



Advancing the science of
surgical site infection prevention
and environmental safety:

Operating Room Air Decontamination and
Monitoring with Illuvia Sense®



What We've Learned Since COVID-19?

1

The air plays a tremendous role in the transmission of infectious diseases.

2

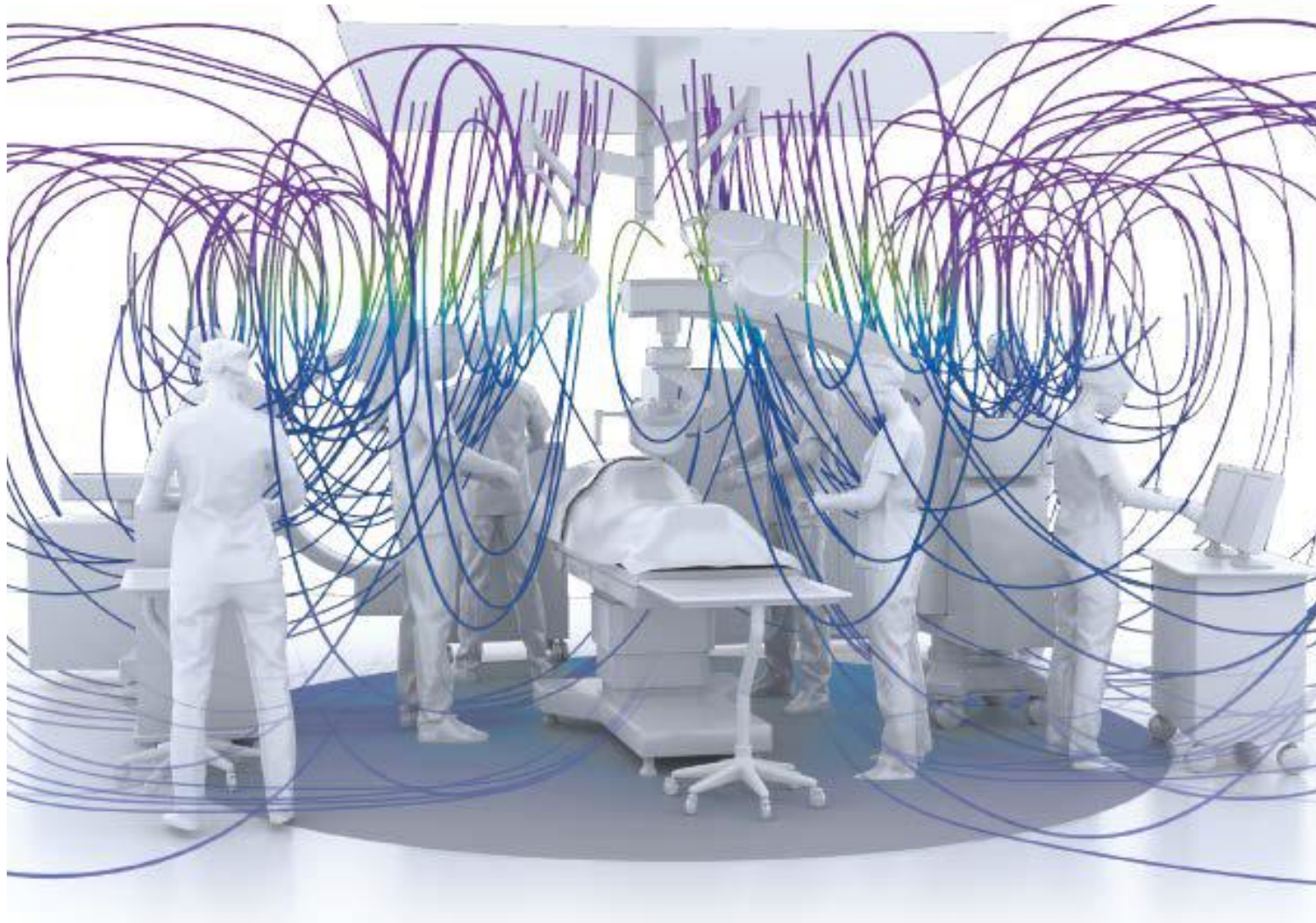
Continuity of care and occupational risk is a critical concern.

3

The air must be treated and rendered “safe” to protect both patients and staff

4

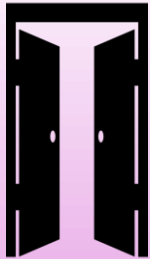
Data solutions are driving improvements in care and outcomes.



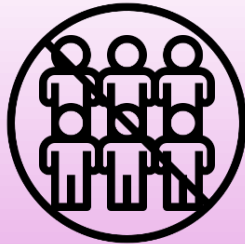
Understanding Airborne Contamination and Risk during Surgery

What we already know....

