

Access the entire webinar series here:

<https://files.asprtracie.hhs.gov/documents/aspr-tracie-healthcare-system-preparedness-considerations-speaker-series-summary.pdf>

Access the recording here: <https://attendee.gotowebinar.com/recording/5355470874005191170>

Access speaker bios here:

<https://files.asprtracie.hhs.gov/documents/innovations-in-hospital-design-penn-med-pavilion-speaker-bios.pdf>



TRACIE  
HEALTHCARE EMERGENCY PREPAREDNESS  
INFORMATION GATEWAY

# Healthcare System Preparedness Considerations Speaker Series

June 2022

Unclassified//For Public Use

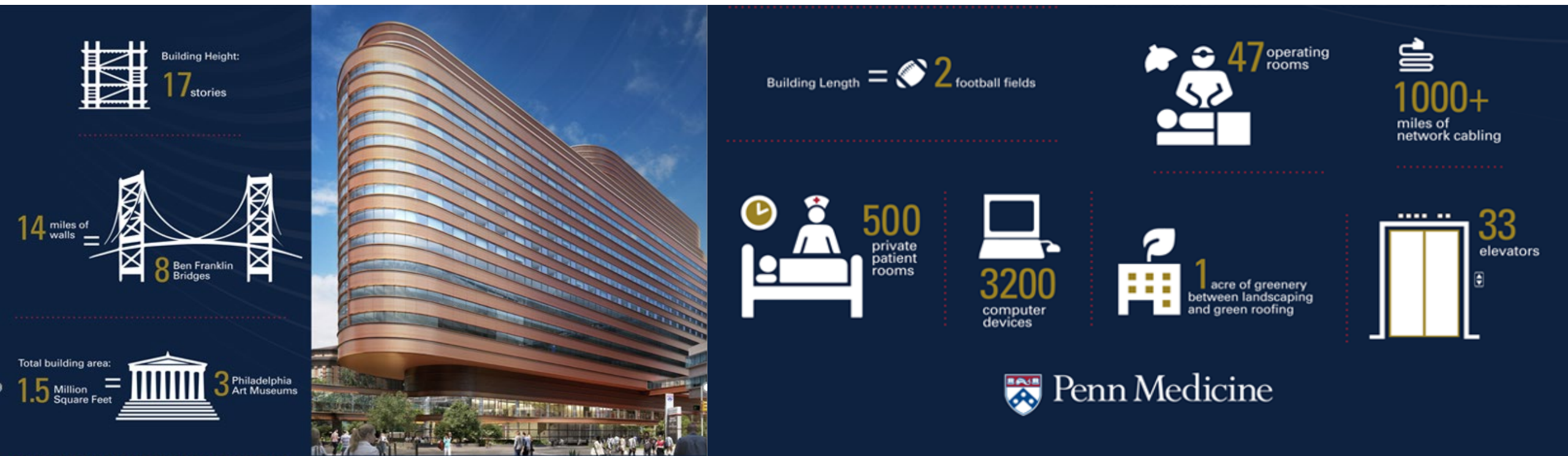


ONE HUP  
Pavilion

June 14, 2022



# The Pavilion - By The Numbers



# Agenda

- ▶ Design & Construction
- ▶ Patient Led Care Technology
- ▶ Operational Readiness
- ▶ Wellness, Sustainability & Security

# Design + Construction



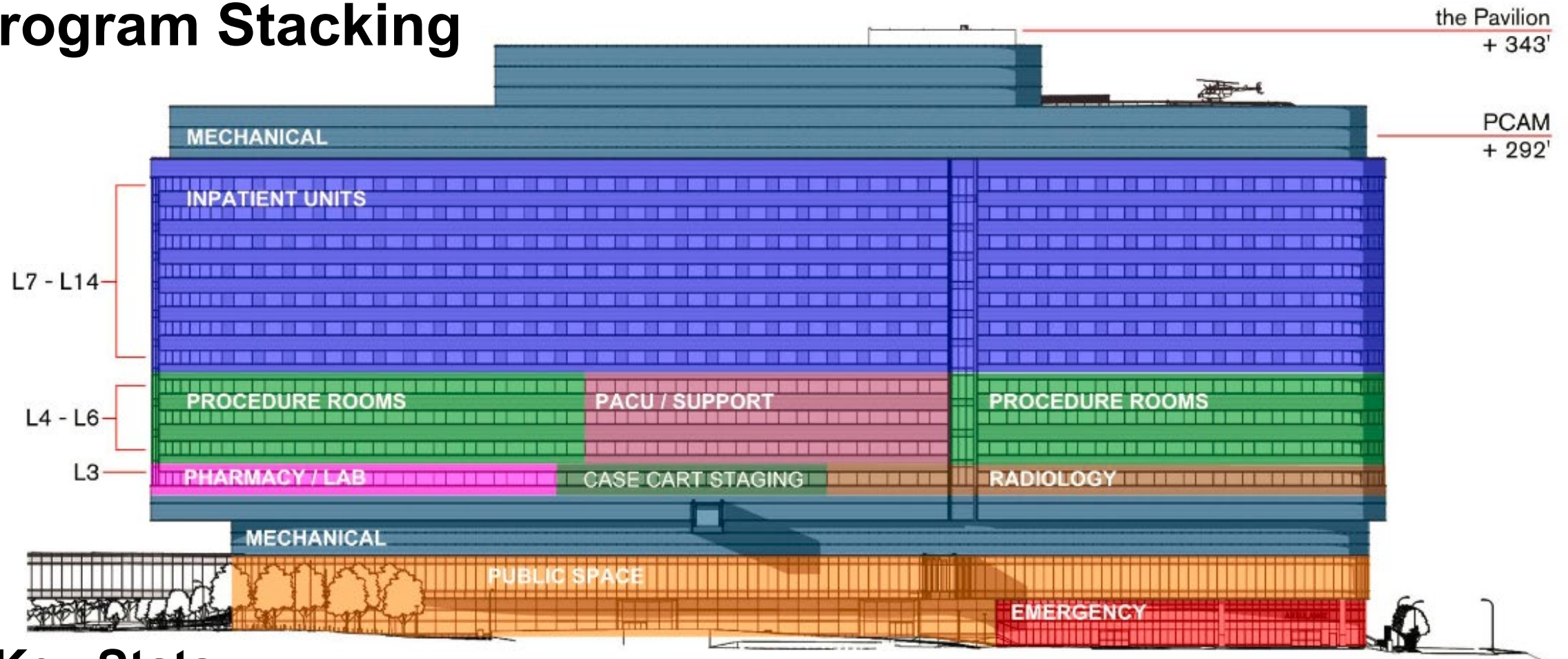


# Penn Medicine Presenters

- ▶ **Stephen Greulich**
- ▶ **Assistant Vice President, Capital Projects Real Estate, Design & Construction**
- ▶ As Assistant Vice President, Capital Projects in Penn Medicine's Real Estate Design & Construction division, Stephen Greulich was involved from the very inception of their new \$1.5 billion new hospital on Penn Medicine's campus in West Philadelphia. Leading the Integrated Project Delivery (IPD) team, he worked closely with the design team on mockups and simulations that helped inform critical design decisions. With Penn Medicine since October 2006, he has had oversight responsibilities of all capital construction projects from small renovation projects to new construction and campus-wide master planning efforts. Steve brings over 20 years of experience in the design and construction industry, both as the Owner and Builder. He spent approximately 10 years in preconstruction which rounds out his career experience in the design, construction and building owner industry.



