

# Post-Occupancy Evaluation:

## Observations on Patient Satisfaction and Staff Operations

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Since joining Ballinger in 1987, Lou Meilink's design solutions have helped shape the future of healthcare at academic medical centers, regional/community hospitals, and healthcare delivery systems. He works closely with clients to develop facility solutions and translate highly complex project concepts into simple terms. His orientation toward client service and delivery of high-quality, cost-effective projects has brought him recognition from healthcare institutions as well as his peers. Lou is an author and speaker for organizations such as the Center for Health Design, the American Institute of Architects, the Association of American Medical Colleges, and Tradeline.

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## Abstract

Penn Medicine Chester County Hospital (PMCCCH) –  
Post-Occupancy Evaluation

Ballinger recently conducted a Post Occupancy Evaluation (POE) of PMCCCH's new Lasko Tower. Although the primary goal of the study was to gather insights for internal education and future projects, it also offered an opportunity to compare patient satisfaction and operational performance between Lasko Tower (built 2013-14) and an existing unit, the West Building (built - 1962, renovated - 1998). The methodology of the POE included staff and patient surveys, staff interviews, and onsite observation.

There were several similarities between the two units including private patient rooms and similar acoustical features. However, significant differences at the new Lasko Tower included larger unit size and decentralized care stations between every 2 patient rooms. Because of the similarities between the two units, there was a more direct comparison between HCAHPS scores (noise & cleanliness), and rates of HAIs. The POE analysis reviewed multiple items:

- Patient satisfaction with the patient rooms and other family amenities,
- Staff operations relative to charting and patient care, and
- Housekeeping operations relative to material selection and ongoing maintenance.

The study assigned a cost/benefit metric to key design considerations including private rooms, decentralized care stations, intangible amenities, and family amenities. The findings included:

- Patients felt that the decentralized nurse stations improved their sense of being cared for - the highest impact for the least cost.
- Staff felt they had higher productivity on the new unit – even after initial concerns about size and layout of the unit.
- The highest satisfier for patients in the new unit was the patient room size and bathroom.

Since the move from West Building to Lasko Tower, the hospital has seen significant improvements in HCAHPS and staff satisfaction. The results from this POE are also being used to help inform the design and furniture/equipment selection of PMCCCH's next bed tower.

## Keywords:

Post-Occupancy Evaluation, Patient Satisfaction,  
Staff Performance, HCAHPS, Cost/Benefit

## Category:

Experience:  
Improvements through experience-balanced patient satisfaction and performance quality.

## Introduction

Post Occupancy Evaluations (POEs) were first conducted in the United States in the 1960's after introduction in the United Kingdom. The goal was to evaluate buildings in a systematic and rigorous way after they had been occupied for some time ([Preiser & Vischer, 2005](#)). Architects' use of POEs has been revived in recent years as the result of a growing awareness of Evidence-Based Design (EBD). More healthcare institutions and architects are interested in feedback that has a basis in science and that can be used to improve a hospital's physical environment. These improvements can have both technical aspects (use of materials, room/unit layout) and emotional aspects (access to light, views to nature). Design interventions at each area can benefit patients and staff, providing lower stress surroundings and the opportunity for more efficient operations. A pleasant, therapeutic environment can also be a competitive advantage as hospitals struggle to recruit and retain talented staff ([Kotzer, et al. 2011](#)). According to Ulrich (2008), the growing body of research indicates that, "well-designed physical settings play an important role in making hospitals less risky and stressful, promoting more healing for patients, and providing better places for staff to work" ([p. 63](#)).

## Case Study: Penn Medicine Chester County Hospital (PMCCH)

Like many hospital systems, PMCCH is modernizing their facility and converting to all private patient rooms. This initial investment started in 2014, with the completion of the new Lasko Bed Tower. Today, the hospital is continuing that commitment with a clinical expansion and the planning of future patient beds. To help inform different features of the new expansion, a Post Occupancy Evaluation (POE) was conducted in late 2015. Although the primary goal of the POE was to provide insights for future projects, it also offered an opportunity to compare patient satisfaction and operational performance between the recently completed Lasko Bed Tower and the original Ground West Building – built in 1962.