Excessive
door
openings



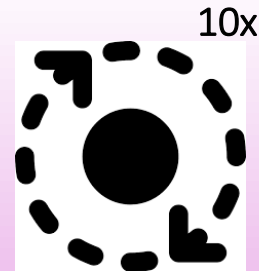
Room
crowding



HVAC
limitations



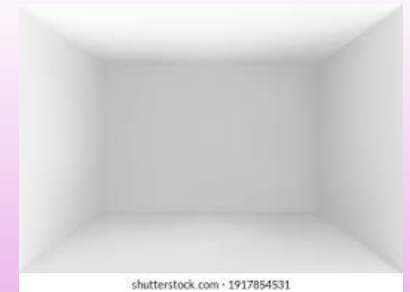
Peripheral room
contamination



High airborne
bacterial
levels



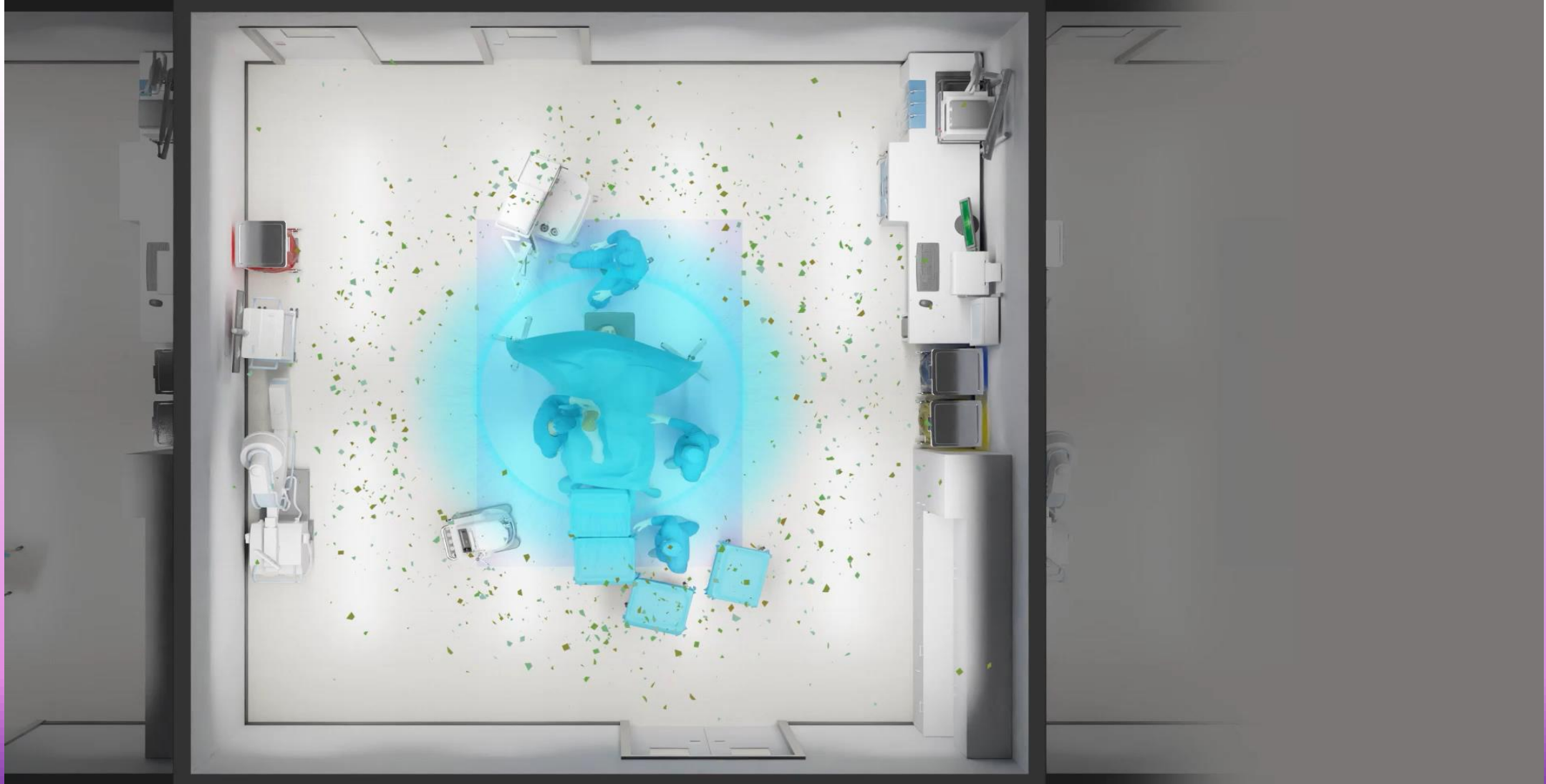
Empty Room
Standards



Addressing the “Dirty Donut” of peripheral O.R. air contamination

*“As door openings and foot traffic increases,
bacterial contamination increases”*

*“Bacteria eventually settles on multiple surfaces
increasing SSI risk to patients”*



Patient safety and satisfaction affects more than just the patient



Patient Safety is a critical concern for perioperative teams and C-suite



Getting to “Zero” should be the goal for a never event.