# Program Stacking



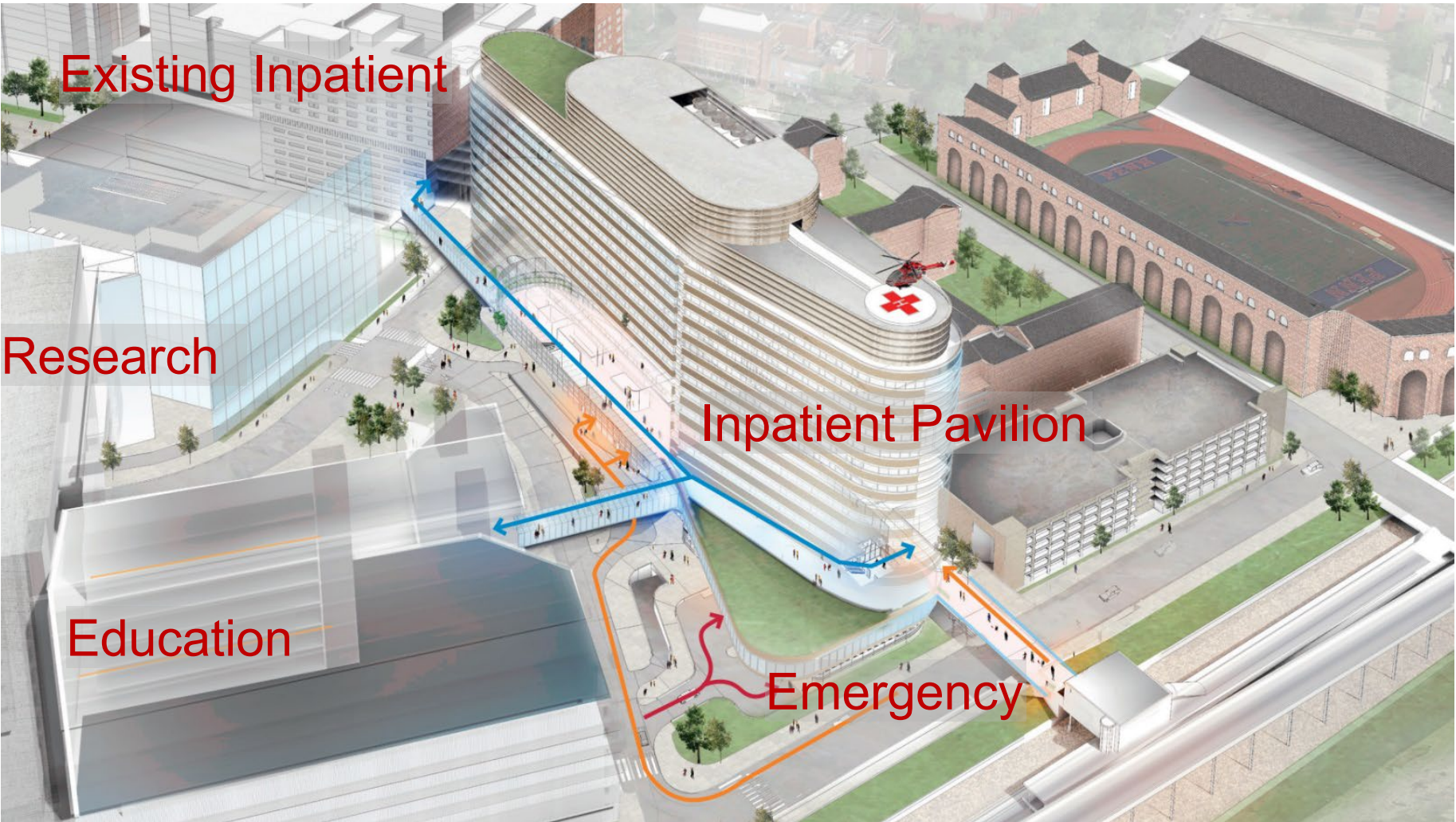
## Key Stats

- 1.5MSF
- 504 Patient Rooms
- 47 Operating & Procedure Rooms
- 61 ED Rooms
- 690 Parking Spaces

**LEED Gold**



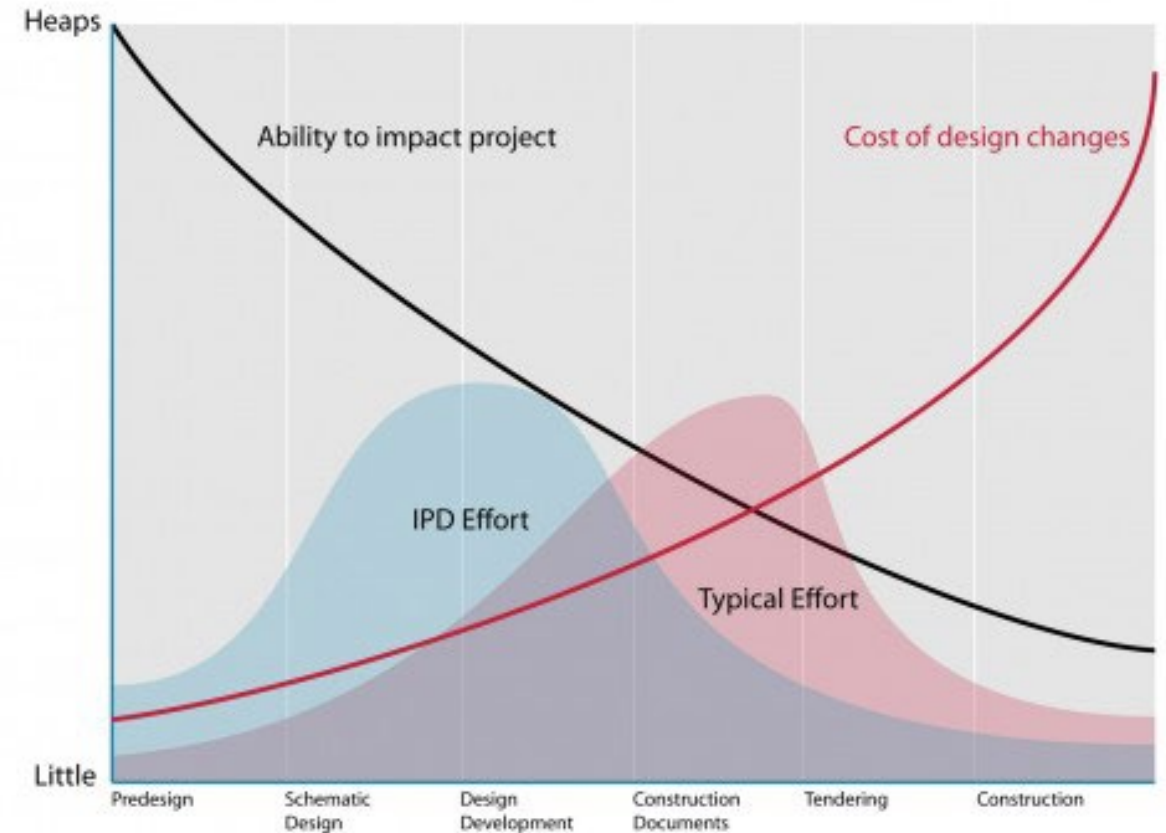
# Site Map





# Integrated Project Delivery

- IPD integrates people, systems, business structures and practices into one collaborative process i.e. PennFIRST
- Traditional delivery models aka design/bid/award models incorporate costs step by step as the project advances
- IPD allows the project costs and scope of decisions to be agreed upon early in the project



# IPD Themes

- Single Multi-Party Agreement
- Shared Risk & Reward
- Jointly developed Project Target Cost
- Highly engaged Owner
- Colocated Team (the Colo)
- Cooperative Behaviors
- Innovation tools
- Real-Time Cost & Constructability Feedback



# PennFIRST Guiding Principles



## Design for Change

We measure the usable life of healthcare facilities in centuries, not decades. Medicine, care delivery, and technology are constantly evolving; spaces must flex to incorporate these new developments. Environments that are modular and adaptable are a necessity for success, not only upon delivery, but for generations to come.



## Patient Experience

Patients are the reason for our existence and our motivation for excellence. They deserve care that transcends expectations. Spaces, operations, and technology are enablers for superior clinical outcomes. By focusing on fundamental human needs, we can enhance the experience for our patients, while satisfying our families, physicians, staff, researchers, faculty, and students.



## Unrivaled Care

We hold ourselves accountable to the highest standards of professionalism, efficiency, and compassion. People, quality, and experience are the drivers for delivering superior levels of care. We attract the best and brightest minds to research and treat medicine's most complex challenges from around the world.



## Innovation

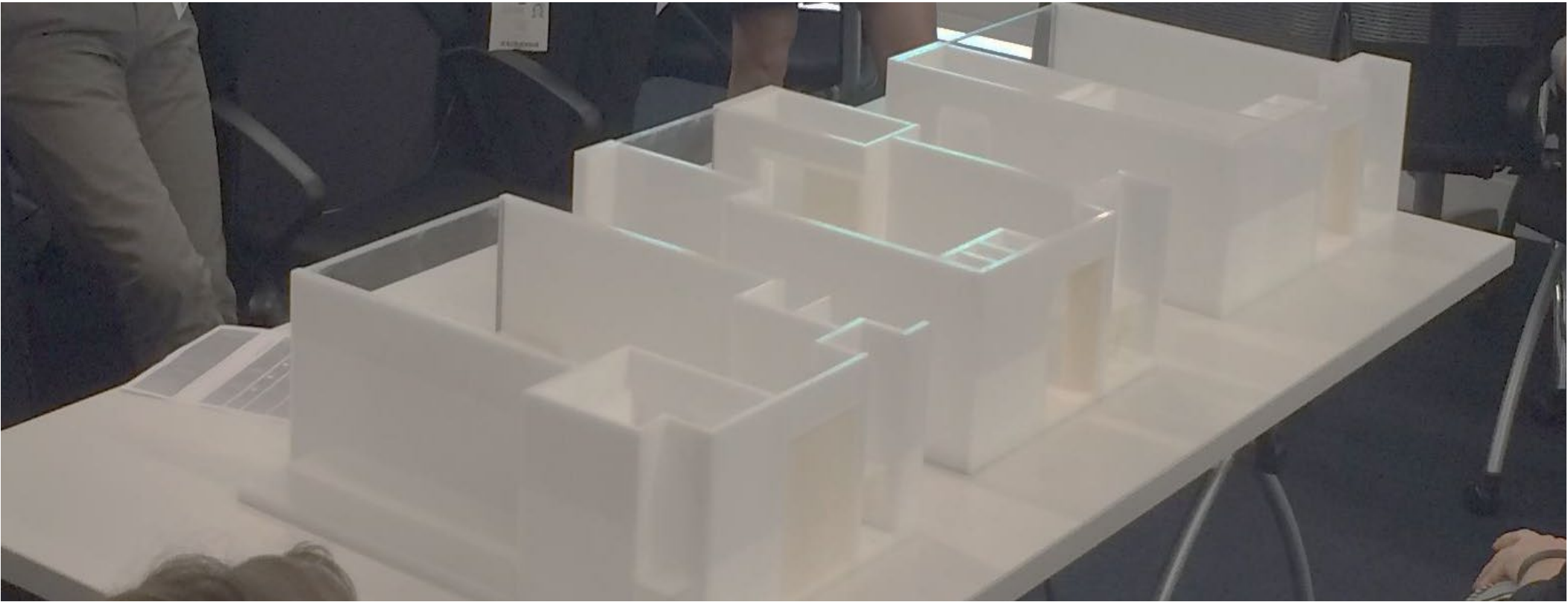
Innovation is in our DNA. We strive to uphold our legacy as the first and the best, continually developing new solutions. Solutions must push beyond today's "cutting edge" to imagine bold new opportunities—knowing that today's possibilities become tomorrow's realities at an astonishing rate.