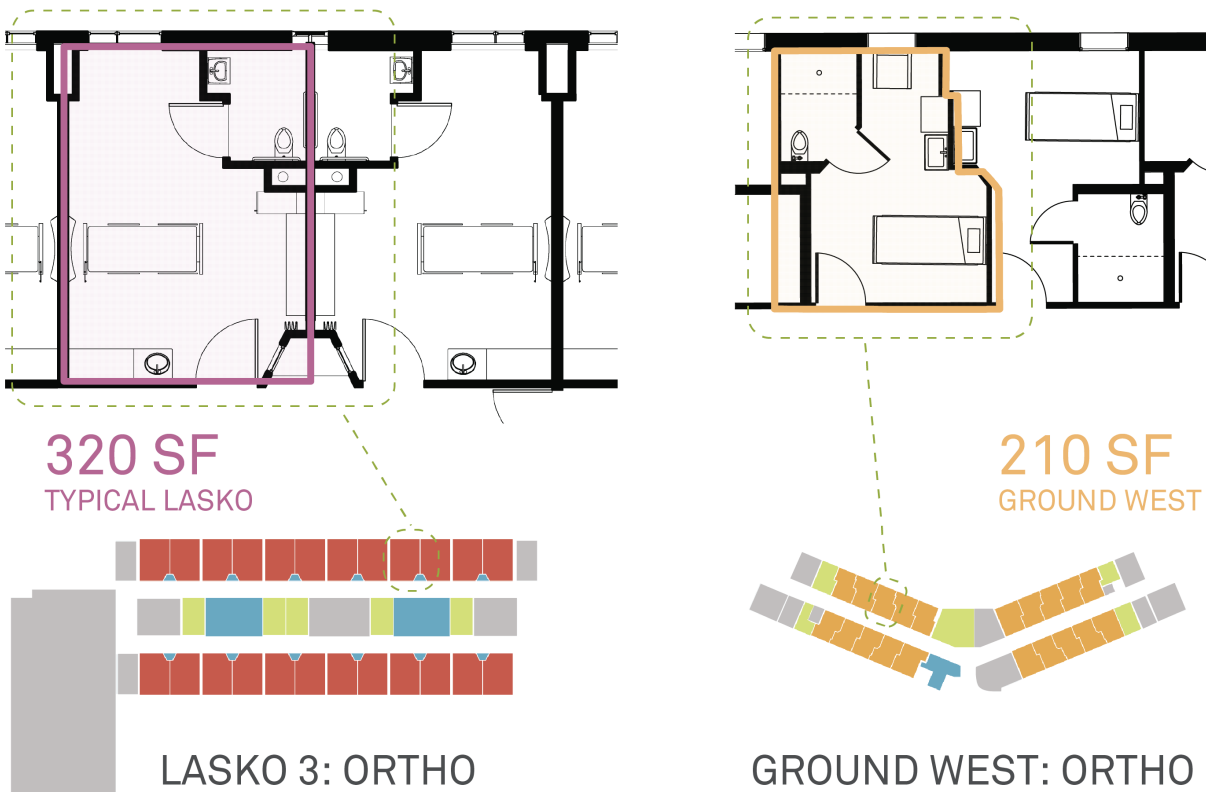
The first part of this paper concentrates on the direct comparison between the new and old patient units – based on POE survey results and HCAHPS scores (Hospital Consumer Assessment of Healthcare Providers & Systems). The second part concentrates on evaluating cost/benefit outcomes for different aspects of the design.

### POE Methodology

The POE included patient/staff surveys, staff interviews, and field observation. With over 117 staff responses and 50 patient responses, the survey became the largest source of insight and data for the evaluation. The survey was conducted in December 2015 (some 18-30 months after the staggered occupancy of the new bed tower) and it addressed three floors in the new Lasko Bed Tower as well as the existing patient unit. The staff completed the survey online while nurse managers recorded patient responses by hand. Patient responses were later entered online to allow for consolidated analysis.