Satisfaction drives reimbursement & improves survey scores



HCAHPS, Leapfrog, and Hospital Safety Grade.



Preventable Cost through proper Risk Stratification



SSI is the costliest HAI, extends LOS by 9.7 days.

Staff safety and satisfaction increases hospital's efficiency



Staff safety is a critical concern for perioperative teams and continuity of care.



Airborne contaminants are one of the most common injuries to nursing and perioperative staff³ exposure to cancer cells and viruses such as HBV, HIV, HPV is a real threat.



The airborne environment poses a threat to safety and satisfaction



Perioperative nurses report 2x as many respiratory issues compared to the general population. Toxic Chemicals, Bacteria, Blood, and Lung damaging particles are a daily airborne exposure risk.



Safety plays a key role in retention and governed by many agencies



Under the OSHA General Duty Clause:
Employers must provide their employees with place of employment "free from recognizable hazards that are causing or likely to cause death or serious harm to employees"

1. Aon Risk Solutions. 2012. 2012 Health Care Workers Compensation Barometer.

3. "Common Injuries with Nurses/Healthcare." Hardison & Cochran. 2021. <https://www.lawyernc.com/workers-compensation-lawyer/common-workplace-injuries/nurses-healthcare/>

Are your air quality standards as thorough as your surface standards?

Updated 2024 AORN Guidelines for Sterile Technique and SSI Reduction

- ***Recommendation 9.4:*** The health care organization should implement strategies to reduce the risk of airborne environmental contamination in rooms where surgical or other invasive procedures are performed.
- ***Recommendation 9.5:*** A perioperative air quality management program may be used as a strategy to reduce the risk of airborne environmental contamination in rooms where operative and other invasive procedures are performed.
- ***Recommendation 9.5.3:*** When an SSI is identified, SSI surveillance may include a review of the air quality sampling data from the OR where the procedure was performed and the recorded or observed equipment, environment, and personnel factors.

Limitations of current O.R. air systems

Based on outdated
standards and
inflexible
systems



No performance
data to evaluate
effectiveness



Don't address
bioaerosols as a
cause of SSI and
Respiratory
Infections



Don't drive
behavioral
change and
compliance



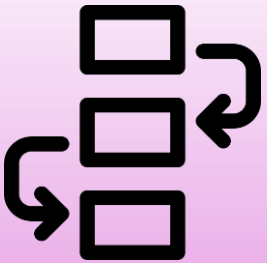
What is needed to advance the state-of-the-art