## Investment in Community

We have been part of the Philadelphia landscape for hundreds of years. All of our efforts are investments in the health, wellness, and well-being of this community. As our community grows and changes, we must grow and change with them, anticipating their needs and desires.

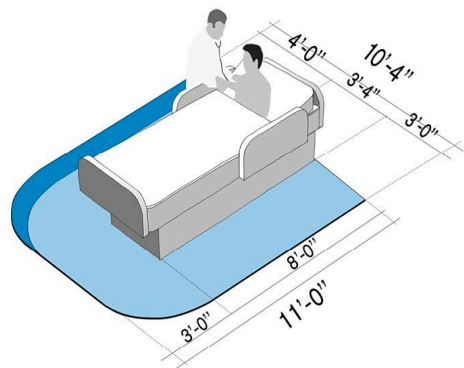




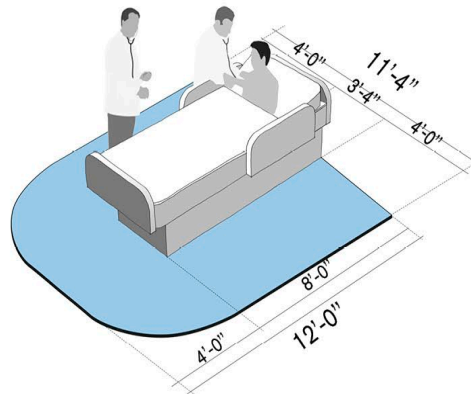
# Inside – Out

# Medical Planning

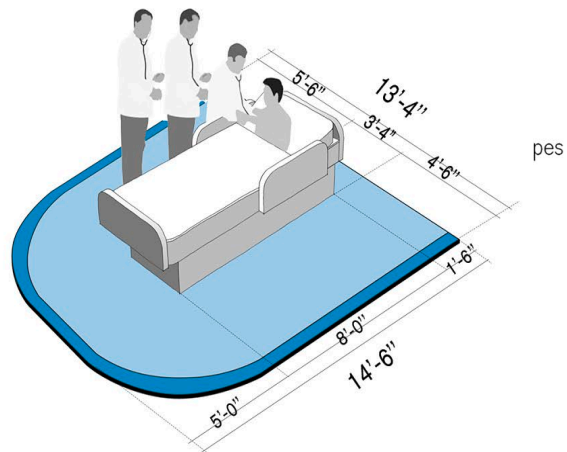
Medical-Surgery Patient Room



Intermediate Care Patient Room



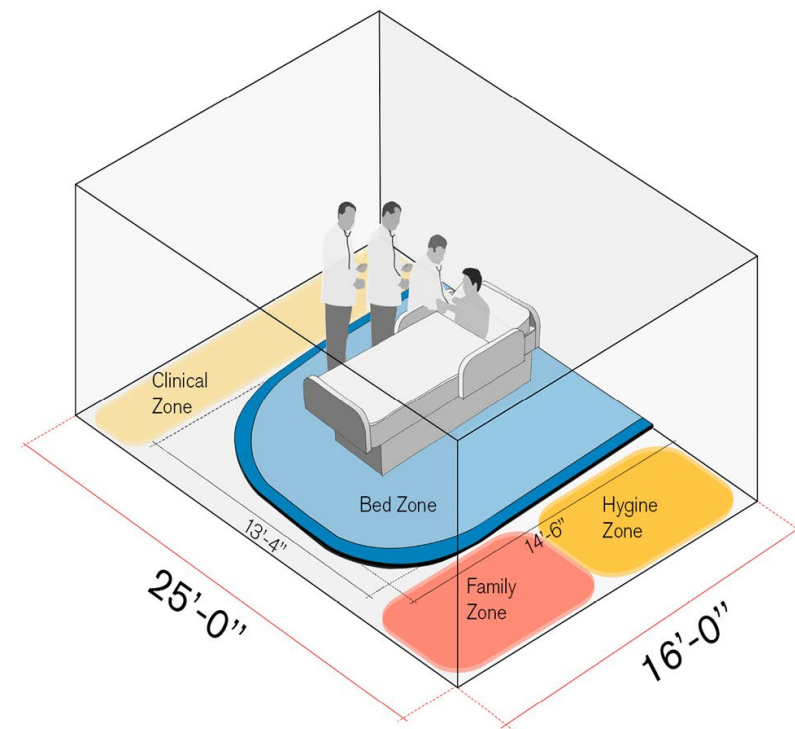
Critical Care Patient Room



Small Large

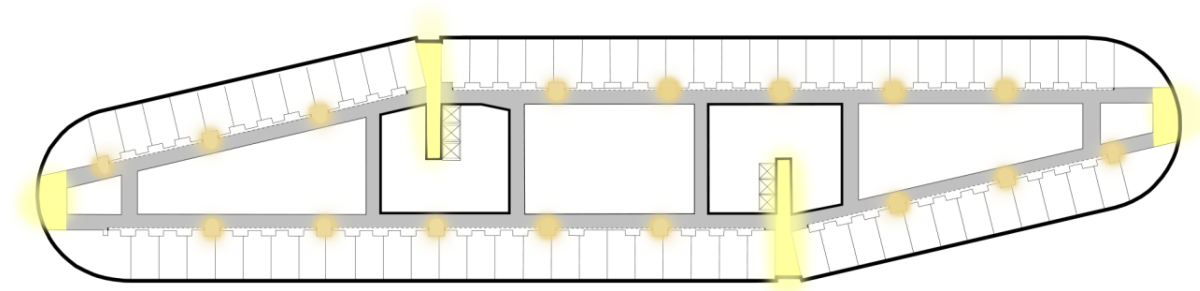
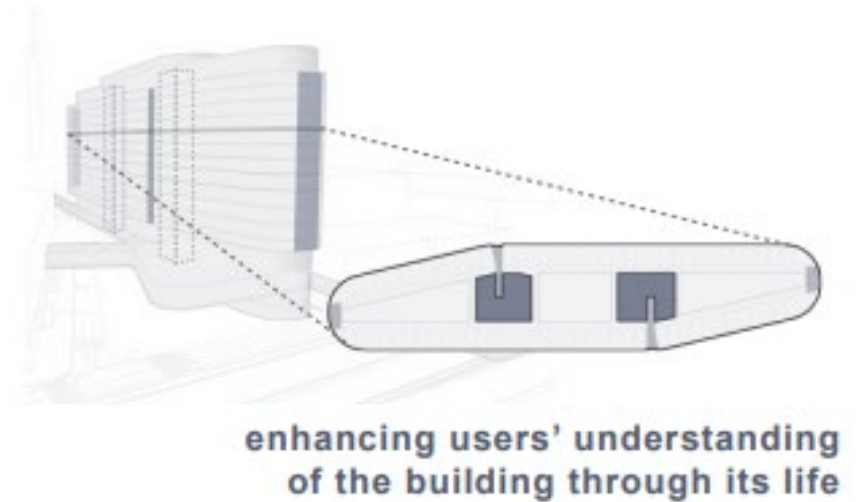
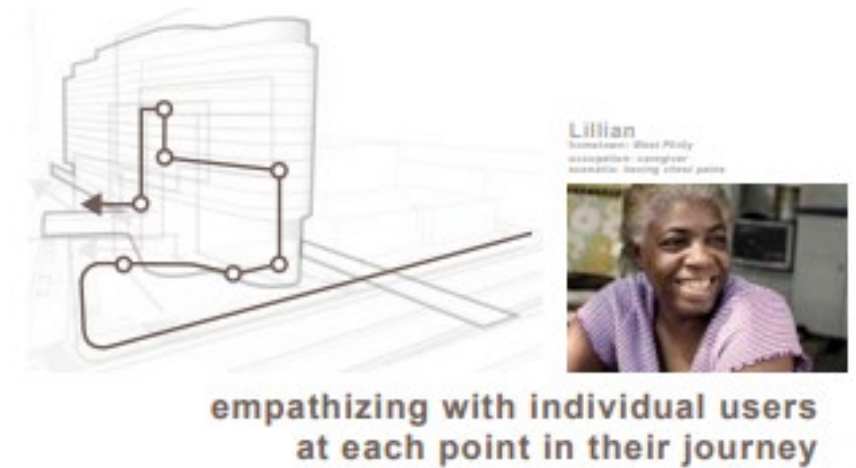
- Standard Clearance
- Mobility Clearance

