The Patient Room of the Future

ARCH 8823/ COA 8823/ CS 8803

Fall 2006

Project Report:

The Functional Headwall

Project Team:

Jenna Schmidt

Jason Dooley
Executive Summary

Problem Declaration

The patient room is a multi-purpose machine that needs to be adaptable to and designed with the patient in mind. The problem with this fact is that currently this customization is achieved by simply bringing in numerous items and pieces of equipment into and out of the room to help monitor and care for the patient. Many of these items have their own wheeling stands or carts associated with them. This aggregation creates clutter in the room, impedes the traffic flow within the room, and can be bothersome or annoying to the patient and family.

The nurse has to deal with the aggregated elements in the room as well as sporadically placed items that she has to use to serve the patient. She also has no defined area within the room for these supplies, equipment, or storage. Many times she has to enter into the Patient and Family Zones to perform her tasks.

In terms of the family it is currently hard to accommodate overnight visitors within the Patient Room. They have no real designated area within the room and a common piece of furniture, the sofa, takes up a large percentage of their open space. There is also little storage for the patient or the family. This area is not efficient.

Proposed Solution

Our main idea in relation to the Patient Room of the Future is consolidation. The solution here is simple one of consolidation for spatial and user efficiency: Creation of a modular/adaptable/customizable piece of furniture centered around the patient but usable and serviceable by the Nurse and Family.

The goal of our product is to introduce a piece of furniture to the room that actually defines space, engages users, and enhances all three zones of the room at the same time. This piece will incorporate the Patient Zone & Headwall/ Family Zone/ Sleeper Storage/ Shelf / Nurse Zone/ Work Station/ Disposability Center/ and Waste Disposal.
Process to Solution

Observation – Inquiry – Synthesis:

- Examination and documentation exercise for all of the equipment and technology currently present in the typical patient room and also devices brought into the room
- Nurse interviews about criticisms and suggestions for a future patient room
- Created visual comparison of equipment that revealed patterns and relationships
- Analyzed information looking for patterns to find design concepts

Resolution of ideas - three sets in mind:

- Nurse's needs vs. everyone else’s needs
- Consolidation of items in the room
- Separate groups of items to enhance work flows

2nd Round of Observation – Inquiry – Synthesis:

- Additional nurse interviews concerning the "servicing" of the patient to find out what items could be centralized to make this process more efficient. This would give more time to directly addressing/interacting with the patient and family
- Re-investigation of mountable or connectable equipment
- Develop better understanding of nurse, patient, and family zone requirements
Reflections

It is rare to get a chance to work with other graduate students from vastly different disciplines, and to come together and create something new. Nurses, designers, architects engineers and computer science majors all have a place in the patient room of the future. Each individual had separate backgrounds and areas of expertise, and by blending these together, we produced a balanced group of projects. Insight and inspiration was not only sought out from the students, but also from the diverse faculty. This class taught us all an important lesson of problem solving through another person’s perspective, or through another set of eyes. The experience we gained through this class will stay with us well beyond the confines of graduate school or the healthcare environment.
Discussion

The open house was a great opportunity to take a look at the hard work of everyone involved in this project. I would have liked to hear the explanations of all the final mock-ups, but we never really had that opportunity. This class was very intense and demanding and I am very proud of the work we accomplished in such a short amount of time. Our ideas were innovative and unique, especially considering most students did not have a healthcare background. This was a great learning opportunity that taught us all lessons that went way beyond our personal disciplines.

In terms of our final product, I feel like we accomplished a tremendous amount of work for only two people, in a short amount of time. Before we actually started building anything, we had all our ideas carefully plotted out, and I think this is why the project went as smoothly as it did. There was an enormous amount of construction, but surprisingly, we did not have many obstacles that we were not able to overcome. The advice we received from June Connor, Sabir Kahn, Abir Mullick, Craig Zimring, Ellen Yi-Luen Do, and David Cowan helped us to refine our design and formulate a great final product. Whenever we had a question or a problem, there was always someone eager to help, and this is one reason why the class was so successful.
Acknowledgements

This interdisciplinary project would not have been possible without the generous support of Steelcase. For many students, this was our first behind-the-scenes look at the design process within a major industry leader, like Steelcase. Joyce Bromberg was supporting and motivating from start to finish. The faculty advisors and healthcare professionals that guided us along this project should also be given great recognition. Their first-hand industry experience proved to be invaluable. There were many instances in which these people went above and beyond their responsibilities as faculty and advisors and put their occupations on hold to help us with our projects. Lastly, we would also like to thank Stryker and The Modular Services Company for providing us with equipment that completed our mock-up.