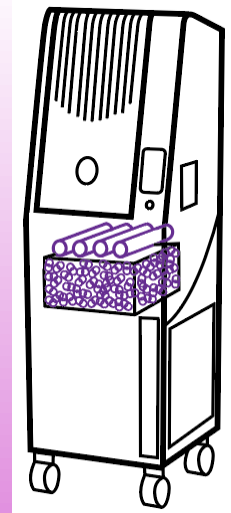
Evidence Based clinical solutions



Measurable, meaningful data collection



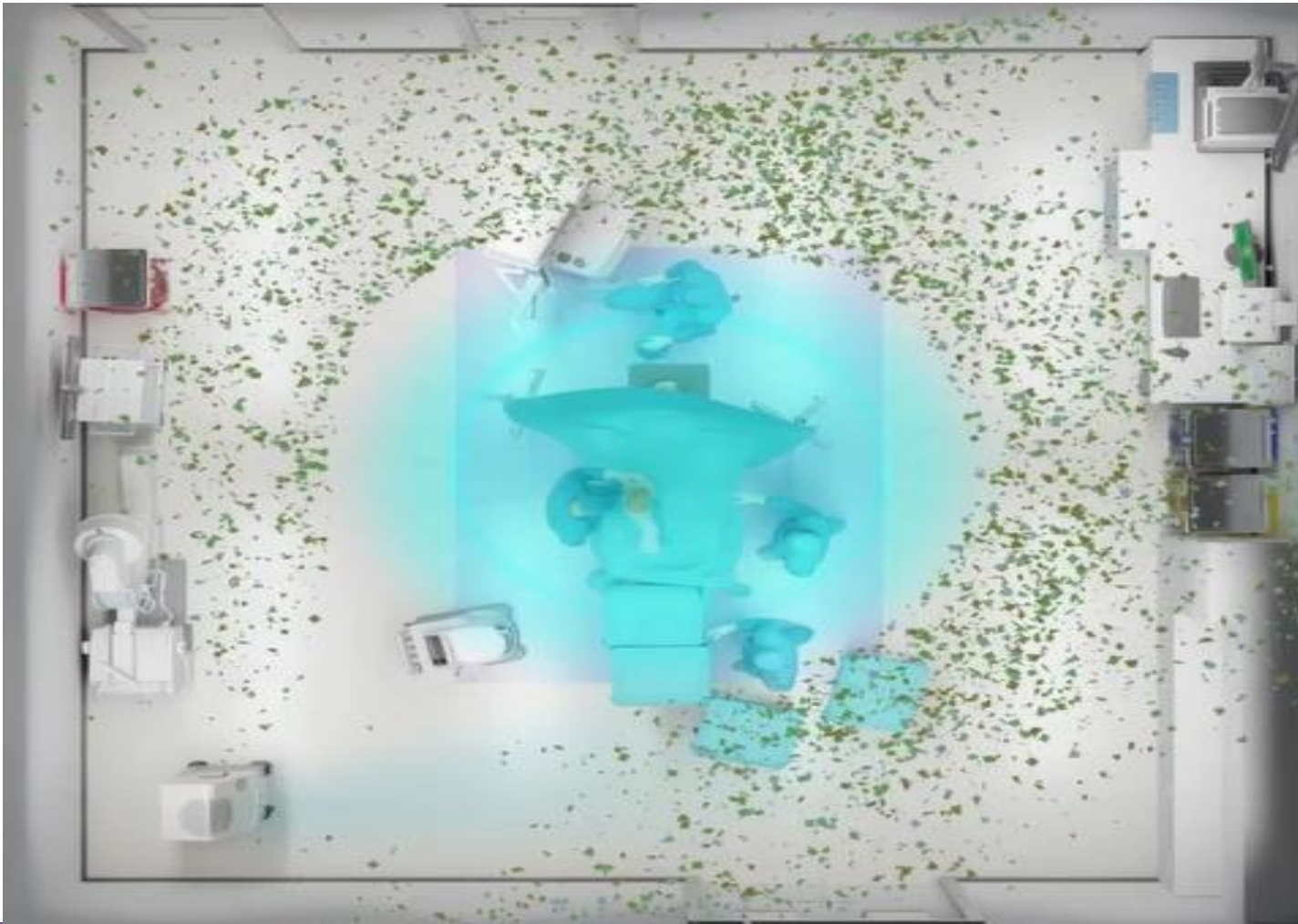
No workflow disruption



Supplemental surgical air system

A Human Factors Engineered Design, treats and helps render the air “safe” in three stages

ILLUVIA
Sense

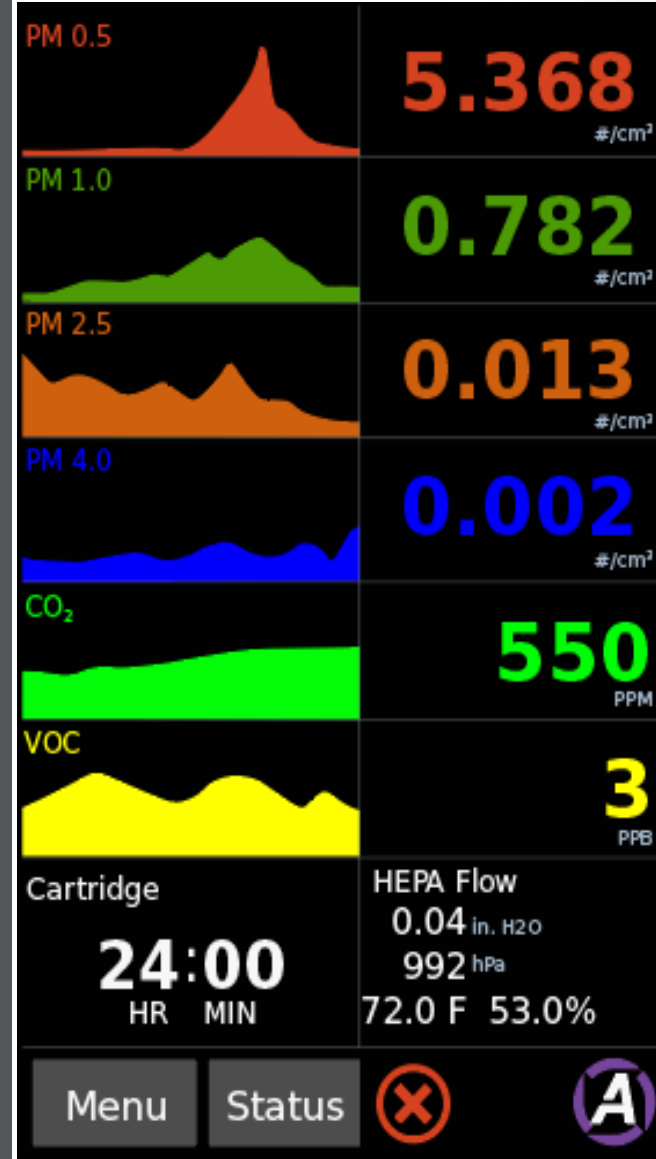


Advanced Environmental monitoring with integrated sensors track and record key metrics such as:

- Contaminant levels
- Temperature and humidity levels
- Door openings and Foot Traffic
- VOCs from Smoke Plume, cement fumes, and WAGS

Use this measurable data in your bundled approach to:

- Identify trends
- Improve current processes
- Drive compliance
- Develop behavioral interventions