- Standard Clearance
- Mobility Clearance



# Design Concepts

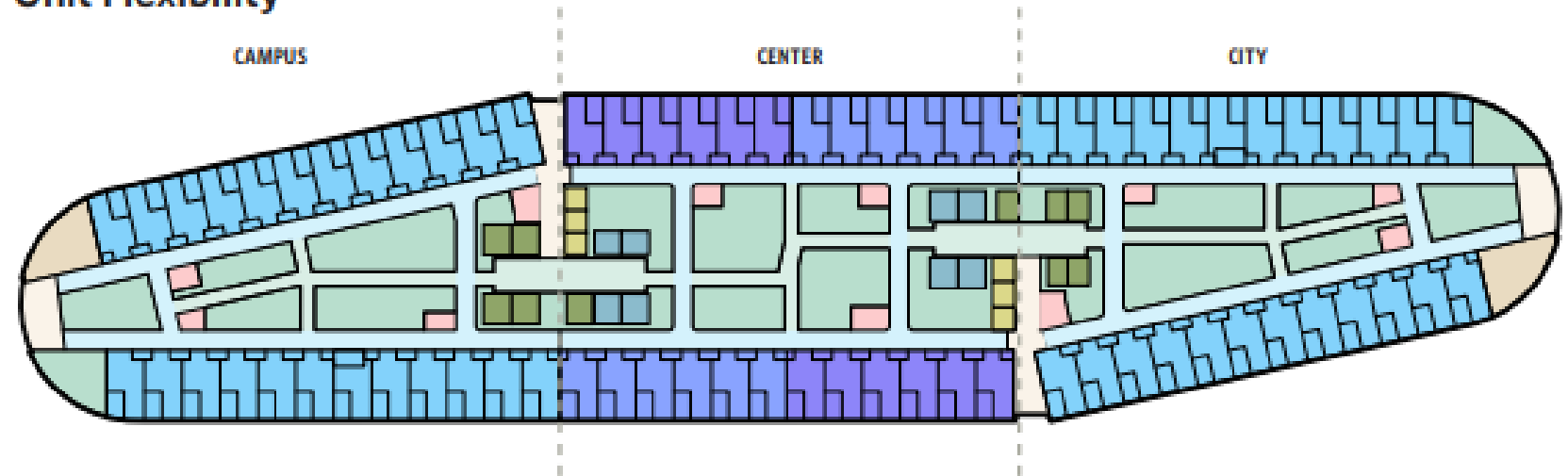
- ▶ Applying Hospitality to Hospital
- ▶ Using Human Experience - mapping staff, patient and visitor journey through navigating building
- ▶ Prioritizing light and views – holistic view towards wellbeing
- ▶ Circulation – areas of respite and wayfinding



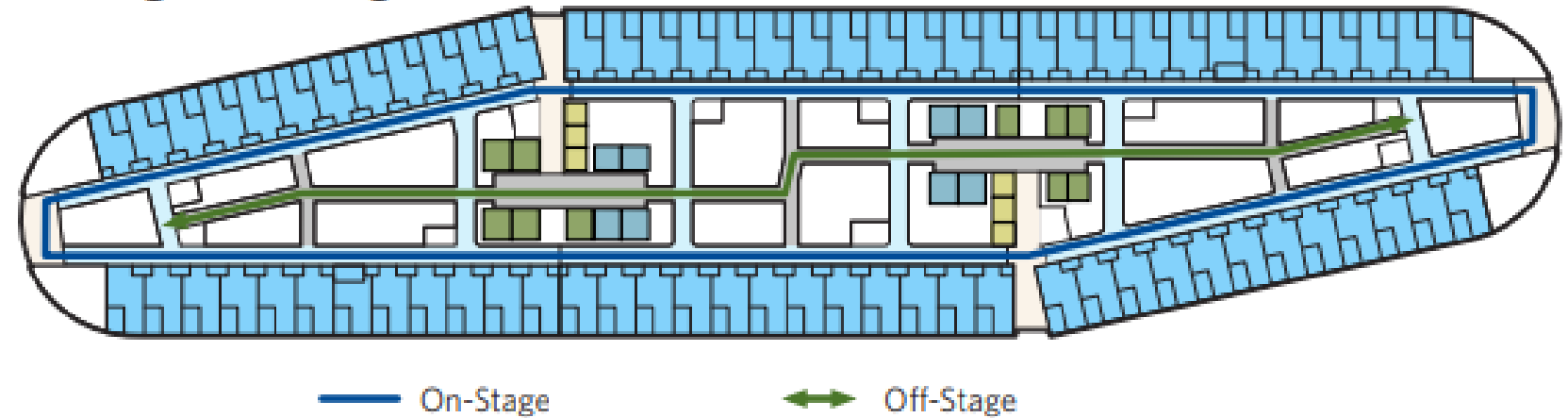


# Inpatient Floor

## Unit Flexibility



## On-Stage / Off-Stage



# Design Innovation: Full Scale Mockup Simulations

- Multidisciplinary Clinical and Non Clinical Staff
- Test Functional Performance
- Feedback & Data Influence Design

