Continuous Learning Through Successive Renovations
Speakers

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In this session, you will learn:

- Recognize methods for analysis of current state and development of countermeasures as a means for making informed design decisions.
- Research the most current strategies for reducing Hospital Associated Infections (HAI) in patient care environments.
- Assess techniques for reducing post-occupancy rework through technology adaptable solutions.
- Summarize the framework of a post occupancy review, identifying techniques for creating a continuous improvement cycle of “Plan-Do-Check-Act”.
Tower Statistics

Tower Built in 1979

16 Tower Levels
- 4 Pods per level
- 41 Pods are currently used for patient beds.

505 Licensed Beds
- 10 observation beds for Emergency Department
- 363 beds are private (72%)
- 450 sf / bed

Inpatient Services
- Orthopedics
- Surgery
- Medicine
- Thoracic
- Research
- Oncology
- ICU’s
- Burn Trauma
- Neuroscience
BWH’s Vision for Tower

- Improve experience for patients and visitors in the tower
- Improve working conditions for staff
- Utilize lean processes to make informed decisions
- Introduce a Tower Standards Program
- Support Medical Education
- Reduce our already low HAIs
- Prepare for relocation of floors 3, 9-16 to a new bed tower
- Medical oncology will stay on floors 4-7 and expand into 3 & 8 after new Bed tower is built
Current State
Research & Analysis of Tower Conditions
Current State
Facilities Zone Analysis (pre-project)
Current State
Observations, 2010

Facility Assessment:
- Entry Sequence
- Public / Family Spaces
- Clinical Workspaces
- Patient Care Zones

Clinical assessment: Nurse shadowing sessions, observation of the following:
- Work Arrounds
- Inefficiencies
- Ergonomic Concerns
- Infection Control Risks
Current State
Clinical Observations, 2010-11

A. No entry / unit clerk
B. Extended central nurse station, no hierarchy
C. Decentralized workstations not ergonomic
D. Nourishment not easily accessible to guests
E. No location for equipment/ supplies
F. Semi-private rooms
G. Infection control concerns
Prototype Pod
Design, 2011

A. Greeting desk
B. Centralized work area in lieu of nurse station
C. Standardization of decentralized workstations
D. Improved patient/family access to nourishment
E. Improved staff access to equipment/supplies/meds
F. Private rooms
G. Room modernization for Infection control
First Pod Design
Pod 7D, Design and Construction, 2012-13

A. Redesigned for Oncology unit, vestibule required
B. Unit coordinator desk at entry
C. Redesigned central work area with technology
D. Sit-to-Stand decentralized work stations
E. Supply and equipment accessible from vestibule
F. Automatic shades
G. PPE cabinet for each room
H. Patient room redesign
I. FGI 2010 Compliance
   - Bed clearances
   - Hand wash sinks in every patient room and bathroom
   - Hard ceilings and sealed fixtures
   - Showers in each room
   - Integral coved base flooring
Second Pod Design
Pod 7C, Design and Construction, 2013-14

A. Central redesign carried over from Pod 7D
B. Tile backsplash added to footwall
C. Introduction of LED lighting
D. Responses to infection control design/detailing
Third Pod Design
Pod 7B, Design and Construction, 2015-16

A. Unit-coordinator desk opened to work area
B. Redesigned central layout
C. Technology removed from work area
D. Manual shades in patient rooms
E. Lighting upgrade to all LED
F. Exterior wall upgrade
G. Exterior window upgrade due to condensation
Fourth Pod Design
Pod 6A, Design and Construction, 2016-2018

A. Work area opened up for visibility
B. Nourishment enlarged
C. Patient room redesigned
D. Infection control
E. Ceiling/ LED lighting redesign
F. Exterior wall and window upgrade
G. FGI 2014 Compliance
   • 6” Integral coved base
   • All/PE Room
VISUAL EVOLUTION
Family Waiting
Pod 7D

BEFORE

AFTER
Clinical Before
Pod 7D

BEFORE

AFTER
Staff Multipurpose
Pod 7D

BEFORE

AFTER

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Patient Room
Pod 7D

BEFORE

AFTER

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Pod 6A

Continuous Learning Through Successive Renovations

NOURISHMENT
Reducing HAI
## Central Line Associated Blood Stream Infections (ICU)

<table>
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<tr>
<th></th>
<th>actual</th>
<th>predicted</th>
<th>SIR</th>
</tr>
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<tbody>
<tr>
<td>Cardiac</td>
<td>0</td>
<td>1.78</td>
<td>0.0</td>
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<tr>
<td>Cardiothoracic</td>
<td>6</td>
<td>6.21</td>
<td>0.97</td>
</tr>
<tr>
<td>Medical</td>
<td>6</td>
<td>4.46</td>
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<tr>
<td>Surgical</td>
<td>3</td>
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<tr>
<td>Neonatal</td>
<td>7</td>
<td>2.47</td>
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## Catheter Associated Urinary Tract Infections (ICU)