## DIAGRAM #1

### LASKO AND GROUND WEST ROOM PLANS AND FLOOR CONFIGURATIONS



Part of the interest in comparing Lasko 3 to Ground West was the similarity between the two units. (See Diagram #1.) Both units had all private rooms, they both housed orthopedic patients, and the building elements affecting acoustic performance (floor/ceiling finishes and partition construction) were similar in both areas. Furthermore, the nursing staff from Ground West moved to the new Lasko unit. These similarities minimized the variables when comparing the two units. In spite of the commonalities, there were also significant differences between the units. With four additional patient rooms, greater support space, and larger rooms, the Lasko floor plate was approximately 75% larger than Ground West. Another notable difference was the unit layout. The Lasko rooms were organized in a racetrack around a central support core. In contrast, the Ground West unit featured a double loaded, “V” shaped corridor. And finally, Lasko rooms also featured decentralized nurse stations between each pair of rooms.

## Results: Noise Reduction

Operationally, the hospital placed a high priority on reducing noise and frequently reminded staff of the benefits of a quiet unit and how to achieve it. They recognized that noise has an adverse impact on both staff and patients, resulting in fatigue, diminished judgement, sleep deprivation, and anxiety ([Baker, 1992](#); [Joseph & Ulrich, 2007](#); [Morrison, et.al., 2003](#)). In fact, one of the biggest complaints regarding the Ground West unit was related to noise. Although the hospital added acoustic insulation above the corridor and patient room ceilings several years ago, the problem persisted. Initially, the noise difference between Ground West and the new Lasko units was attributed to individual elements of the physical environment – such as older ceiling tiles and the construction of the demising partitions. However, the facilities group reported that Ground West had a gut renovation in 1998 (which included new, full-height, insulated partitions with STC 45) and new ceiling tiles in the fall of 2015 - to match the new unit. Consequently, the finishes and partition construction between the units were not the primary contributors to the perception of noise. Instead, the variation in unit configuration between Ground West and the Lasko Tower had the greatest impact. The activities generating noise, including food/medication deliveries, congregating nurses, visiting families, and traffic through the unit, were concentrated in a much smaller area at Ground West. The racetrack design in Lasko, larger patient rooms, and multiple decentralized nurse stations all contributed to a less dense environment and a noticeably quieter unit. The average increase in HCAHPS satisfaction for quietness between the original patient units and the corresponding new units in Lasko was 34%. The POE survey results between Ground West and Lasko 3 showed an even more pronounced improvement. (See Diagram #2.)

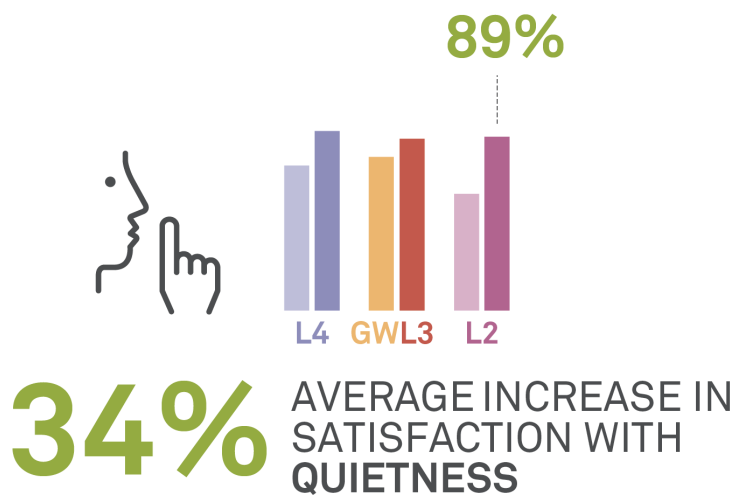
Focus groups were also held with Baystate's Patient and Family Advisory Council. An objective facilitator from Baystate conducted three sessions with 10-12 participants each. In 40-minute meetings, patients discussed their stay in the unit and reviewed room designs, ranking priorities for 26 room features such as ability to control lighting elements and room temperature, access to personal and medical technology, staff visibility, and visitor accommodations (See Diagram 3).