22

Tours

546

Tour Participants

291

Tour Surveys

40

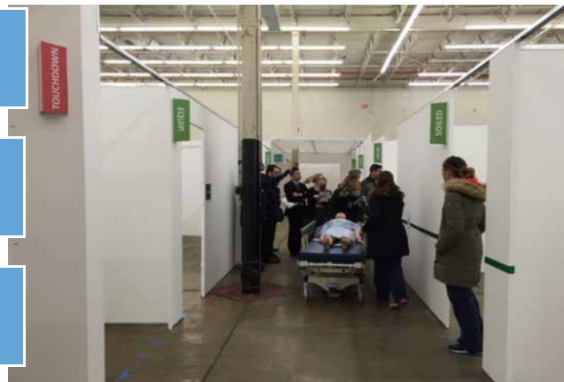
Simulation Sessions

138

Simulation Participants

100+

Hours of Video Review



# Patient Room – Mockup



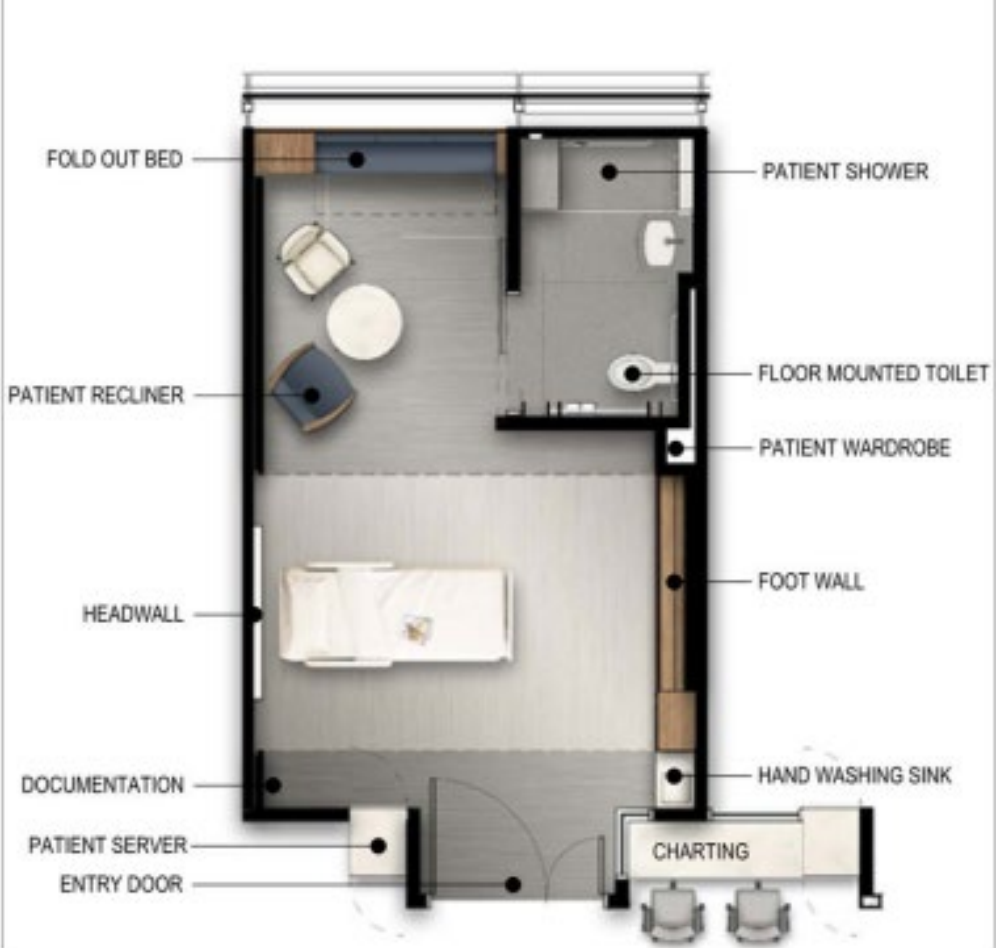


## P/P/R Room Mockup

### ED Room Mockup



# Inpatient Room



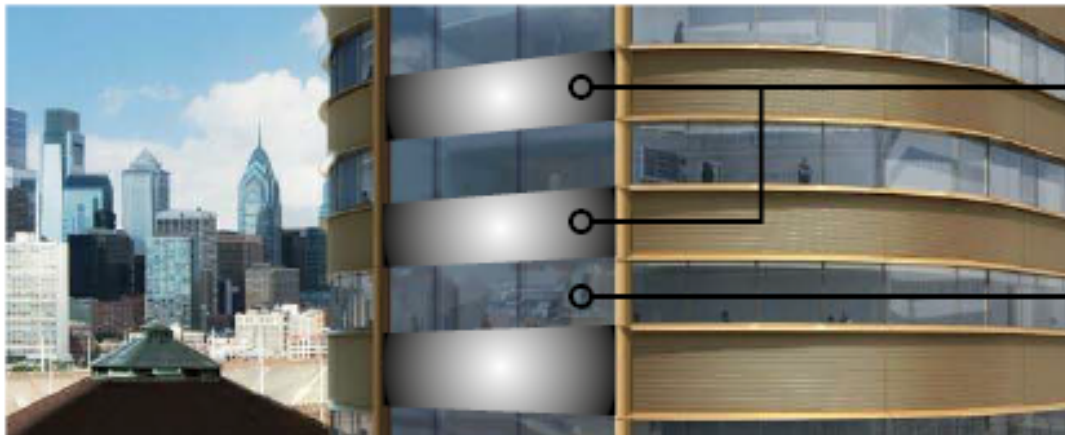
# Patient Space Preparedness

## Ready for ????

- ▶ One size fits all . . . . . All requirements
- ▶ 100% Outside Air . . . . . Everywhere
- ▶ Large rooms; Patient Servers
- ▶ OR Walls . . . . . Easy additions
- ▶ Accessible infrastructure



## Glazing properties the same in patient rooms and 'end' zones



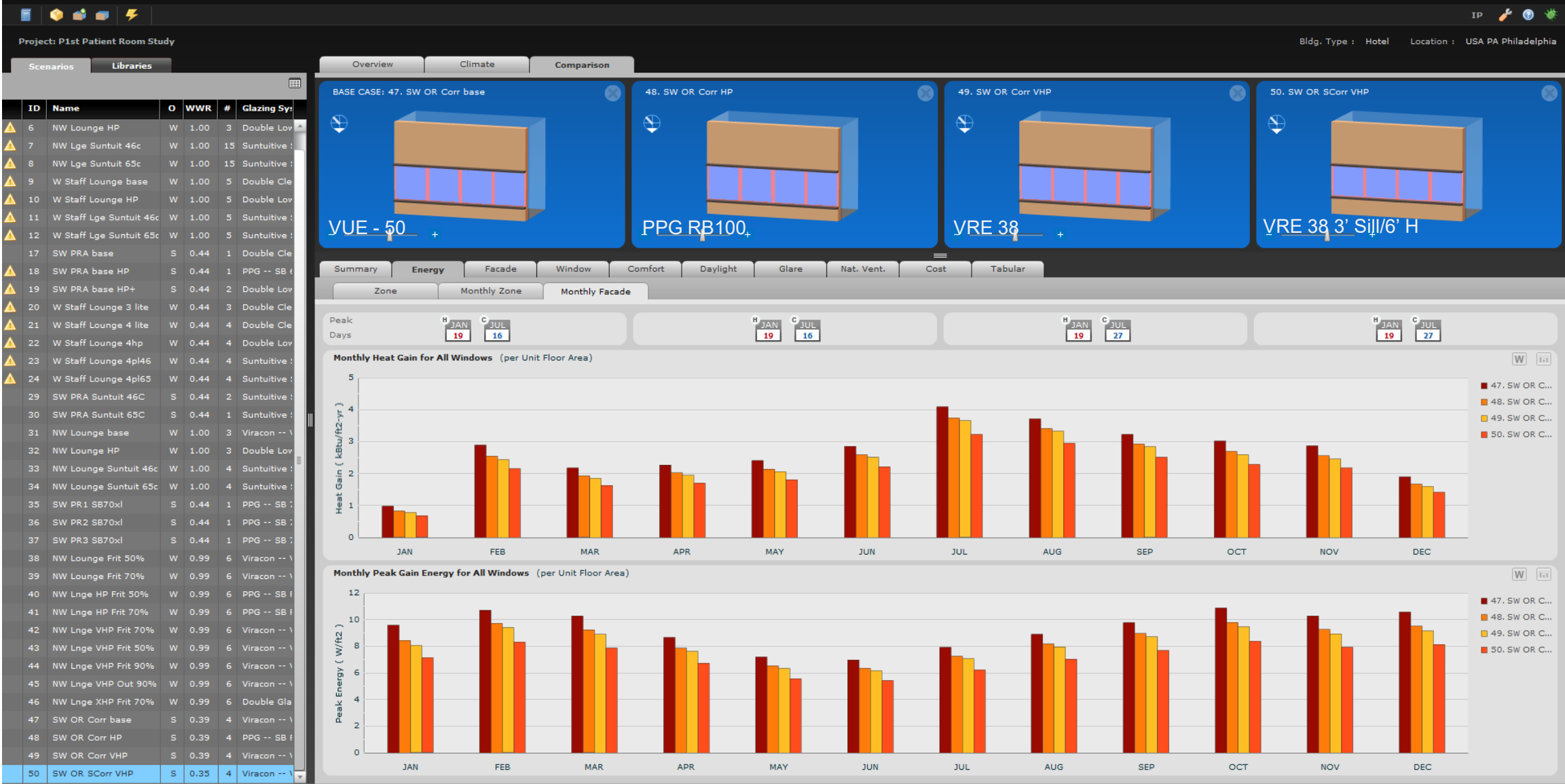
**Frit zone (50%/70% frit)**

**Vision glazing zone  
(aligned with room glazing)**

Lounge Façade

PennFIRST Draft Façade Study

2016-10-19



South Interventional Façade

PennFIRST Draft Façade Study

2016-10-19

# Off-Site Manufacturing (Prefab)

## Mechanical/Electrical/Plumbing

- MEP Penthouse Equipment
- Chiller System Modules & Skids
- Multidisciplinary Racks (Patient Level, Interventional, Equipment Level, P1 Level Distribution)
- Multidisciplinary and Single Trade Vertical Risers
- Medical Gas Racks
- In-Wall Zone Valve Box & Piping
- Vanity Sink Wet Walls
- Janitor Closet Wet Walls

## Operating Rooms

- Prefabricated and kitted operating room ceilings
- Panelized/Demountable partition walls with integral casework

## Architectural Elements

- Nourishment Stations
- Nursing Stations
- Observation Stations
- Premanufactured Casework
- Prefabricated stairs
- Pre-Installed Door Hardware
- Preformed Drywall (Column wraps, corners, soffits, curved walls)

## Structural

- Precast Concrete (Foundation walls, elevator core walls, garage elements, Hamilton Walkway & Septa Connection)
- Prefabricated Helipad
- HUP Tunnel

## Exterior

- Unitized curtainwall
- Lower level glazing and storefront

## Headwalls

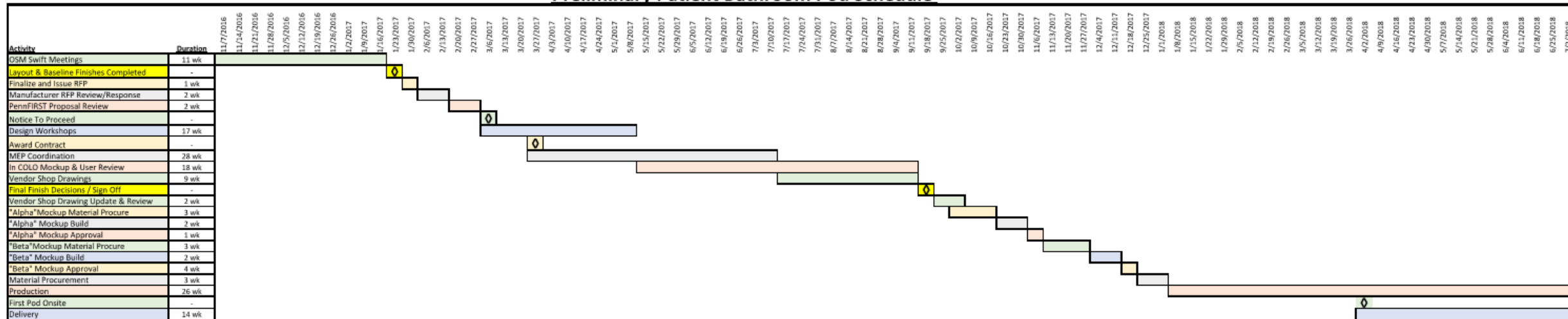
- Patient Room
- Resuscitation (Emergency Dept)
- Interventional/Surgical (P/P/R Rooms)

## Bathroom Pods

- Patient Room Bathrooms
- Staff & Public Unisex Toilets

Preliminary Patient Bathroom Pod Schedule

Date: 11/14/2016





# Construction Innovation: Prefabrication

- ▶ 25% of materials prefabricated off-site including more than 570 mechanical, electrical, plumbing racks and 504 patient bathrooms.
- ▶ Minimize on-site waste, reduce traffic impact and site congestion  
Increase quality, lower costs.