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<td>Cardiac</td>
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<td>3.22</td>
<td>1.86</td>
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<td>Cardiothoracic</td>
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<td>7.69</td>
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<tr>
<td>Medical</td>
<td>1</td>
<td>5.48</td>
<td>0.18</td>
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<tr>
<td>Surgical</td>
<td>17</td>
<td>14.32</td>
<td>1.19</td>
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## Surgical Site Infections

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<tbody>
<tr>
<td>Coronary Artery Bypass graft</td>
<td>5</td>
<td>4.15</td>
<td>1.21</td>
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<tr>
<td>Knee Prosthesis</td>
<td>7</td>
<td>2.07</td>
<td>3.39</td>
</tr>
<tr>
<td>Hip Prosthesis</td>
<td>1</td>
<td>4.47</td>
<td>0.22</td>
</tr>
<tr>
<td>Abdominal Hysterectomy</td>
<td>3</td>
<td>4.96</td>
<td>0.64</td>
</tr>
<tr>
<td>Vaginal Hysterectomy</td>
<td>0</td>
<td>0.52</td>
<td>0.00</td>
</tr>
<tr>
<td>Colon Surgery</td>
<td>17</td>
<td>21.63</td>
<td>0.79</td>
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## Facility Wide Lab ID Events

<table>
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<th></th>
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<tr>
<td>C-Diff</td>
<td>160</td>
<td>187.97</td>
<td>0.85</td>
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<tr>
<td>MRSA</td>
<td>6</td>
<td>22.1</td>
<td>0.27</td>
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Average: 1.00
HAIO Design Challenge

- **Mission statement:**
  To minimize and/or eradicate the spread of Healthcare Associated Infections through the use of architecture, design, and construction including their impact on operations and maintenance

- **Design Challenge:**
  To propose innovations in design, the use of materials, cleaning and/or other considerations that will provide measurable reduction in the amount of bacteria in an inpatient room.
The Patient Smart Room

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**Encourage Best Hand Hygiene Practices**
- Easy access to soap dispenser
- Soap dispenser located in patient's reach
- Soap dispenser located near sink

**Point of Touch Reduction**
- Automatic door openers
- Automatic soap dispensers
- Automatic hand sanitizers
- Automatic paper towel dispensers

**Reduce Area of Potential Contaminant Accumulation**
- Glass surfaces on doors and windows
- Glass surfaces on countertops
- Glass surfaces on medical equipment
- Glass surfaces on equipment

**Separate Potential Sources of Contamination**
- Glass surfaces on medical equipment
- Glass surfaces on equipment
- Glass surfaces on medical equipment

**Distinct Visual Cues to Influence Desired Behaviors**
- Use of color and lighting to indicate "please wash hands"

**Design Surfaces to Be Easily Cleanable**
- Prefinished Kinetex® solid surface headwall
- Prefinished Kinetex® solid surface wall
- High-quality Kinetex® solid surface floor
- High-quality Kinetex® solid surface ceiling
- High-quality Kinetex® solid surface ceiling

**Antimicrobial Materials**
- Disinfectant-resistant surfaces
- Disinfectant-resistant surfaces
- Disinfectant-resistant surfaces
- Disinfectant-resistant surfaces

**Use of Technology to Reduce Contamination**
- Wash & Dry® system
- Wash & Dry® system
- Wash & Dry® system
- Wash & Dry® system
Innovative Concepts Being Designed into the HAIO Room
Pod 6A

PATIENT ROOM

BUILDING ON SUCCESS
Continuous Learning Through Successive Renovations
Pod 6A

A. Modifications to headwall
B. Reduction of horizontal surfaces
C. Amenity lighting
D. 6” coved base
Pod 6A

AIRBORNE ISOLATION PATIENT ROOM

BUILDING ON SUCCESS
Continuous Learning Through Successive Renovations
Pod 6A

A. Handwave door control
B. Sliding vestibule doors
C. Disengaged handwashing sink
D. Faucet selection for reduced splash
E. Simplified works surfaces
Lean Toolkit
Plan-Do-Check-Act Cycle

- Caregiver Shadowing
- Continuous Improvements
- Knowledge Briefs
  - Research
  - Problem solving
  - Project sheets
- Post Occupancy Evaluation Template

Diagram:
- **PLAN**
  - Identify Your Problems
- **DO**
  - Test Potential Solutions
- **CHECK**
  - Study Results
- **ACT**
  - Implement the Best Solution
HAIO Product research for reducing HAIs in the inpatient care environment.