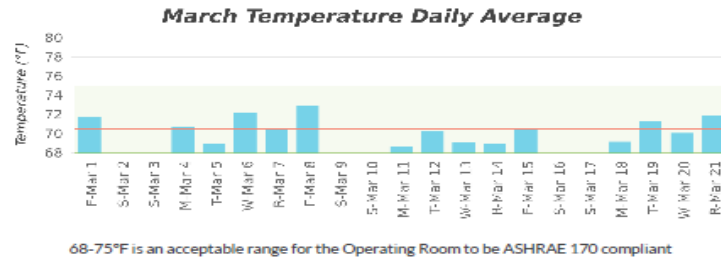


Monthly Report for your Air Quality Management Program

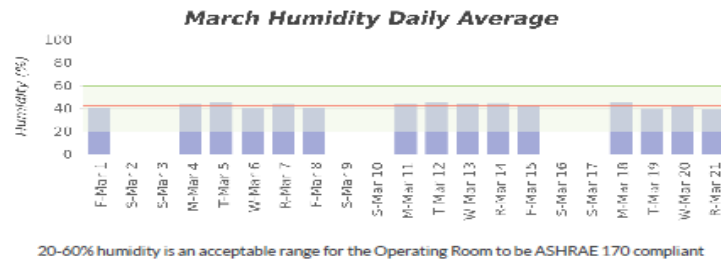


March 2024
Illuvia Sense #00002077
Memorial Regional Hospital
OR 4

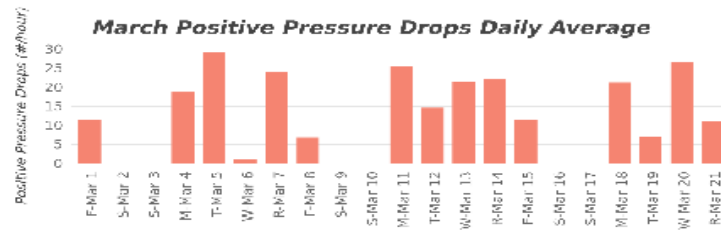

Temperature Daily Average:
70 °F




Humidity Daily Average:
43%

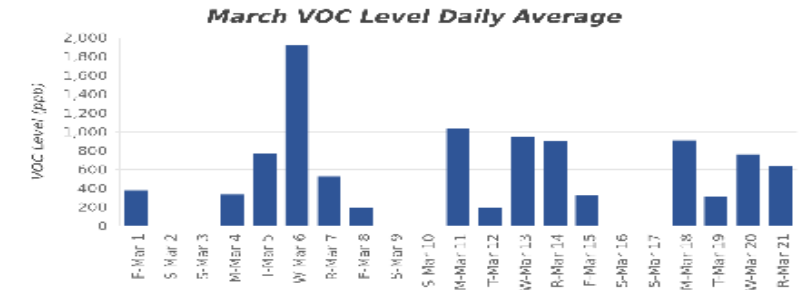



Positive Pressure Drops
Daily Average:
17 / hour

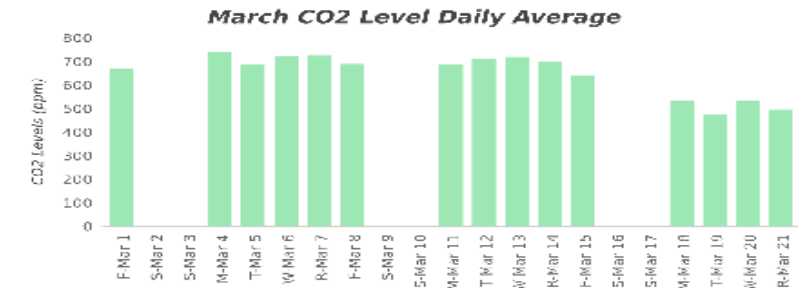


March 2024
Illuvia Sense #00002077
Memorial Regional Hospital
OR 4


Average VOC Level:
679 ppb




Average CO₂ Level:
650 ppm
Level indicates number of people and activity level in the room