# Patient Led Care Technology

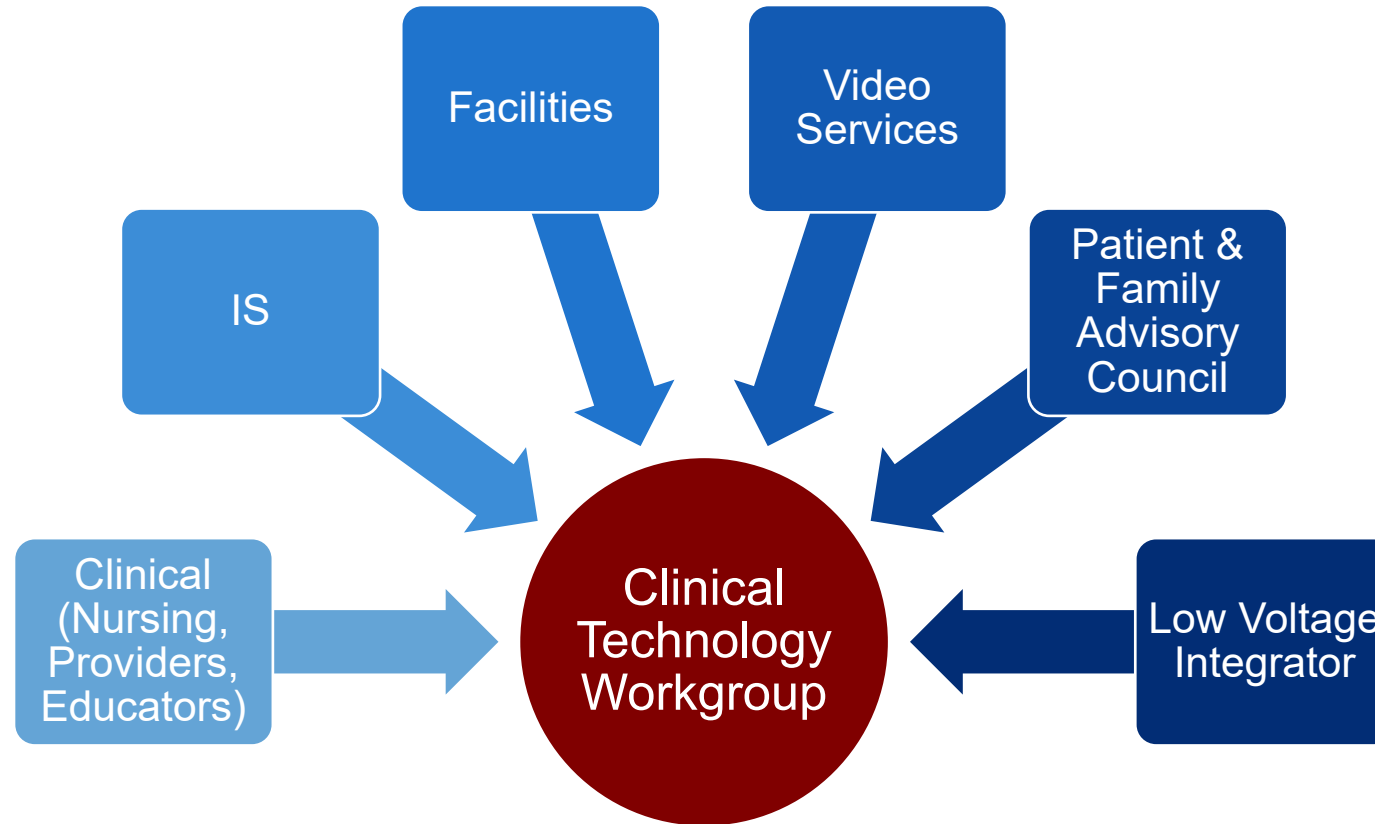


# Penn Medicine Presenters

- ▶ **Denise Vaughn**
- ▶ **Corp Information Services Program Plan Director, IS-Proj Mgmt Office**
- ▶ As Corporate IS Director for Program & Planning Management for Penn Medicine, Denise Vaughn was responsible for ensuring the technology integration for the HUP Pavilion, including network and cybersecurity. The patient rooms are considered among the most technologically advanced in the country and features IRIS, a 75-inch digital Careboard that provides critical patient information for clinicians on demand. IRIS also integrates with the building management system to provide a concierge experience for the patient. With Penn Medicine since 2006, Denise is currently directing the CE/IS/Networking support for the Hospital of University Health System and has over twenty-five years of experience in technology integration and project management.



# Clinical Technology Workgroup

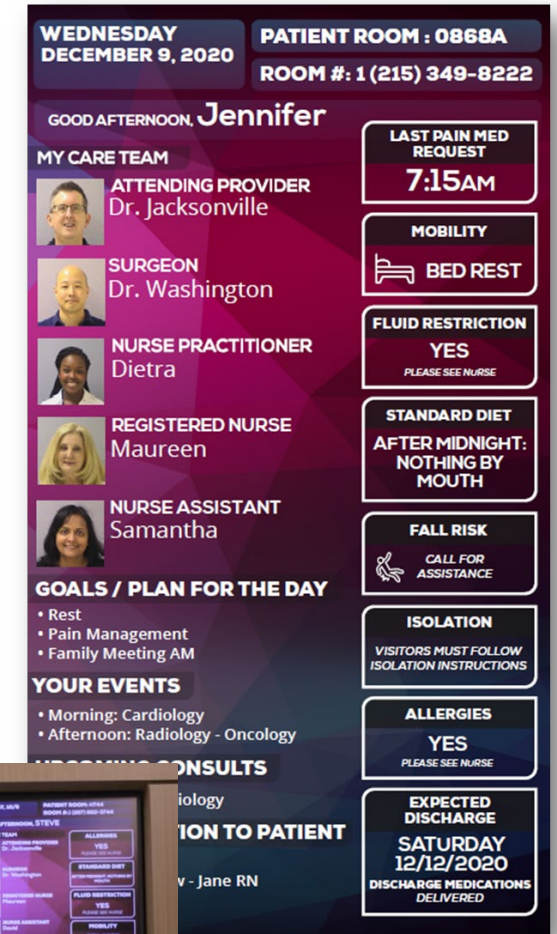
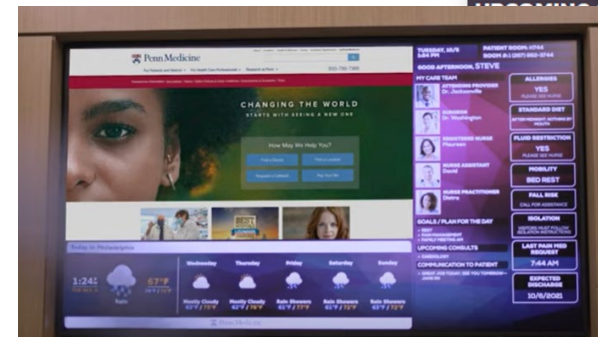
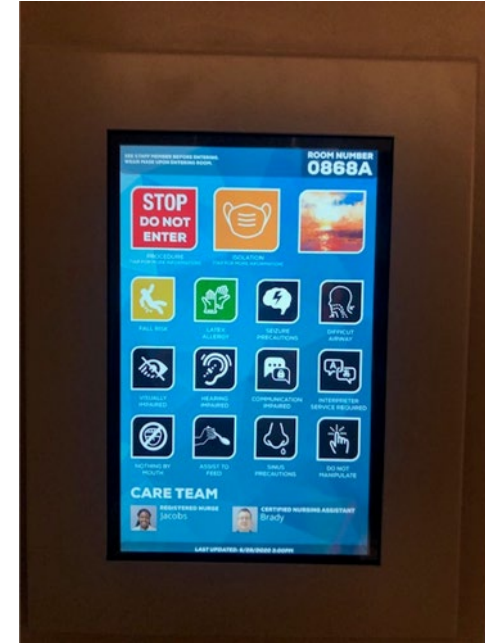


- ▶ PFAC had design inputs for IRIS Careboard, Outside Door Display
- ▶ Decision making group for Key Technology Systems (Nurse Call, Telehealth, Mobile Application, etc.)



