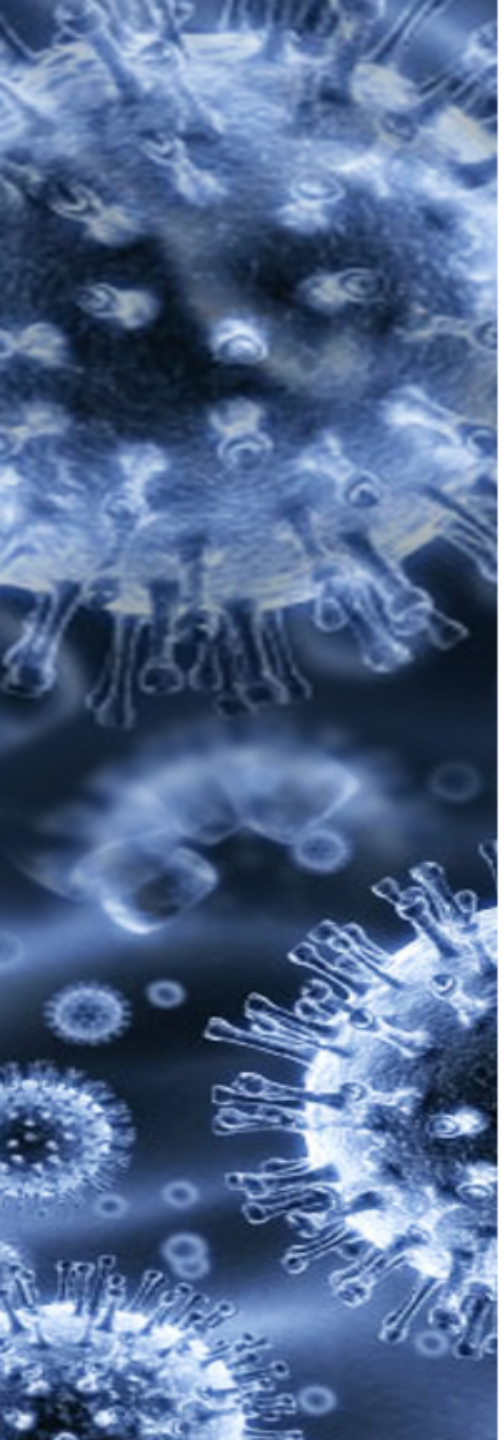
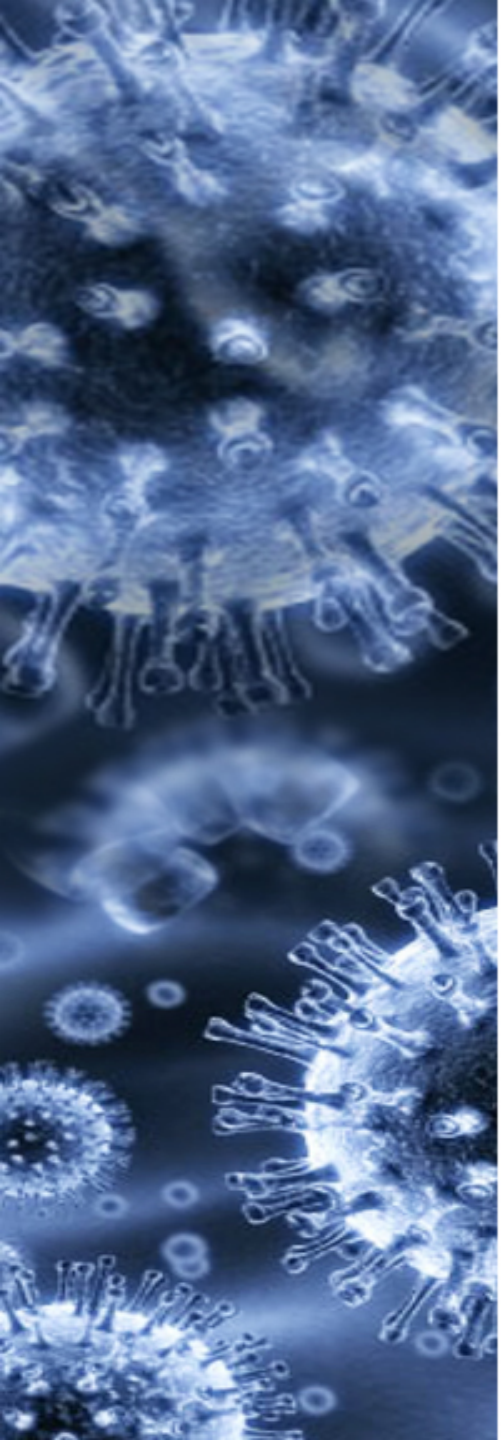