Multi Room Report for Room and Specialty Comparison

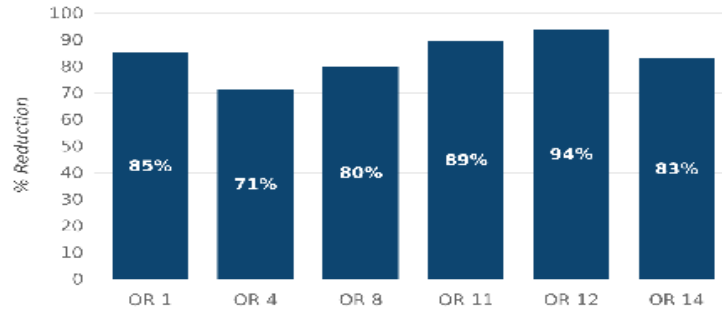


Multi-Room Reduction

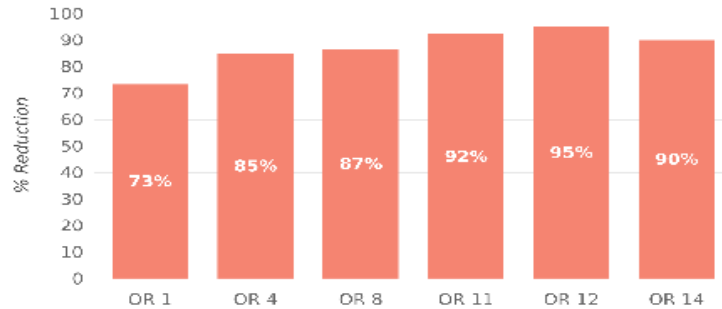


March 2024

4.0 Micron Reduction Results



10.0 Micron Reduction Results



Temperature Daily Average:

73 °F



Humidity Daily Average:

43%

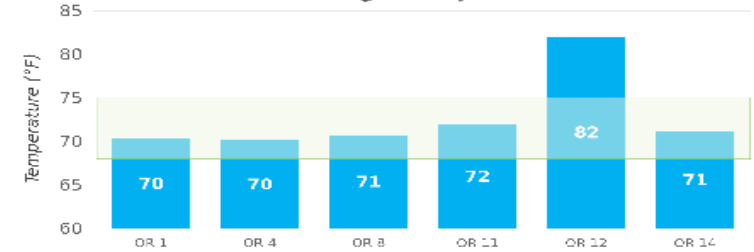


Positive Pressure Drops Daily Average:

19 / hour

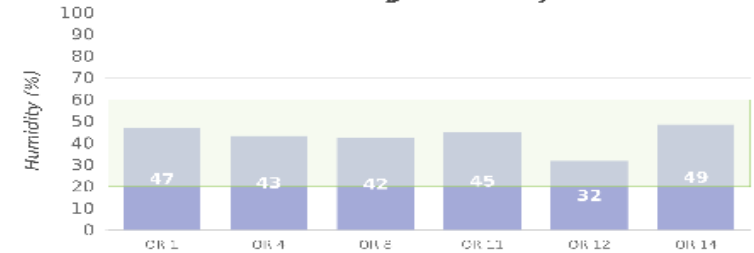


March Average Temperature



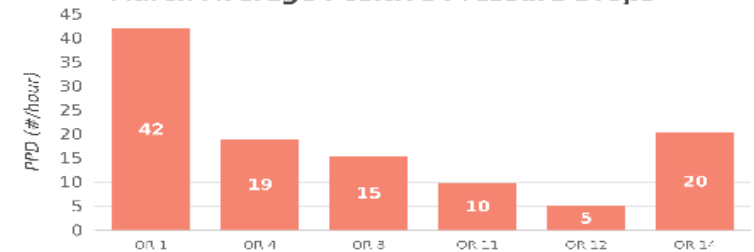
68-75°F is an acceptable range for the Operating Room to be ASHRAE 170 compliant

March Average Humidity



20-60% humidity is an acceptable range for the Operating Room to be ASHRAE 170 compliant

March Average Positive Pressure Drops



Snapshot Report for SSI Analysis



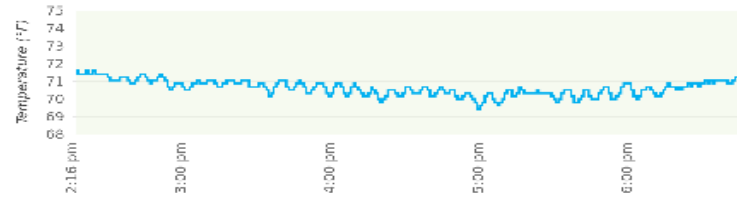
February 22 2024
Illuvia Sense #00002077
Memorial Regional Hospital
OR 4



Temperature Daily
Average:

71 °F

Temperature Hourly Average



68-75°F is an acceptable range for the Operating Room to be ASHRAE 170 compliant



Humidity Daily Average:

41%

Humidity Hourly Average



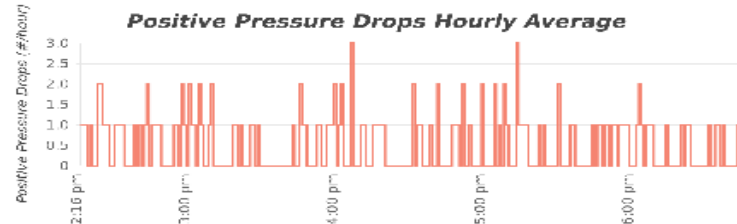
20-60% humidity is an acceptable range for the Operating Room to be ASHRAE 170 compliant



Positive Pressure Drops
Daily Average:

29 / hour
132 Counts
*2:16pm - 6:47pm

Positive Pressure Drops Hourly Average



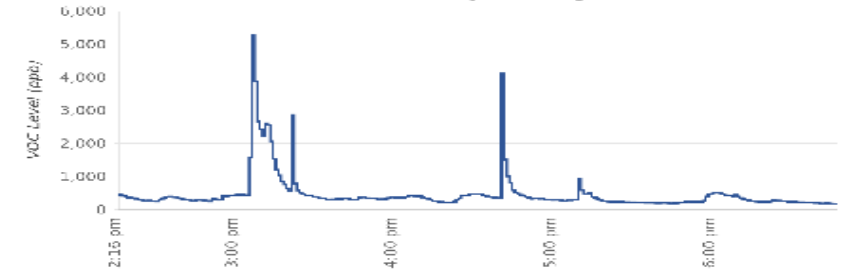
February 22 2024
Illuvia Sense #00002077
Memorial Regional Hospital
OR 4



Average VOC Level:

455 ppb

VOC Level Hourly Average

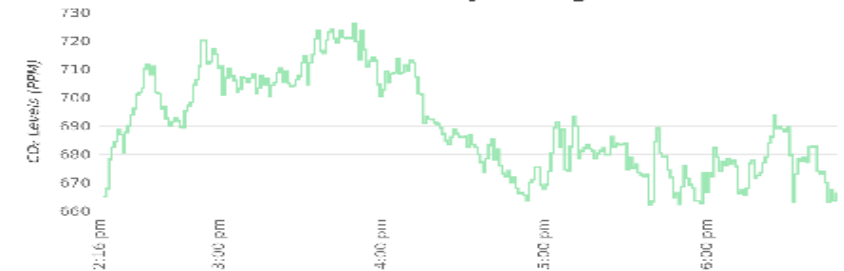


Average CO₂ Level:

690 ppm

Level indicates number
of people and activity
level in the room

CO₂ Level Hourly Average



Real Time Access for SSI Surveillance

← → ↻ aerobiotixdata.com/#device/detail?uuid=00002010 🔍 ☆ 📁 ⬇️ 📱 M Finish update



HOME DEVICES LOCATIONS

📊 Realtime 📊 Measures 📊 Custom 📊 Present Values 📊 Manage

👤

C02

Particle Matter

Particle Size

Temperature

Humidity

VOC

UV Light

Machine Run State

Positive Pressure Drops

Resolution

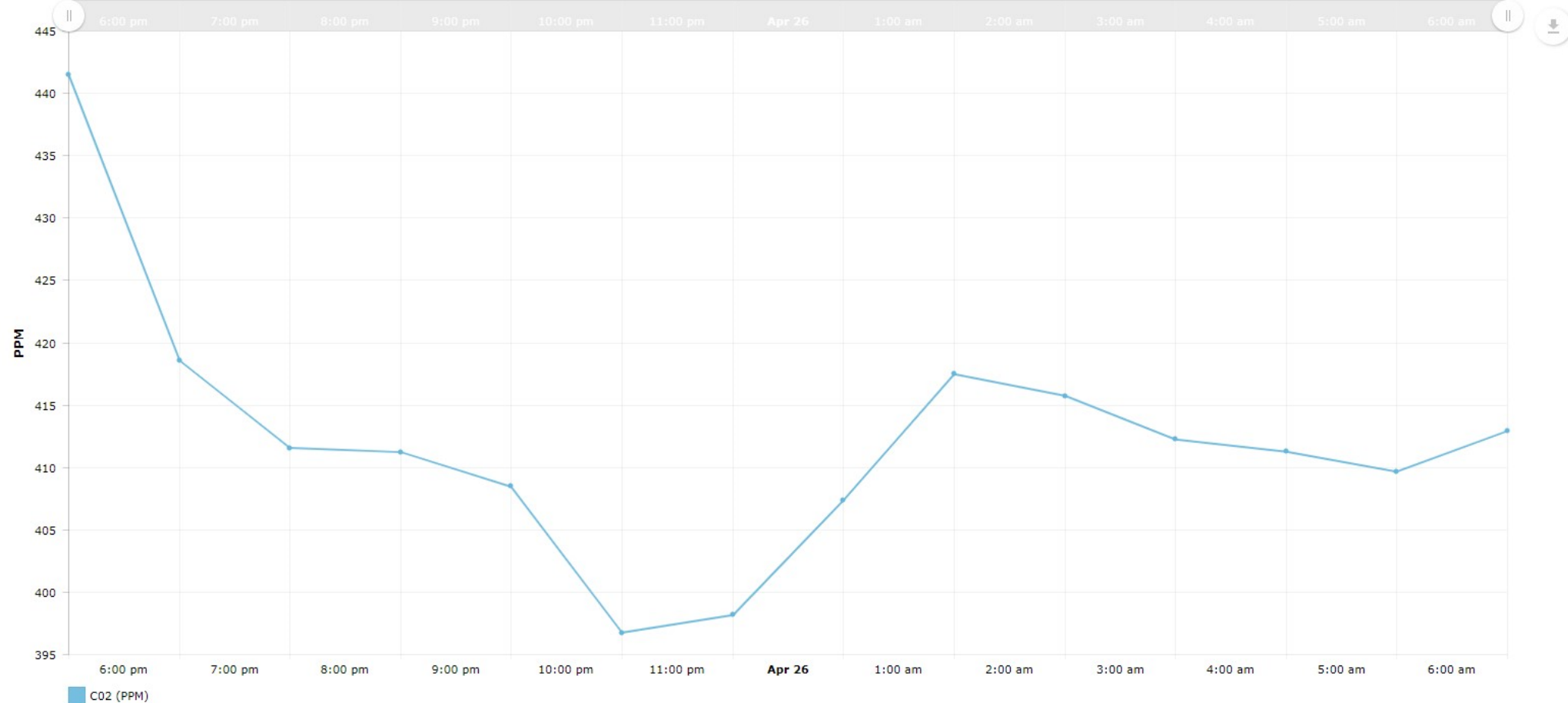
Dates

Quick Set:

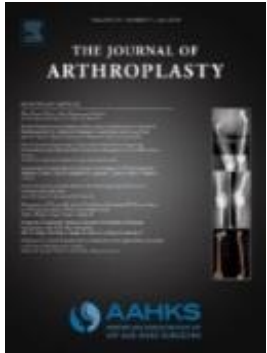
Start Date:
04-25-2024 18:00

End Date:
04-26-2024 07:00

Equal Spacing:
☐

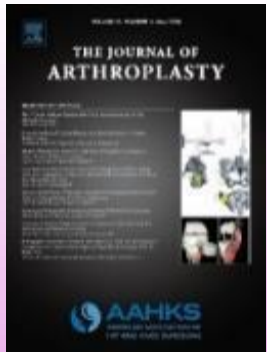


Strong portfolio of peer-reviewed data



Curtis, et al. JOA, July 2018
Cleveland Clinic

Statistically significant
reduction (60%) in O.R.
bioaerosol levels with Illuvia



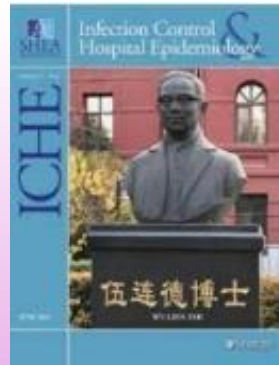
Cook, et al. JOA,
January 2019
Study of 496 total joint
replacement patients

5 infections in control group, **no
infections in Illuvia group**—
statistically significant



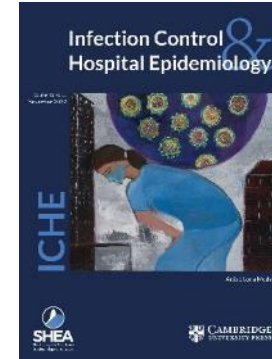
Bischoff, et al. AJIC, Jan 2019
Wake Forest School of
Medicine

Statistically significant
reduction (50%) in air
bacterial levels with Illuvia



Barnewall, et al. Infection
Control & Hospital
Epidemiology, March 2021
Battelle Institute

Successful **removal of
airborne SARS-CoV-2 virus**
with Illuvia



Bischoff, et al. ICHE, Aug 2020
Wake Forest School of Medicine

Reduction of **both** airborne
bacteria air and surface bacteria
using Illuvia.



American Journal of Infection
Control. February 2024
Baylor Scott & White

Experienced a **51% SSI reduction** in
>31,000 patients over 5 years by
implementing the Illuvia into their
bundled approach

Seeing is believing with our Complementary Air Quality Assessment

AEROBIOTIX®

Air Quality Assessment Results

$\mu\text{m}/\text{m}^3$

micrograms per cubic meter of air contaminants like bacteria and viruses. The 4.0 to 10.0 $\mu\text{m}/\text{m}^3$ particle size range has been most closely connected to pathogenic (disease-causing) airborne populations.¹¹

71.5% Reduction in air contamination

August 16-18, 2022, Air Quality Assessment results:
71.5% overall particle reduction of all studied sizes.

4.0 μm Reduction Results

Device Status	4.0 μm Particles (per cubic meter)	Reduction
Illuvia Sense Powered OFF	2,617	
Illuvia Sense Powered ON	403	84.62%

10.0 μm Reduction Results

Device Status	10.0 μm Particles (per cubic meter)	Reduction
Illuvia Sense Powered OFF	776	
Illuvia Sense Powered ON	234	58.31%

BETTER AIR FOR HEALTHCARE

AEROBIOTIX®

Average Door Openings: 7/hour

Average Temperature: 72°F

Average Humidity: 43%

Door Openings Per Day

Date	Door Openings
8/17/2022	49
8/18/2022	67

Temperature Daily Average

Date	Temperature (°F)
8/17/2022	72
8/18/2022	72

68-75 Degrees are acceptable ranges for the Operating Room to be ASHRAE 170 Compliant

Humidity Daily Average

Date	Humidity (%)
8/17/2022	43
8/18/2022	43

20-60% Humidity is acceptable for the Operating Room to be ASHRAE 170 Compliant

BETTER AIR FOR HEALTHCARE





THANK YOU