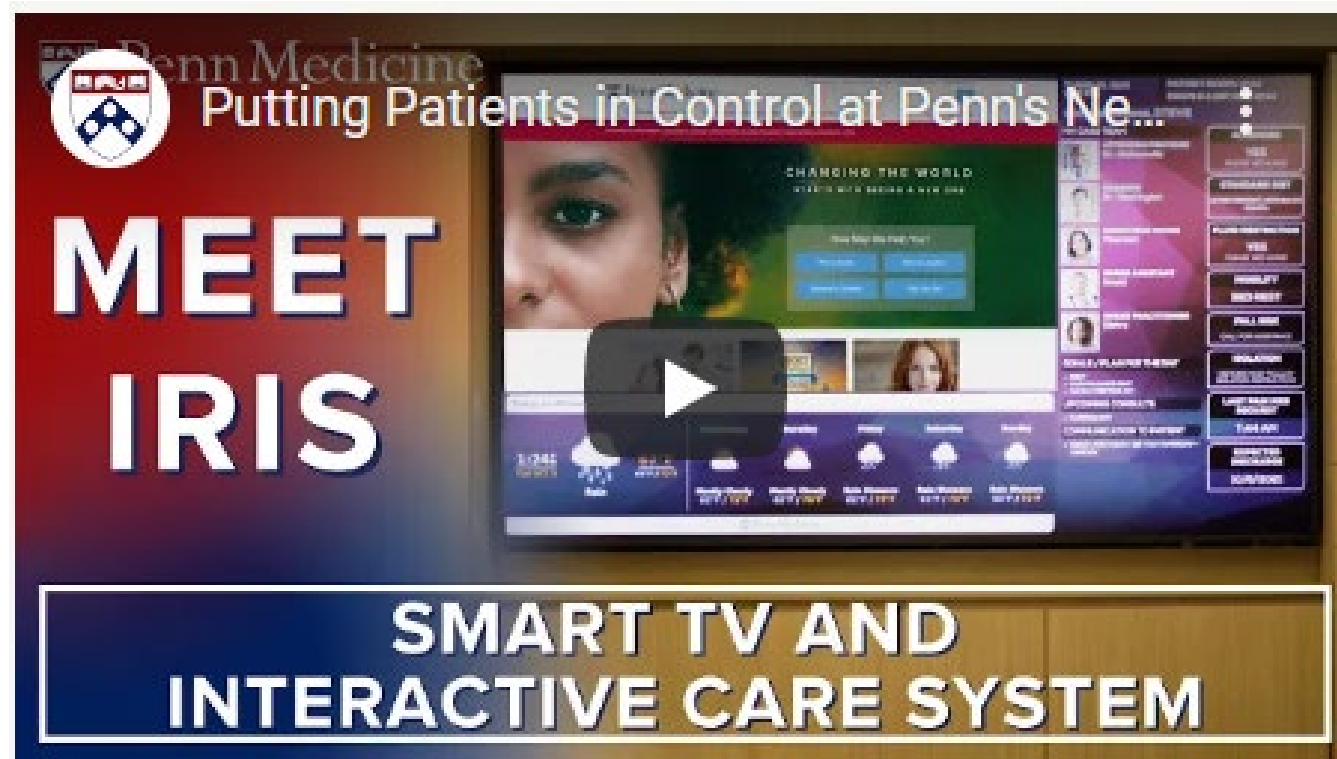
# Technology Innovation: Iris

- ▶ The smart technology is comprised of:
  - **MyPennCareBoard**- digital whiteboard that displays patient care team plan and education
  - **PennChart Connection** - inpatient tests and results
  - **In Room PC** – Display test results on large monitor
  - **Room entertainment** system, contains the television, movies and on-demand features
  - **Room Control** - managing room temperature, lighting, window shades, and privacy glass to the hallway directly from patient bed.
  - **iPad tablet controls** – video communication, patient education, gaming, entertainment



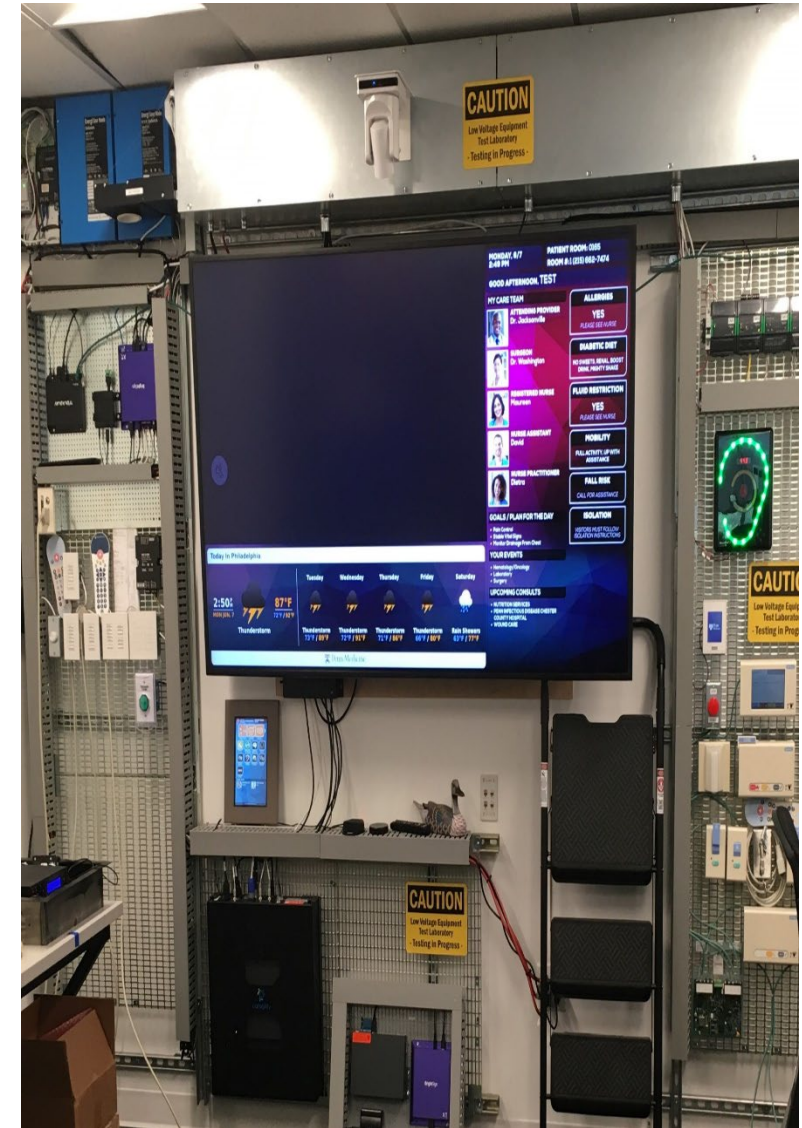
# Putting Patients in Control

- ▶ [https://youtu.be/Q28\\_xxQhuYk](https://youtu.be/Q28_xxQhuYk)



# Goals of the Low Voltage Integration Lab

- ▶ Enriched patient experience through environment and care empowerment
- ▶ Enhanced clinical outcomes through technology (reduce risk, etc.)
- ▶ Understand stakeholders needs and verifying use-cases through education
- ▶ Ease of use for any level of user
- ▶ Breakdown construction silos and look for conflicts
- ▶ Better integrated technology for staff efficiencies
- ▶ Reduced capital and operational expenses
- ▶ Capturing data for analytics (savings, prevention)
- ▶ Simplify maintenance and support (six possible internal departments)
- ▶ Maintain IS standards (cybersecurity, preferred equipment, vendors, etc.)
- ▶ Think out of the box (Technology Garage)





# Future Proofing Infrastructure

- ▶ Large Network Closets
- ▶ Additional Cabling Pulled to Patient Rooms
- ▶ Extra HDMI cable for future use case





# Operational Readiness



# Penn Medicine Presenters

- ▶ **Alyson Cole**
- ▶ **Associate Executive Director, Transition and Occupancy Planning, Hospital of the University of Pennsylvania**
- ▶ As Associate Executive Director for Transition and Occupancy Planning, Alyson Cole provided strategic and operational leadership and oversight for the transition and occupancy initiatives for the \$1.5 billion new hospital facility on Penn Medicine's campus in West Philadelphia. The 1.5 million SF facility features 504 patient rooms, 47 ORs, and a new emergency department was occupied in October 2021. Prior to this assignment, she was Associate Executive Director at Penn Presbyterian Medical Center, where she provided operational leadership for ambulatory integration, trauma and behavioral health programs, and business development. She also served as the Chief Patient Experience Officer.

