The Patient Room Of The Future...

A look at factors that will influence the design, planning and operation of patient care spaces in years to come.
Context of the Discussion

To fully understand the patient room of the future we must take a look at the hospital of the future and the trends affecting its design.
Current Trends in HC design

• Patient & Family Focused Care
• Staff Retention & Recruiting
• Healing Environments
• Consumerism: value = price + outcome + experience
• Integrating Research into Design
Current Trends in HC design

- Healthcare Quality & Efficiency
  - LEAN, TPS, Six Sigma – process improvement
- Changing Patient Demographic
- Patient & Staff Safety
- Sustainable Design
Factors Driving These Trends

• Healthcare costs and utilization rates are out of control – Reform is coming....

• Systems are getting squeezed from the other directions as well
  – Revenues down
  – constantly changing reimbursements

• High cost of healthcare construction

• Technology
Factors Driving These Trends

- Cost is the only part of the equation that systems can control
  - Shift of risk from health plans to individuals
  - Shift to a Retail model of care
  - Become more efficient – less waste
Healthcare Costs

• **What Costs can Design affect?**
  – Labor And Benefits
  – Operations And Services
  – Capital Program
  – Pharmaceuticals And Medical Therapies
  – Equipment, Materials And Supplies
  – Facilities Management And Operations
  – Compressed Payments And Uncompensated Care
  – Compliance And Unfunded Mandates
Healthcare Quality & Efficiency

• We must design facilities to support process improvement techniques
  – Design to remove silos
  – Optimize the whole and not just the parts
  – Must be thought of in context of patient centered care
Healthcare Quality & Efficiency

• Plan For Multi-disciplinary Care Teams (Cellular Design)
• Create Opportunities For Care Providers To Come Together At The Bedside
• Minimize Patient Movement/Transfers
• Create An Environment Of Collaboration
Changing Patient Demographic

• Patients that end up in the hospital will require a higher level of care
  – Aging population
  – Prevalence of chronic conditions
  – Increased outpatient procedures
Changing Patient Demographic

Good news for patients, bad news for hospitals

• This effect will be compounded by:
  – Wellness incentives for health plans
  – Patient centered medical home model of care
    • Chronic care model
Patient and Staff Safety

• Goals Of Design For Safety And Wellness
  – Reduce Patient Falls
  – Reduce Medical Errors
  – Reduce Hospital Acquired Infections
  – Reduce Staff Injuries
Sustainable Design

• Sustainability
  – Not Green......
    Carbon Neutral (2030 Challenge)
  – This will fundamentally change the way we commute

• Transit Oriented Development
  – Live, Work, Play
  – Learn - American College &University Presidents’ Climate Commitment (ACUPCC)
  – Access Healthcare?
Construction Costs

• Specialty Hospital
  – “Retail” Model Of Care
  – $225 / S.F. Construction Cost

• Large Medical Center
  – “Wholesale” Model Of Care
  – $375 / S.F. Construction Cost
The bottom Line...

• Healthcare Systems Must Respond To These Changes To Ensure Future Viability – “Reform Ready”

• Hospitals Can Only Control The Cost Side Of The Equation
  – Will Become Smaller To Meet Cost Challenges
  – Will Become Distributed To Meet Changing Access Modalities
  – Will Have To Be LEAN To Survive
Responding to the Trends

- Practical steps to take
- We must look at the nursing unit as well as the patient room itself
Patient Centered Care

• The nursing unit great debate.....
  – Centralized nursing stations
  – Decentralized or distributed nursing stations

• We prefer to think about “re-centralizing” patient care to the patient

“To be patient-centered-effective, we must understand the Nursing Workspace and rethink how it should support staff needs to provide optimal patient care delivery.”
Patient Unit Configuration

• To be fully “Patient-centered” the focus must shift from the caregiver to the patient

• The unit must be designed to be:
  – Efficient and flexible
  – Allow care team more time with the patient
  – Still allow for teaming and information sharing
  – Support more procedures at the bedside
Patient Unit Configuration

• The idea of a tiered access system
Patient Unit Configuration

**Level 3 Access**
- 6 Rooms
  - Nursing Team/Care Stations
  - Clean Supply/Clean Linen Supply
  - Soiled Holding
  - Medication Station & Dispenser

**Level 2 Access Resource Center**
- 12 Rooms
  - Nourishment Area
  - Tube Station
  - Toilet, Staff Equipment, Supply Storage
  - Crash Cart Alcove