Background/Context:
- Hospital Associated Infections are a major problem in healthcare environments. Approximately 95,600 deaths annually are associated with HAIs in the United States.
- Under the auspices of the HAIO, we have been studying ways to reduce HAIs and the new dedicated to cleaning patient care environments. This collaborative effort has been undertaken by a group of healthcare architects and designers, as well as representatives from Massachusetts General Hospital (MGH), Brigham and Women’s Hospital (BWH) and colleagues.
- Research and design process to date has been focused on the creation of an inpatient room mockup, which will test a number of products and proposed design solutions.
- Reducing HAIs could save thousands of lives annually.

Product Information: Handwashing Sink (Patient Room)
- Use of this product was discussed for handwashing zones, and would be used instead of an integral sink and countertop, avoiding contaminating adjacent horizontal surfaces with splashing.
- Offset drain and deep sink basin avoids splash and contamination.

Product Information: Bedpan Washer
- Meiko Bedpan washer: eliminates aerosolization from manually washing bedpans.
- Product recesses into wall above the toilet. It requires an 18" x 26" clear footprint in the plumbing chase wall so needs to be planned into the project early.
- Additional coordination required for plumbing of toilet and washer.

Product Information: Electrochromic Glass
- Switchable glass provides instant privacy from transparent to blackout, by using electrical current in an embedded layer of liquid crystals. Use of this product can eliminate the need for a cubicle curtain, one of the dirtiest high touch surfaces in a patient room.
- LTI Smart Glass, Inc. www.LTISG.com

Product Information: technology

Product Information: Interior finishes and details
- Rounded inside GWB corners for ease of cleaning.
- Curved copper grab bars to reduce continually reduce bacteria growth.
Post Occupancy Evaluations
What is working well?

The unit has a pleasing look.
21 responses

Lighting controls are easy to use and meet my needs.
21 responses

Medical gas and power outlets are appropriately located on the headwall for patient care.
20 responses

The use of integrated blinds provides adequate privacy for patients and families.
21 responses
Post Occupancy Evaluations
Where should we focus improvement?

I can have a clear view of patients from work areas.
21 responses

The Inpatient unit environment makes me feel safe and secure.
21 responses

The staff lounge meets the needs of staff.
21 responses

The patient rooms adequately meet the needs of larger and bariatric patients.
21 responses
Post Occupancy Evaluations
Digging Deeper

Describe how the Inpatient unit design supports or inhibits patient & staff communication and patient privacy.

12 responses

- The central nursing area has a wall on each side, rooms 71-73, and 79-80 are completely out of site. Sometimes people can be out of their rooms and hear staff talking about patients bc they are not visible.
- Bathrooms are ridiculously small in most of the rooms, toilets are in the shower.
- Supplies and linen all conveniently located in 1 area.
- Centralized nursing station is very beneficial also seeing who calls in nursing station is helpful.
- The call light system does not work and it has been an ongoing issue since the change. Patients are calling and we are not aware. Big safety issue.
- No real collaboration area.
- Doors are usually closed, hard to hear thru.
- There is no designation for staff work space. Patients & families routinely walk out to work stations to interrupt staff making concentration challenging at times. There are no privacy screens to block confidential information displayed on computer screens.
- While sitting at work station cannot see pt lights ring. Problems still with bellsystem.
- UC desk is separated from the rest of the staff, the UC is a very important part of our team and being separated from the rest of the staff makes their job more difficult and unsafe.

Describe how the Inpatient unit environment supports or inhibits the patient experience and staff working conditions.

10 responses

- Secretary sitting alone at the desk takes her out of the workflow of the floor and is unsafe for her.
- Can’t see the end rooms on either side when sitting at nurse station on 7D.
- The work station is very uncomfortable. The set up is not ergonomic at all and I often don’t sit with my co workers because there isn’t enough room for me to spread out. The computers are off center and it’s difficult to get comfortable while working.
- Some beds, 51, 52, 59, 60, are unable to be seen by RN station.
- Very poor air quality patient complain about it all the time the layout in the room is very inconvenient. The needle boxes and the thermometer.
- The pod is to spread out.
- Equipment is readily available when working.
- Again, lack of designated, private workspace. Also, the bathroom designs are a hazard. There is not adequate space for patients who use walkers to safely enter & leave bathrooms. The floors are also excessively slippery when wet. The handicapped accessible hook on the back of bathroom doors is a hazard for non handicap patients who often bump into it.
- Lastly, patients & families often hit their heads on the television when accessing the refrigerator.
- Oh & one more… the needle boxes are in inconvenient locations. Staff are often required to use poor body mechanics (ie. stand or sit for long periods) to access these needles.
“Best construction project I’ve ever participated in and I’ve done many. The flow is perfect”
- Katie Fillipon, Associate Chief Nursing Officer, BWH
THANK YOU