



# Lighthouse Worldwide Solutions

MWHCEC Conference 2023 – Indianapolis, IN

# Lighthouse Worldwide Solutions



*“We use Science and Technology to better mankind and identify mission critical environmental issues and develop necessary monitoring solutions with Technology that Counts”*

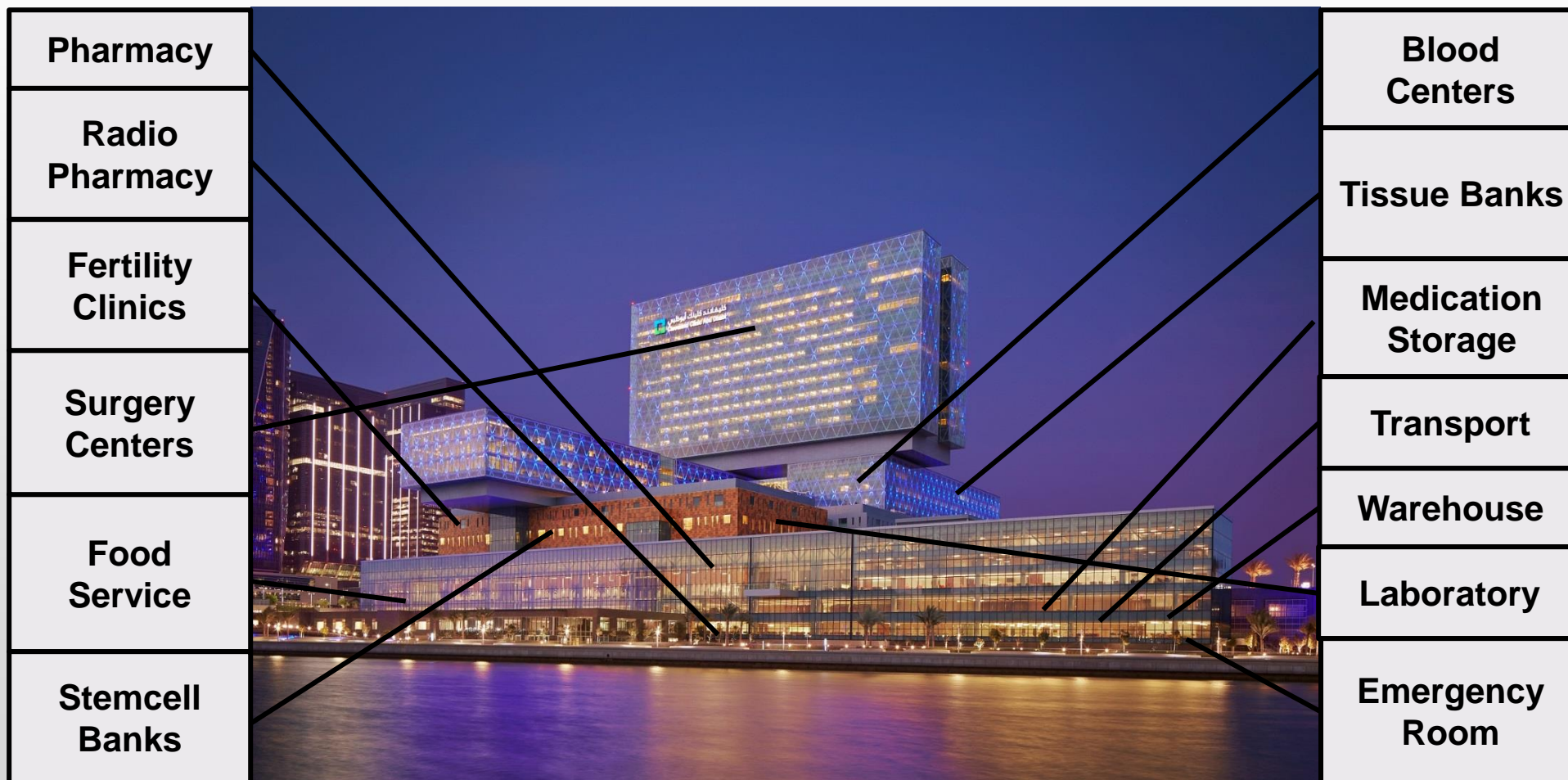


**Founded in 1982**

**Headquarters in White City, OR.  
(Southern Oregon)**

# Monitoring Throughout The Hospital

# Hospital Monitoring Applications





# Pharmacy Department



- Aseptic
- Rooms
- Grade ABCD
  - LMS-Express
  - LMS-Pharma
  - Wireless

# Emergency - Intensive Care Department



- Clean Gasses
- Temperature
- Relative Humidity
- Air Quality



# Fertility Clinic Department



- Freezers
- Incubators
- Ovens
- N2 Vessels
- Room Temperature
- Relative Humidity