**Level 1 Access Clinical Integration Center**
- 24 Rooms
  - Unit Clerk/Team Station
  - Office, Director (Supervisor)
  - Office, Manager
  - Office, Assistant
  - Office, Staffing
  - Office, Shared (Rotating Staff)
  - Office, Physicians
  - Copy/Work Alcove
  - Chart Assembly/Dictation Area

**Staff**
- Staff Lounge
- Toilet, Staff w/Lounge
- Staff Lockers/shower, toilet
- Call Room

**Visitor**
- Family/Visitor Lounge
- Toilet/Public Telephone/Data Alcove

**Miscellaneous**
- Stretcher, Wheelchair Storage
- Housekeeping
- Recycling Room

**Patient Care**
- Procedure Room
- Special Bathing (Tub Room)
- Multipurpose Room
- O2 Storage

D/P/S Healthcare ...design to enhance the healing experience
Patient Unit Configuration

- **Patient Rooms**
  - Patient Room
  - Toilet, Patient

- **2 Rooms**
  - Nursing Care Stations

- **Level 3 Access**
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D/P/S Healthcare  ...design to enhance the healing experience
Patient Unit Configuration

• Alternate floor configurations studied
Patient Unit Configuration

<table>
<thead>
<tr>
<th>Rank</th>
<th>Plan</th>
<th>Actual Travel (Per Nurse - Per Shift)</th>
<th>Compare Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Square Patient Care Plan</td>
<td>5,039</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Bowtie</td>
<td>6,049</td>
<td>83%</td>
</tr>
<tr>
<td>3</td>
<td>L. Shape</td>
<td>6,392</td>
<td>79%</td>
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<tr>
<td>4</td>
<td>Downtown Presbyterian Hospital - 7th Floor</td>
<td>8,172</td>
<td>62%</td>
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</tbody>
</table>
# Patient Unit Configuration

## Results

<table>
<thead>
<tr>
<th>Plan</th>
<th>Distance (In Feet)</th>
<th>Time Traveling (Trips Modeled)</th>
<th>Time Saved (Trips Modeled)</th>
<th>Potential Time Saved - Compared to PHS</th>
<th>Savings - Compared to Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square Patient Care Plan</td>
<td>5039</td>
<td>1.15 Hours</td>
<td>0.71 Hours</td>
<td>0.89 to 1.02 Hours</td>
<td>0.45  0.64</td>
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<tr>
<td>Bowtie</td>
<td>6049</td>
<td>1.37</td>
<td>0.48</td>
<td>0.39</td>
<td>0.22  0.31</td>
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<tr>
<td>L Shape</td>
<td>6392</td>
<td>1.45</td>
<td>0.40</td>
<td>0.51</td>
<td>0.14  0.20</td>
</tr>
<tr>
<td>Downtown Presbyterian Hospital - 7th Floor</td>
<td>8172</td>
<td>1.86</td>
<td>0.00</td>
<td>0</td>
<td>-0.26 0.59</td>
</tr>
<tr>
<td>Nationwide Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.59</td>
</tr>
</tbody>
</table>

**Walking Saved**

Square Plan - PHS 128 to 147 Miles Each Year
Care Team Configuration
Patient Room Configuration

• Images of patient room
Practical Steps to Room Design

• Pay Close Attention To How The Caregiver Enters The Room
• Locate The Sink Near The Entry And Mind The Details
• Medical Gas Locations
• Eliminate Sources Of Infection Spread
• Safe Passage To The Toilet Room
• Use Mock-ups (Rapid Prototyping) And Game Boarding
Patient Room Configuration

• Enter The Room At The Foot Of The Bed To Allow Nurse To Assess The Situation

• Nurse And Patient Handedness, Not Room Handedness
Nurse and Patient Handedness

- If There Are No Obstacles, The Nurses Handedness Plays An Important Part In Determining The Side Of Patient Care Is Delivered – Primarily the Nurse’s Dominate Hand
- If There Are Obstacles, The Nurses Will Overwhelmingly Choose The Opposite Side
  - The IV Is Typically Placed On The Patient’s Non Dominate Hand

Source: HKS presentation at 2009 ASHE PDC
Nurse and Patient Handedness

IV as Obstacle at the Bedside

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Patient Room Configuration

- Locate The Sink Near The Entry To The Room
- Separate From The Counter
- Offset The Drain Or Use UV Trap.
Patient Room Configuration

Leave space between the sink and counter to prevent splashing on supplies.