## DIAGRAM #2

### PATIENT AND STAFF SATISFACTION WITH SOUND CONTROL



### HCAHPS SATISFACTION



## Results: Hospital Acquired Infections (HAIs) - Reduction

With respect to patient satisfaction for cleanliness and patient safety (Hospital Acquired Infections HAIs), the improvements were equally dramatic. The HCAHPS scores for cleanliness increased an average of 28% between the old and new units and the rate of HAIs decreased by 52% (See Diagram #3.). Because this category compared new units against units with 18 year old finishes, the hospital anticipated greater patient satisfaction. They also expected improvements with HAIs because of a lower accumulated bio-burden in a new building.

However, the dramatic decrease of 52% for HAIs was beyond their expectations. In addition to new finishes, this decrease was associated with several other factors including the ease of maintenance, better placement of handwashing sinks, and the greater use of alcohol gel stations. The hospital's Director of Environmental Services noted that even though the new Lasko units were substantially larger, the rooms were easier to clean and additional staffing was not required at the new unit. With a much smaller footprint and an odd configuration, the Ground West rooms were cluttered and difficult to navigate. (See Diagram #1.) The material choices in the new bathrooms also eased maintenance. The Ground West bathroom had a small format ceramic tile at the floor, base, and walls. In contrast, the Lasko bathrooms have a seamless epoxy floor (with integral base) and large format ceramic tile walls. (See Diagram #3). With fewer grout seams and a seamless floor, the Lasko bathrooms were easier to clean and maintain. Another contributing factor to lower HAIs was the number of handwashing sinks and more convenient access to those sinks. Ground West had only one handwashing sink - located within the patient room. In the Lasko unit, there was one sink in the bathroom and one in the patient room - both with easy access. The final contributing factor to lower HAIs was the increased quantity of hand sanitizers. Initially, Ground West had no hand sanitizers but they were added after the HAI data was compared with the new units and the positive results were proven. This result was supported by multiple studies which showed that easily accessible hand sanitizers helped to reduce contact contamination ([Ulrich, et al. 2008](#)). Many elements contributed to reductions in infections and deliberate choices in finishes and hand hygiene reinforced these improvements.



## DIAGRAM #3

PATIENT AND STAFF SATISFACTION WITH CLEANLINESS AND IMPACT ON HAIs



HOSPITALS REPORTED:  
HAIs HAVE  
DECREASED

52%↓

SINCE THE MOVE



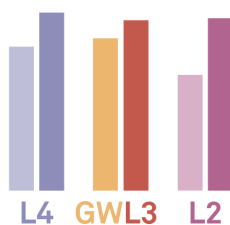
SURVEY RESPONSE:



79%

OF STAFF ARE SATISFIED WITH  
SELECTION OF MATERIALS  
AND HOW THEY HAVE HELD UP

90%



HCAHPS SATISFACTION

28%

AVERAGE INCREASE IN  
SATISFACTION WITH  
CLEANLINESS



## Comparison

While the first part of this paper reviewed global issues, the second part will focus on a cost/benefit comparison for different design options. The cost (\$) and benefit (+) status was determined by a relative comparison of multiple factors. For instance, the cost score was based on cost of space, materials, and ongoing operations. Similarly, the benefits were scored based on contribution to patient satisfaction, patient safety, staff satisfaction, or staff operations.