Event Based Modeling

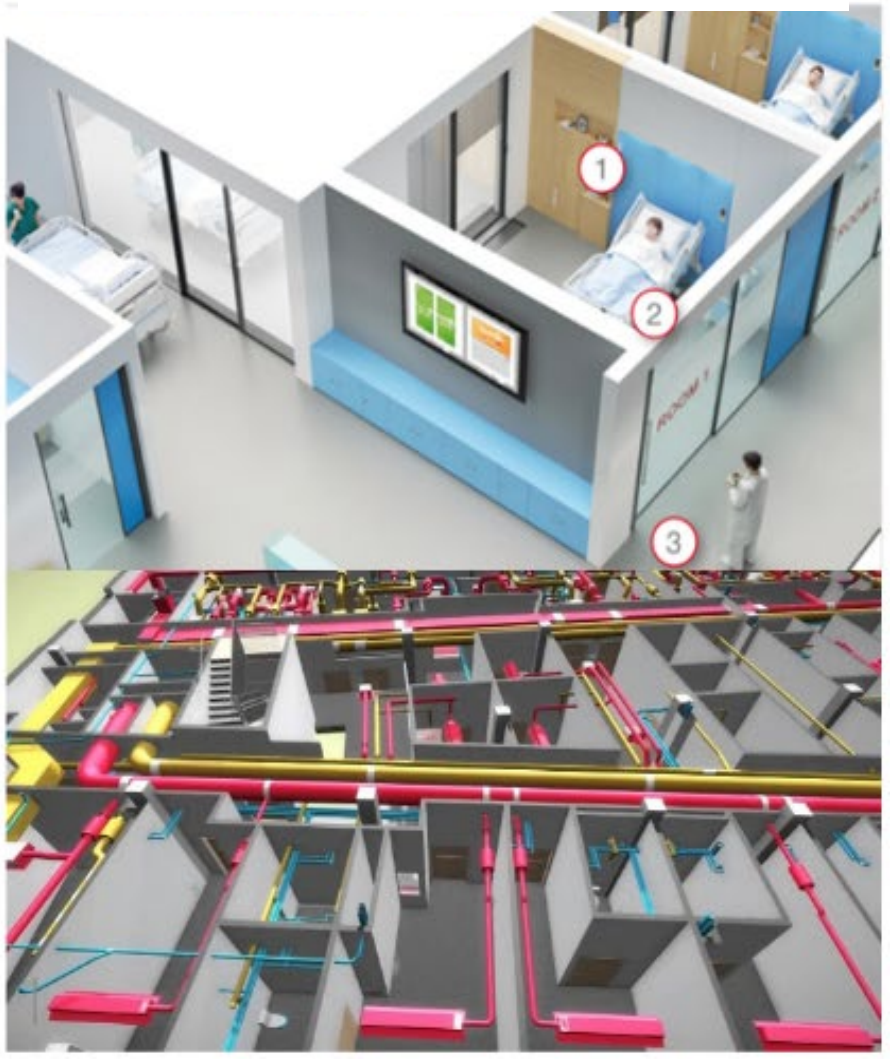
- A ***National Science Foundation*** (NSF) project in collaboration with the ***Center for the built environment*** (CBE) at UC Berkeley.

- **EBM** is a numerical tool aiming to ***approximate*** realistic indoor airflow patterns (subsequently pathogen movement patterns) when ***human-environment interactions*** are not ignored.