In this project the sink was moved from this location. The change was made during the mock-up exercises because they kept hitting the sink when moving the bed out of the room.
Patient Room Configuration

- The sink is a major source of infection spreading germs
  - Easy ways to keep infection spreading

Image from www.optimusise.com

UV Sink Trap

Offset the drain from the faucet
Medical Gas Locations

• Avoid Placing Outlets Behind The Patient’s Head
  – Risk Of Dropping Items On Patient
  – Risk Of Reaching Injury To Staff
• Place On Both Sides Of Headwall
  – Accommodate Nurse And Patient Handedness
  – Provide Acuity Flexibility
Privacy Curtain Alternatives

- Replace curtains with easily cleanable alternatives.

Swing out privacy panel in lieu of curtain.
Toilet Room Access

• Is a handrail from the bed to the toilet room the best solution?

In this configuration the grab bar is a good solution.
Toilet Room Access

- What if the assumptions change?

  If the chair is moved to this likely location does the grab bar help?

  Does the grab bar help if the patient is restricted to exiting the bed on this side?
Toilet Room Access

• Is there an alternative?

Could a better solution be an overhead trapeze rail? This system could work in tandem with ceiling lift rails.
Toilet Room Access

• This solution could help multiple room configurations
Toilet Room Access

• Other common sense safety solutions

Provide a “landing bar” at toilet room doors
Rapid Prototyping

• Rapid Prototyping of the patient room
  – Invite Medical and Clinical staff to critically assess the functionality, efficiency, and safety of the rooms
  – Create opportunity for dialog and interactive feedback to arrive at a design solution that is acceptable to different user groups
  – Give the staff a feeling of empowerment in determining the future of their workspace.
Rapid Prototyping

- Create Full size (real world) model of the room
- Use actual furnishing and equipment where possible
- Employ inexpensive and easily modified materials
- Test clinical scenarios for routine care and emergency situations
- Solicit input from a large and varied group of people
- Collect and study data and opinions of participants
- Incorporate feedback into the room design
- Verify with users that feedback was correctly interpreted
- Make any changes “on the fly” during final session to gain consensus and approval of final design.
Rapid Prototyping

“The rapid prototyping process was extremely valuable because it allowed us to role play with several people in a setting that encouraged participants to make changes in the moment and experience the effect of those changes in real-time. The redesign will greatly enhance caregiver and patient satisfaction, productivity, and safety.”

Presbyterian’s Senior Vice President for Performance Acceleration, Joe Calvaruso
Rapid Prototyping

• The process can result in drastic changes

Initial LDRP Layout

Final LDRP Layout
Rapid Prototyping

• What we learned from the mock-up room
  – The simple room geometry is very calming and allows for maximum flexibility
  – Staff for different acuity levels see the space very differently. Having them all in the same room together to come to a consensus is invaluable.
  – Being able to modify elements on the fly is the key to success. Let the staff interact in the process.
Game Boarding

• A method to foster communication with clinical staff
  – Provide a unit plan at a large scale – the game board
  – Use moveable game pieces to simulate clinical scenarios
  – Keep track of the process flow that is simulated
Future of the Patient Room

• Ideas to think about for future room development
  – Raised floor with under-floor air distribution
  – Modular walls for patient rooms
Raised Floor with U.A.D.
Raised Floor with U.A.D.

• Very flexible for utilities
• Can lead to major energy savings
  – Lower air pressure
  – Higher temperature air delivery
• Enhanced air quality
  – Low to high air flow
• Quiet for the floors below
Raised Floor with U.A.D.

Jefferson Green – Albuquerque, NM - Dekker/Perich/Sabatini office

Performance Projections
- 45% energy savings = $100,000/yr
- 31% water savings = 222,000 gallons/yr

Actual Savings:
- $1.30/sf = $110,000/yr
- ENERGY STAR score of 99

Features
- Underfloor air distribution
- Direct and indirect evaporative cooling
- Refrigerated backup
- Rooftop air handlers
- Gas boilers
- T5 lighting
- Low-VOC materials
- Recycled & regional materials
- Non-potable water line
- Operable windows

Imagine what a Hospital could save
Modular Walls

Images courtesy of:
Haworth®
change by design

D/P/S Healthcare  ...design to enhance the healing experience
Modular Walls

- Flexible space layout
- Can have sinks built-in
- Could be configured with headwall units
- Considered furniture – advanced depreciation
Conclusions

• The patient room of the future should focus on more than just on the room itself
• The nursing unit layout can have great impact on the quality of care
• The room and unit have to be flexible to accommodate changing modalities of care
• There are some very practical steps we can take to enhance patient and staff safety now
Thank You

• Questions?

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