### Comparison: Private Patient Room

Cost: \$\$\$ Benefit: ++++

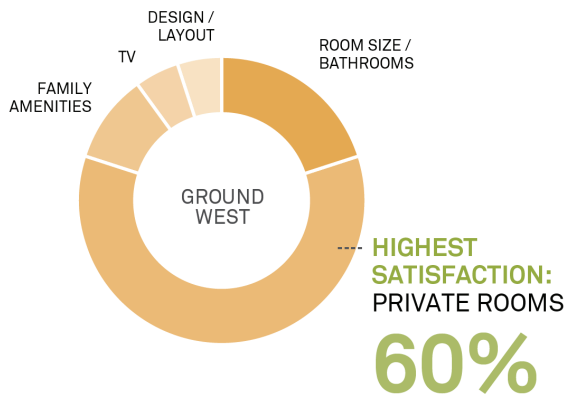
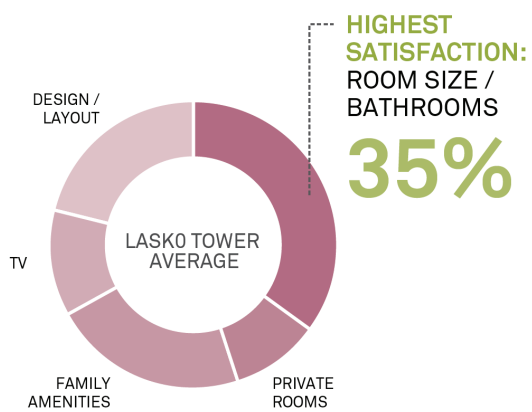
For both staff and patients, the single largest satisfier in the new Lasko unit was the room size and bathroom. The staff appreciated having adequate space for equipment in the room, easy access to patients, and adequate space to assist patients to the toilet room. Likewise, patients appreciated rooms that allowed enough space for family members to stay overnight and an unobstructed path to the toilet. Accommodating families in the patient room can result in higher patient satisfaction and greater patient care ([Harris, Shepley, & White, 2006](#); [Miceli & Clark, 2005](#)). Ground West patients also expressed satisfaction with the size of their very compact rooms but stated the greatest satisfaction with just having a private room. They complained more about the TV being too small than the size of their room. Diagram #4 summarizes the survey results and HCAHPS scores.

Over the years, additional space in a patient room has been driven by several factors. Current codes require private rooms in new construction – reflecting evidence of many patient benefits and best practice. Also, many institutions are converting existing semi-privates into privates because it has become the standard of care in today's consumer society. But additional space represented large first cost as well as ongoing operational costs – for heating, cooling, and lighting. Consequently, there were many options in room size/dimensions and the final configuration must be balanced against functional needs and the competitor's offerings.

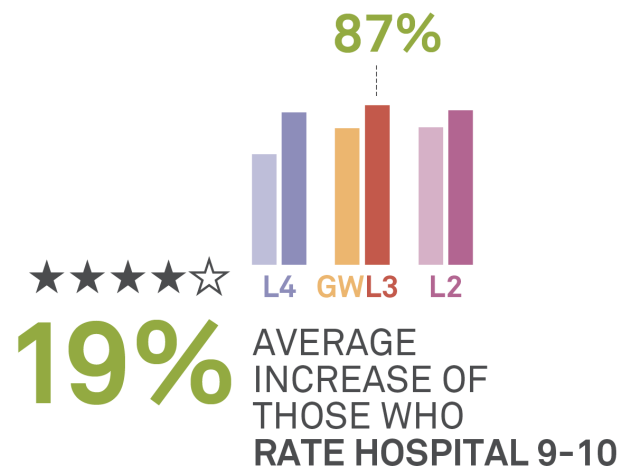
## DIAGRAM #4

PATIENT SATISFACTION WITH ROOM DESIGN AND HCAHPS

### SURVEY RESPONSES



### HCAHPS RESPONSES



## Comparison: Intangibles – Daylight and Nature

Cost: \$ Benefit: +++

Other intangible aspects of the patient room were access to daylight, views to nature, and therapeutic interior finishes. Unlike the size of a room, these items can be provided at a modest cost and deliver benefits ranging from lower blood pressure to better sleep quality and greater patient satisfaction ([Vincent, et al. 2010](#); [Beauchemin & Hays, 1996](#)). An interesting comparison of these intangibles can be seen in Diagram #5. While patients at both units and the staff at Lasko viewed their rooms favorably, Ground West staff were much more critical of their environment. In addition to noise, Ground West patients were frequently displeased about old, dated finishes.