Thank You.
THE FUNCTIONAL HEADWALL
<table>
<thead>
<tr>
<th>UNIT DESCRIPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAREGIVER</strong></td>
</tr>
<tr>
<td>- SUPPLY STORAGE</td>
</tr>
<tr>
<td>- EXTENDABLE WORK SURFACE</td>
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<tr>
<td>- DISPOSABILITY CENTER</td>
</tr>
<tr>
<td>- MEDIA/COMMUNICATION STORAGE</td>
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<tr>
<td><strong>PATIENT</strong></td>
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<tr>
<td>- CONNECTIONS FOR PATIENT BED</td>
</tr>
<tr>
<td>- TWIN HEADWALL PANELS</td>
</tr>
<tr>
<td>- MULTIPLE SETTING EXAM LIGHT</td>
</tr>
<tr>
<td>- IV HOOKS</td>
</tr>
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<td>- EQUIPMENT MOUNTING POLES</td>
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<td>- PRIVACY SCREEN</td>
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<td>- SHELVING</td>
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<td>- CLOTHES STORAGE</td>
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<td>- REMOVABLE BED-SIDE TABLE</td>
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<td>- EXTENDING WORK SURFACE</td>
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<td><strong>VISITOR</strong></td>
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<td>- STORAGE</td>
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<td>- READING LAMP</td>
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Bibliography


Attachments

1. Powerpoint Presentation 1
2. Powerpoint Presentation 2
3. Powerpoint Presentation 3
4. Powerpoint Presentation 4
5. Powerpoint Presentation 5
Patient Room of the Future

Team Delta

June Connor, Jason Dooley, Jenna Schmidt, Ted Ullrich
Introduction

June Connor –

Jason Dooley – Masters of Architecture Student

Jenna Schmidt – Masters of Industrial Design Student

Ted Ullrich – Masters of Industrial Design Student
our Method

• During our visit to Emory Crawford Long Hospital we examined and documented all the equipment and technology that was present in the room and also devices brought into the room.

• We also thought it was important to talk with a group of nurses and get their criticisms and suggestions for a future patient room.

• In order to show several relationships among the existing equipment we compiled our data into a spreadsheet format.
our Method

• We broke the spreadsheet down into 10 categories that we used as a basis to compare the equipment and technology.
  • Used by: Nurse, Patient or Family
  • Mobility: Wheels, Leaves Room
  • Information: Audible, Visual
  • Other: Electronic, High Frequency Use, Disposable

• The advantage of this approach is that we have a visual comparison of equipment that we can utilize to see patterns and relationships and help make the room as efficient as possible. In addition to the spreadsheet, we talked with nurses and now have a better understanding of the existing successes and failures within the current system.

• After reviewing the spreadsheet, we came up with 5 specific concepts that we felt were important improvements and could ultimately make this room better.
### Inventory

#### Equipment Inventory Analysis

**Team Delta**

<table>
<thead>
<tr>
<th>Item</th>
<th>Nurse</th>
<th>Patient</th>
<th>Family</th>
<th>Wheels</th>
<th>Leaves Room</th>
<th>Visual</th>
<th>Audible</th>
<th>Electronic</th>
<th>High Freq</th>
<th>Disposable</th>
<th>Description/Comments</th>
<th>Price</th>
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<td>x</td>
<td>Measures Blood sugar by fingerstick; also used by nurse techs</td>
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<td>Used by all to summon help or communicate needs</td>
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<td>x</td>
<td>Place contaminated or used syringes, needles, devices</td>
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<td>Sleeper Sofa</td>
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<td>Against health regulations to store under the sink, mostly a waste of space</td>
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<td></td>
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<td>Regulates suction pressure to catheters on patient</td>
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<td>Monitors patients heart rhythms for visual tracing at a central monitor</td>
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Inventory

• Highlight interesting relationships, patterns
• show venn diagram
Synthesis

Nurse Suggestions & Criticisms

1) Wider and Deeper rooms so equipment can be easily transferred in and out.
2) Removal of cupboards/ storage under the sink (against health regulations).
3) IV Pump in every room.
4) Better way to display information for the patient (meal schedules, visitor hours, etc)
5) Covers for oxygen, suction canisters and vacuum ports.
6) Window Seat with storage that can also transform into a bed for the family.
7) Recliner for patients, or a bed that bends into a chair.
8) Single remote control for patient aspects of the room, including window blinds.
9) Better Heat/ Air flow (raise the vents above the window instead of on the floor behind the sofa).
10) Scale integrated into each bed.
Synthesis

• Compare our findings with nurse’s criticisms and suggestions
Concepts

- Multiple Instances/locations for high-frequency use items. Example: remotes, intercoms, possible wireless interfaces

- Low frequency and non-mobile items: group these into built-ins. Example: bay seat with bed and storage

- Universal IV pole – one pole w/ multiple uses - for bed attachment, rolling stand mounting, and ceiling mounting

- Separate service from healing. This breaks into A) grouping disposability items, B) information center, and C) high frequency items positioned up-front. The over-riding idea is to conceal from the patient what they don't have to see, including things like suction canister, sharps, thermometer, etc. and make visible what they should see like info center.