- **Temperature, Relative Humidity and CO2 Sensor in Incubator, Monitoring Nitrogen Vessels**





- **Isolators**
- **Incubators**
- **Ovens**
- **Freezers**

# Blood Centers



- Cold cells
- Refrigerators
- Freezers





# Tissue Banks



- Cold cells
- Refrigerators
- Freezers
- Incubators
- LAF Devices



# Radio Pharmacy - Cyclotron



- Cold cells
- Refrigerators
- Freezers
- Incubators
- Hot Cells

## Hospital Acquired Infections

- 2 million American hospital patients develop HAI per year
- 90,000 deaths per year directly related to HAI
- Estimated direct costs of \$5.7 billion dollars
- Top 4
  - Urinary catheter associated infections (CA-UTI)
  - **Surgical site infections (SSI)**
  - Catheter associated bloodstream infection (CA-BSI)
  - Ventilator associated pneumonia (VAP)

Other than setting the Operating Room temperature, the impact of the Surgery / Operating Room environment is really not taken into consideration.



- Everything brought into the Operating Room is sterile
- Patient body is sterilized and pre-op antibiotics are administered
- Surgical tools and equipment are sterile
- Surgical team is gowned up
- Medical devices – manufactured in a cleanroom environment that requires real-time environmental monitoring
- Pharmaceutical Parenterals IV and Injectables are manufactured in a ISO rated cleanroom environment that requires real-time environmental monitoring

*“It is assumed that the Operating Room room is sterile. That is a major assumption”*

# Surgery / Operating Rooms Monitoring Systems



**Goal** – patient safety and elimination of the probability of contamination around the sterile zone.

Particle sizes 0.5um & 5.0um

- Particles
- Pressure
- T/RH
- Door Switch



# Lighthouse Europe HQ - Benelux



85% Hospitals in The Netherlands use Lighthouse Monitoring Systems with increased patient satisfaction

*LWS is No.1 Supplier in Europe*





# Measurements - Surgery Rooms

*Assessment of the performance of the airflow in an operating theatre*



What percentage of particles laying on the ground end up on the operation table?

# Monitoring System – Operating Room (USA Study)



## LWS Participated in Study on Operating Rooms in Portland OR

Dr. Jennifer Wagner Study published in ASHRAE Journal Feb 2014

Mock-up operating theater, with the ability to accommodate air delivery systems in the conventional configurations (air curtain and multi-diffuser array) as well as the single-large diffuser assembly used in Semiconductor cleanrooms.

### In this mock Operating Room

- Simulated operations
- Collected **airborne microbial and particle samples**
- Providing over **8,500 individual data points**.

Challenged the current, conventional guidelines for air delivery in an OR by using methods set forth for air cleanliness in the Pharmaceutical industry.

Tackled the controversy over the use of particle counts to assist with measurement of air cleanliness with real time data in an OR, similar to that used in the Semiconductor Industry.

# Monitoring System – Operating Room (USA Study)



## Monitored:

### ▪ Particles

- Viable & Non Viable in room and over the patient and OR table “Sterile Zone”

### ▪ Room pressure

### ▪ Room temp

### ▪ Airflow over OR table

### ▪ HEPA filter airflow

### ▪ Incubated the samples

Evaluated all of the data





## Summary of the Dr. Wagner study

Preventing airborne contaminants from settling in the desired sterile zone is an important objective for the airflow systems in the OR.

The fact that an operating room presents a much more dynamic environment than a Semiconductor manufacturing facility along with the likelihood that doctors, nurses and other OR personnel are not always required to wear full coverage clothing to prevent release of squames into the OR, means that more airborne contaminants are released into an OR during surgery than are released into a working Semiconductor manufacturing facility.

Therefore the role of airflow in maintaining a sterile field becomes critical for ORs

*“Real-time OR Monitoring Systems can play a vital role as a Watchdog  
Particle Counters enable us to monitor the invisible particles in the air”*

# Environmental Monitoring Systems – Key Points



- Only the important parameters are made visible to the people working in the surgery room.
  - Increased awareness of contamination hazards in real time
- Continuous process improvement opportunities
- System is validated according to GMP regulation
- Real-time detection of HEPA filter failures

# Environmental Monitoring Systems – Key Points



- Real-time response to alerts will lead to cleaner environments
- Universal data accessibility leads to increased social controls and improved behaviors
- Enables collaboration in decisions to hold or proceed with surgery based upon environmental conditions



# Environmental Monitoring Systems – Key Points



- Historical information can be accessed on specific surgeries in the case of post-operative infections
- Helps decrease of the number of post-operative infections and improve patient satisfaction!
- Increased awareness of particle counting offers real-time monitoring “Watchdog”

Questions?