Cosmetic upgrades can be relatively inexpensive and include paybacks of a cleaner, calmer, and more therapeutic environment with higher patient satisfaction. Also, when staff members are satisfied by their surroundings, they are more apt to provide better patient care, creating a virtuous cycle.

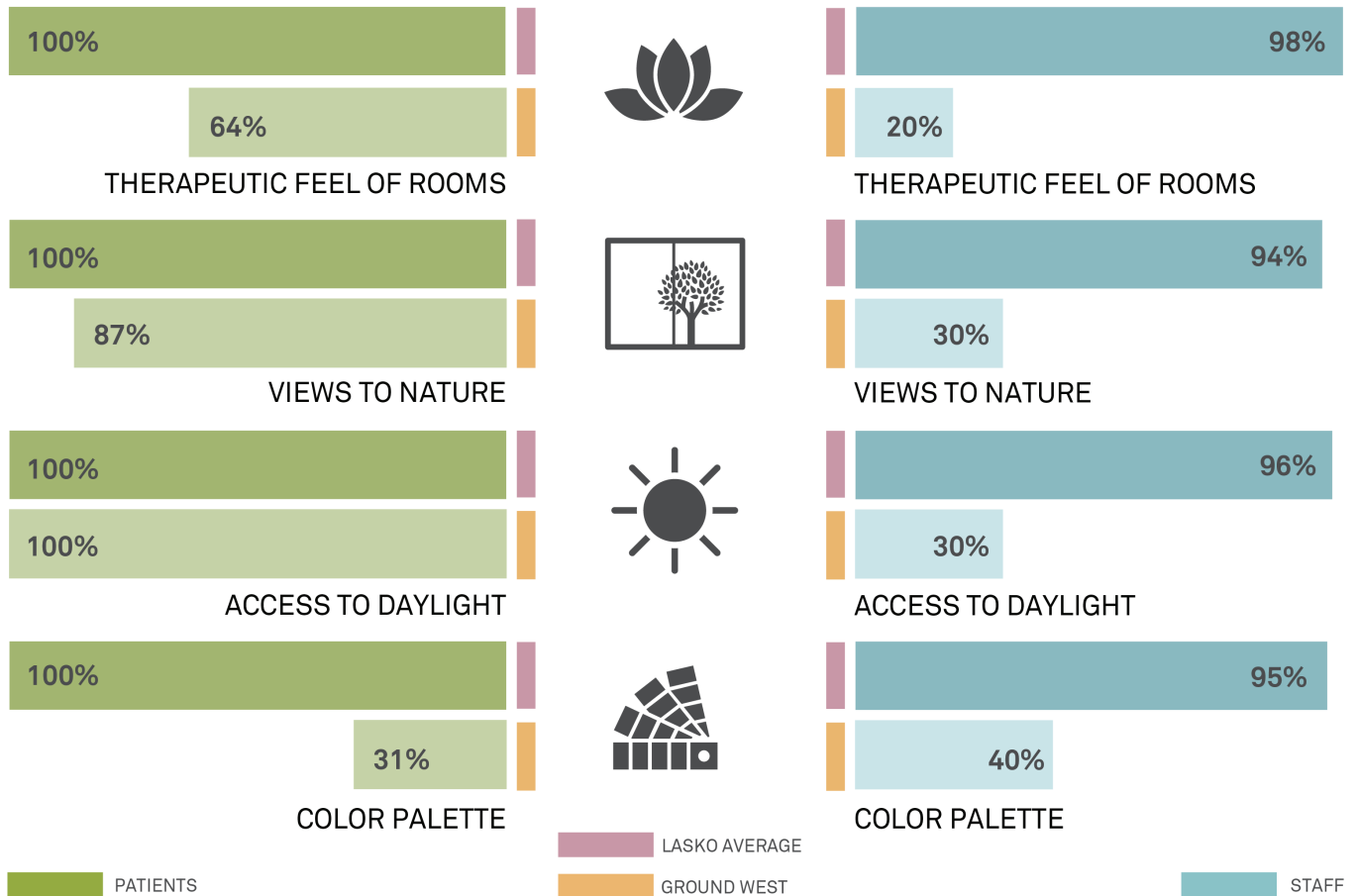
## Comparison: Family Amenities

Cost: \$\$ Benefit: ++

Family amenities outside the patient room were another variable for consideration. Although the Lasko Tower included different patient units from Ground West including OB and Telemetry, the family amenities were similar. Each unit had a waiting area at the entrance to the unit and a family lounge at the opposite end. Due to the patient population, the OB unit also had a family pantry. Patients and staff members expressed overwhelming satisfaction with the amenities on each of the units (94% and 93% respectively). The lounges allowed alternate locations for family visits, access to daylight, and long views to the exterior. However, the utilization of those amenities varied depending on the population being served. For instance, the OB and Orthopedic patients reported nearly universal use of the family amenities while the Telemetry patients reported only 20% usage. PMCCH administration noted that with private rooms, some patients/families preferred to remain in their rooms. Also, with a 24/7 visiting policy, the usage of a large waiting room may have been less than in prior years. Although patient amenities were relatively low cost, usage among patients and families varied considerably. Consequently, institutions can be selective about the amenities they provide based on patient populations and other concerns.

## DIAGRAM #5

### PATIENT AND STAFF SATISFACTION WITH INTANGIBLE ELEMENTS OF PATIENT ROOM



### Cost/Benefit Comparison: Decentralized Nurse Stations

Cost: \$ Benefit: +++++

The last design consideration to review was the use of decentralized nurse stations between each pair of patient rooms in Lasko Tower. This feature was considered to return the highest benefit for the least cost because it promoted patient safety, patient satisfaction, and nursing efficiency. Also, several studies have suggested that decentralized nurse stations result in more patient room visits and a better distribution of workload across the unit ([Bayramzadeh & Alkazemi, 2014](#); [Gurascio-Howard & Malloch, 2007](#)). A majority of the nursing staff (66%) felt that the nurse stations improved the way they cared for patients, while 91% of the patients felt an improvement in their care. One nurse commented, "Having pods right outside the patient rooms creates a more intimate patient/nurse relationship and quicker response time to calls." The decentralized nurse stations also afforded all staff easier access to computers and more choices on where to work. Staff did not have to delay charting because computers were not available and they could choose where to work depending on patient condition, need for collaboration, or proximity to other tasks.

## CONCLUSIONS

Although some nurses were initially concerned about the unit size and obstacles to communication in the Lasko Tower, 64% thought that their productivity had increased and 90% were generally satisfied with the new space. As a result of the survey, decentralized nurse stations, patient room size, large windows, and the same finishes will be carried into the future design. The importance of these environmental attributes has been described by other authors (*e.g., Gurascio-Howard & Malloch, 2007; Verderber & Reuman, 1987*). The POE was critical in supplying operational feedback from a broad group and will be used in the next design and future projects.

The results of this POE provided value to the client and the architect on multiple levels. While the hospital gained information on patient satisfaction, operational performance, and building technical performance, the design team gained critical insights for the next design phase. These lessons learned can be generalized to other areas of the hospital.

Several lessons can be drawn from this POE that can be applied to practice:

- The use of an existing unit as a basis of comparison to the new unit created a stronger result because of the similarities – private rooms, same patient population, and similar nursing population.
- More discussion is needed on standardizing methods and systems of measurement across the industry to create a larger body of data that can be shared and compared.
- More research is needed on ways to enhance decentralized nurse station usage relative to communication and collaboration.

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