- Overall Consolidation where possible - grouping or combining similar items together to fit more into a smaller space. Finding instances where equipment could be combined (integrated into each other) so that the items when brought in or taken out, would be more portable, condensed, & hopefully easier to use
Photos
Photos
Photos
Conclusion

• Method
• Procedure
• Results
Patient Room of the Future

Team Delta
Introduction

Jason Dooley – Masters of Architecture Student

Jenna Schmidt – Masters of Industrial Design Student

Ted Ullrich – Masters of Industrial Design Student

June Connor – Masters of Nursing from Emory, Nurse at Emory Crawford Long Hospital
our Method

• During our visit to Emory Crawford Long Hospital we examined and documented all the equipment and technology that was present in the room and also devices brought into the room.

• We also thought it was important to talk with a group of nurses and get their criticisms and suggestions for a future patient room.

• In order to show several relationships among the existing equipment we compiled our data into a spreadsheet format.
our Method

• List all equipment; analyze each peace with 10 categories as a basis of comparison.
  • [Used by:] Nurse, Patient or Family
  • [Mobility:] Wheels, Leaves Room
  • [Information:] Audible, Visual
  • [Other:] Electronic, High Frequency Use, Disposable

• Spreadsheet provides a visual comparison of equipment revealing patterns and relationships.

• Asking experts; nurses.

• Analyze information, looking for patterns to find 5 concepts.
## Inventory

**Patient: Room of the Future**

### Equipment Inventory Analysis

**Team Delta**

<table>
<thead>
<tr>
<th>Item</th>
<th>Used By</th>
<th>Mobility</th>
<th>Information</th>
<th>Other</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed</td>
<td>Nurse</td>
<td>Patient</td>
<td>Family</td>
<td>Wheels</td>
<td>Leaves Room</td>
</tr>
<tr>
<td>Bed - Mattress</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Blood Glucose Monitor</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Blood Pressure Sphyg. w/ cuffs</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>Blood Sugar Check (Accucheck)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Crash Cart</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>FNA</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
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<td>IV rack - bed</td>
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<td>IV rack - ceiling rack</td>
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<td>IV rack - rolling pole (EXACTO)</td>
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<td>Light - above sink</td>
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<td>Light - Exam/Headwall</td>
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<tr>
<td>Light - Overbed</td>
<td>X</td>
<td>X</td>
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<td>Monitor - Radio frequency</td>
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<td>Outlets - bed headwall</td>
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<td>Remote - ALL IN ONE</td>
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<td>X</td>
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<tr>
<td>Remote - lights</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Remote - nurse call</td>
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<td>X</td>
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<td>Remote - television</td>
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<td>X</td>
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<td>X</td>
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<td>X</td>
<td>X</td>
</tr>
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<td>Table - bedside (nightstand)</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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<td>X</td>
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<td>Television</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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<td>Thermometer</td>
<td>X</td>
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<td>X</td>
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<td>Trash Can</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Visitor Chair</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Wireless Internet</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

---
Inventory

- Heavily nurse oriented
- Many objects used by all
- No shared objects between family and nurse
Synthesis

Nurse Suggestions & Criticisms

1. Wider and Deeper rooms so equipment can be easily transferred in and out.
2. Removal of cabinets/storage under and around the sink (health regulations).
3. IV Pump in every room.
4. Better way to display information for the patient (meal schedules, visitor hours, etc).
5. Covers for oxygen, suction canisters and vacuum ports.
6. Window Seat with storage that can also transform into a bed for the family.
7. Recliner for patients, or a bed that bends into a chair.
8. Single remote control for patient aspects of the room, including window blinds.
9. Better Heat/Air flow (raise the vents above window; not on the floor behind sofa).
10. Scale integrated into each bed.
Synthesis

Overlap between Nurse’s suggestions and Chart

- Two sets of mind: Nurse’s needs vs. everyone’s needs
- Consolidation of items in the room
- Separate groups of items to enhance work flows
Concepts

5 Final Design Paths

1. Multiple Instances/locations for high-frequency use items. Example: remotes, intercoms, possible wireless interfaces. picture