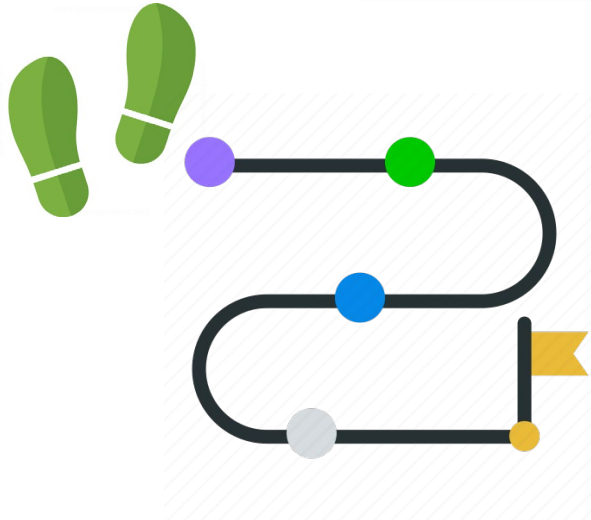
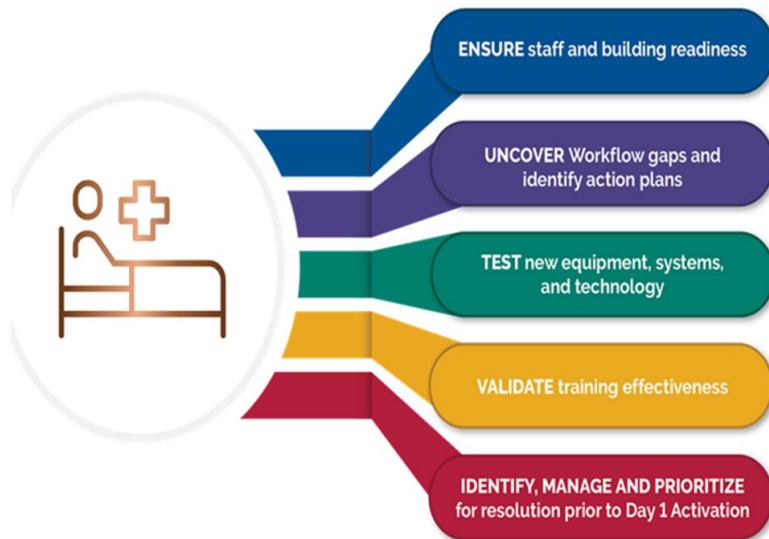


# By the Numbers – Operational Readiness



# Innovative Practice: The Pavilion Dress Rehearsal #1 Goals

- Familiarize the Departments with their space and workflow





# Wellness, Sustainability & Connectivity



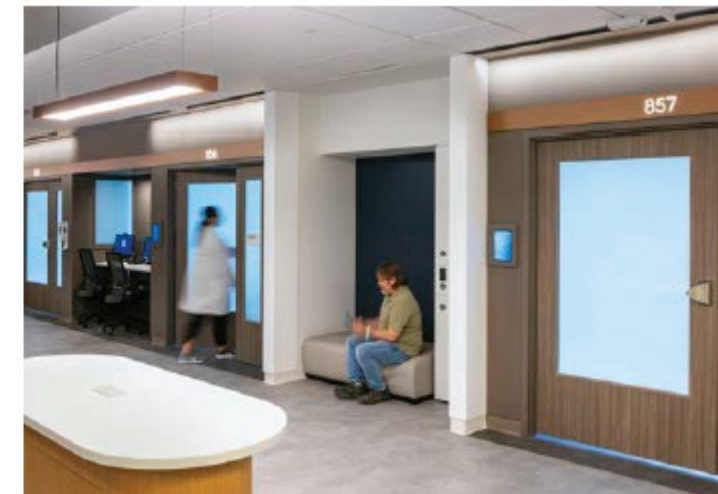
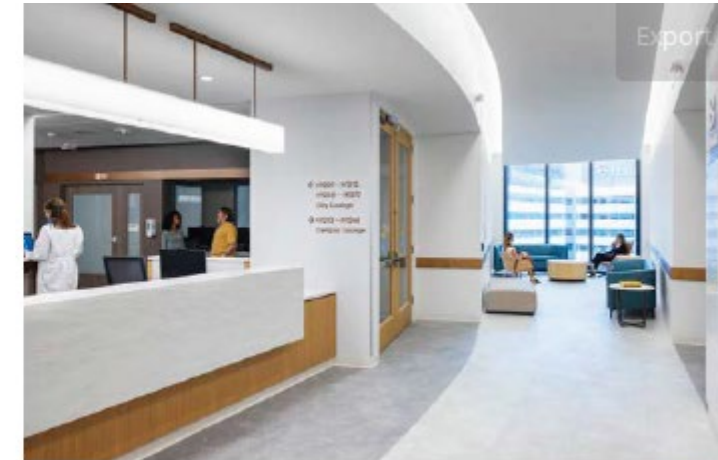
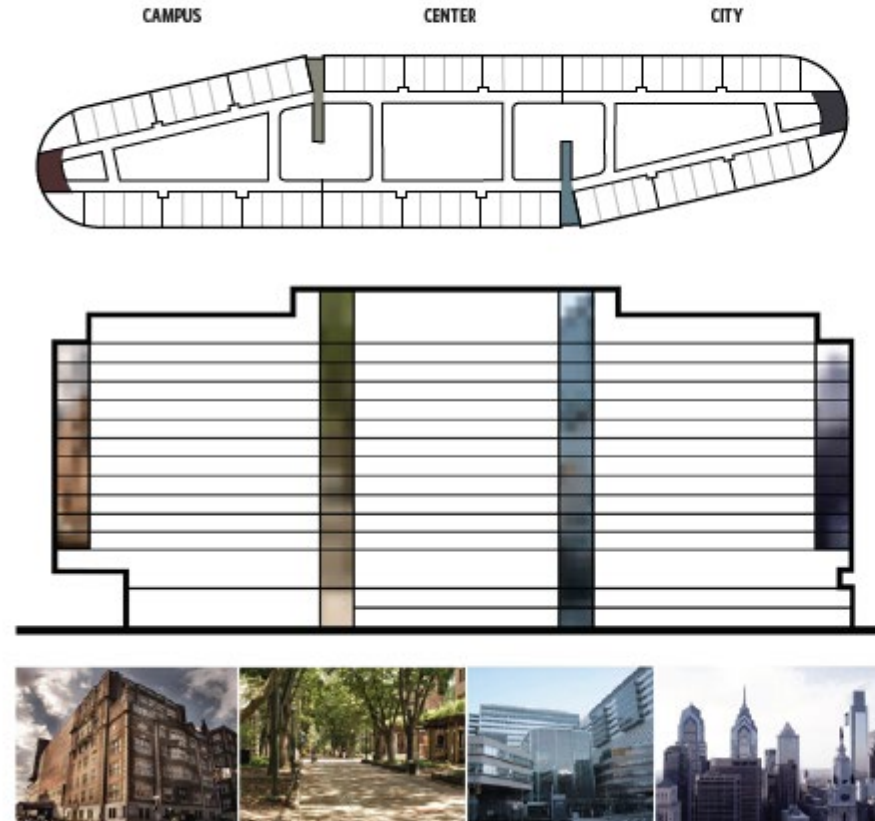
# Wellness

- ▶ Natural light flows into the lounge spaces for visitors and staff, through large windows creating an improved environment for care teams.
- ▶ Areas of respite incorporated into every care environment
- ▶ Accessible pedestrian areas and outside amenities



# Welcoming Arrival & Navigation

- ▶ Human experience centered
- ▶ Spaces are bright and welcoming
- ▶ Evolves the sensibilities of hotel design
- ▶ Circulation areas are indirectly lit for comfort of patients during transport





# Public Spaces – Art & Food for the Soul

- ▶ Public spaces serve as a place of respite and relaxation
- ▶ **Creating Calming environments:** Selection of art designed to transport views from the insides of the hospital – where may feel stressful – to vivid, outdoor scenes to pause and reflect.
- ▶ **Serving up hospitality:** Upscale dining options provide healthy and flavorful meals to those in healthcare community including workers, patients, and families.





# Sustainability - Inside and Out

- ▶ The largest certified project in the United States to use the LEED Healthcare Rating
- ▶ **The largest certified project in the world to achieve Gold or higher in LEED Healthcare**
- ▶ The first hospital in the United States over 1,000,000 sf to achieve certification in LEED Healthcare

## Minimizing Construction, Reducing Waste

- Materials and systems, such as MEP racks, and bathrooms, were pre-fabricated and manufactured off-site, then transported to the building, to minimize on-site waste and maximize energy efficiency.

## Healing with Nature

- An acre of greenery has been incorporated through the Pavilion's landscaping and green roofs, comprised of native and hardy species that require minimal watering and maintenance.
- Repurposes resources like outside air through its HVAC system to source cold and heat, in addition to rain and runoff water, which will be used for the chilled water system to also assist with heating and cooling throughout the building.

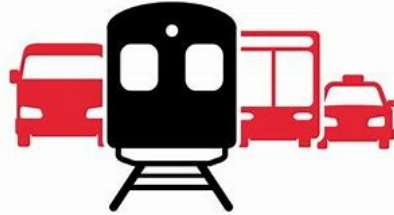


# LEED Gold Elements



## Site

- Access to courtyards and lush plantings
- Extensive green roofs on the upper levels with native plants



## Transportation

- Supports alternative transit options
- Bicycle storage options
- Dedicated spaces for hybrid and electric vehicles
- Access to electric vehicle recharging stations



## Water

- > 30% reduction in indoor water due to installed low flow fixtures
- Site landscaping was carefully designed to beautify reduce irrigation
- > 20% of the water required for building HVAC is provided by water captured and reused on site



## Energy

Anticipated to save 14% in energy costs

Refrigerants used in building limit environmental impact

# Connections

- ▶ Security features
- ▶ Population planning
- ▶ Surge spaced
- ▶ Campus connectivity
- ▶ Emergency services







# Contact ASPR TRACIE



**asprtracie.hhs.gov**



**1-844-5-TRACIE**



**askasprtracie@hhs.gov**