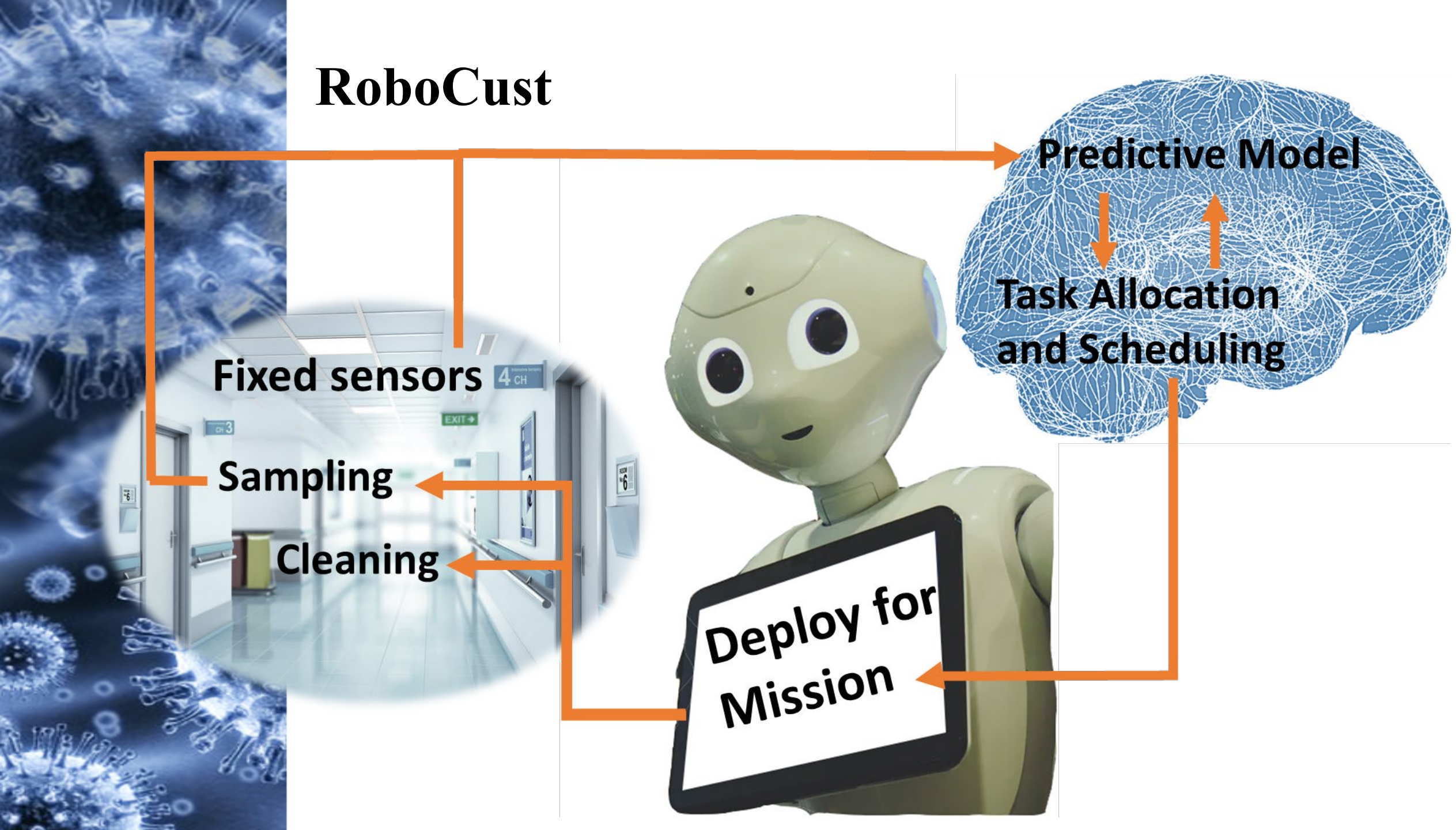


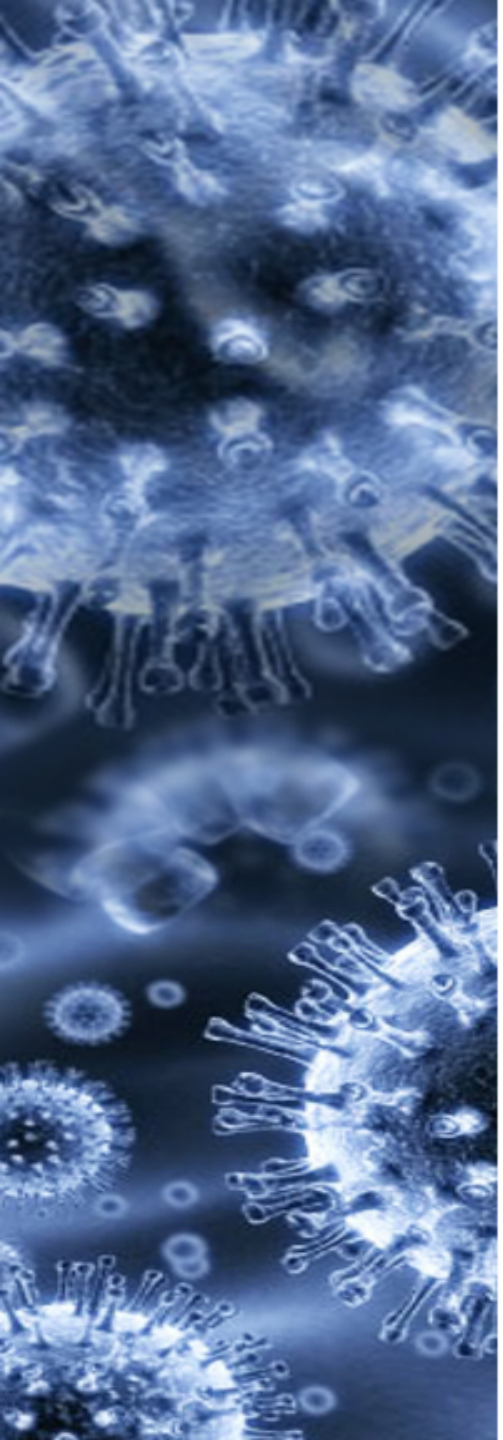
Wishful thinking -What is the future like

Smart HVAC Design



RoboCust


Predictive Model
Task Allocation and Scheduling
Fixed sensors
Sampling
Cleaning
Deploy for Mission



Takeaways

- We need to work ***collaboratively across discipline*** for achieve the desired results.

- Current Technology accounts for ***room geometry***, but can we take this to the next level
  - *Contamination probability*
  - *Optimizing performance*
- New disinfection techniques can (***and should***) help us ***save energy***.

Thank you ☺