2. Low frequency and non-mobile items: group these into built-ins. Example: bay seat with bed and storage. picture

3. Universal IV pole - one pole w/ multiple uses. Example: for bed attachment, rolling stand mounting, & ceiling mounting. picture

4. Separate service from healing.
   • A) Grouping disposability items
   • B) Information center
   • C) High frequency items positioned up-front. Conceal from the patient what they don't have to see. picture

5. Overall Consolidation where possible - grouping or combining similar items together to fit more into a smaller space. picture
Conclusion

• Method: Spreadsheet
• Procedure: Observation, Inquiry, Synthesis
• Results: 5 Design Paths
Remote, Nurse Call
Current Sofa
Bay Window
IV Poles
Patient Room of the Future

Patient Zone

Jenna Schmidt, Jason Dooley
The Problem

- The patient room is a multi-purpose machine that needs to be adaptable to and designed with the patient in mind. The problem with this fact is that currently this customization is achieved by simply bringing in numerous items and pieces of equipment into and out of the room to help monitor and care for the patient. Many of these items have their own wheeling stands or carts associated with them. This aggregation creates clutter in the room, impedes the traffic flow within the room, and can be bothersome or annoying to the patient and family.

- The nurse has to deal with the aggregated elements in the room as well as sporadically placed items that she has to use to serve the patient. She also has no defined area within the room for these supplies, equipment, or storage. Many times she has to enter into the Patient and Family Zones to perform her tasks.

- In terms of the family it is currently hard to accommodate overnight visitors within the Patient Room. They have no real designated area within the room and a common piece of furniture, the sofa, takes up a large percentage of their open space. There is also little storage for the patient or the family. This area is not efficient.
our Method

• Develop understanding of Nurse, Patient, & Family Zone requirements

• Nurse interviews about the "servicing" of the patient to find out what items could be centralized to make this process more efficient giving more time to directly address/interact with the patient

• Re-investigation of mountable or connectable equipment

• Develop design solutions to integrate all these features

• Produce 3D and detailed drawings of final design

• Build a full scale volumetric mock-up in a room
site Research

• We visited Emory University Hospital in Decatur where we examined and documented multiple patient rooms.

• We interviewed several groups of nurses about their criticisms and suggestions of what they felt needed to be included in a future patient room.
Interviews

- **Nurse Interviews – Patient Room Needs:**
  - **For Caregivers**
  - Adequate room for circulation
  - Adequate area around bed
  - Easy access to the patient
  - Caregiver access to lighting controls (multiple locations)
  - A work surface (not by a sink)
Interviews

• Easy access to electrical outlets
• IV hanging locations
• Limited open shelving for storage of supplies
Interviews

• Covering for Med Gas/ Air/ Suction connections
• Computer connections
• Clocks
Interviews

• Nurse storage for objects they typically carry in their pockets (alcohol swabs, Band-Aids, drug compatibility charts, Saline flushes, calculator)
Interviews

- **For Patients & Family**
  - Shower, no bathtub
  - Light for reading
  - Adjustable lighting levels
  - Computer connections
  - Storage
Interviews

- Less institutional looking
- Refrigerator
- Natural light
- Views of Nature
Interviews

- Privacy
- Visitor Seating
- Lockable Storage
Concepts

• Our main idea in relation to the Patient Room of the Future is consolidation. The solution here is simple one of consolidation for spatial and user efficiency: Creation of a modular/adaptable/customizable piece of furniture centered around the patient but usable and serviceable by the Nurse and Family.

• The goal of our product is to introduce a piece of furniture to the room that actually defines space, engages users, and enhances all three zones of the room at the same time. This piece will incorporate the Patient Zone & Headwall/ Family Zone/ Sleeper Storage/ Shelf / Nurse Zone/ Work Station/ Disposability Center/ and Waste Disposal.
Initial Design
Design Progression
Design Progression
Problems Resolved

- Nurse Work Surface
- Storage (nurse, patient, visitor)
- Easier Headwall Access
- Consolidation of Equipment
- Consolidation of Disposables
Problems Resolved

• Better Lighting
• Less Institutional
• Visitor Functions
Patient Room of the Future

Patient Zone

Jenna Schmidt, Jason Dooley
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Interviews

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Interviews

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Design Progression
Design Progression
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- Nurse Work Surface
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Problems Resolved

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- Less Institutional
- Visitor Functions
Final Design
Final Design
Final Design
Final Design
Final Design
Final Design
Final Design
Patient Room of the Future

Patient Zone

Jenna Schmidt, Jason Dooley
Final Design
Final Design
Final Design
Final Design
Final Design
Final Design