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Contents

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As the official journal of the AIA Academy of Architecture for Health (AAH), this publication explores subjects of interest to AAH members and others involved in the fields of health care architecture, planning, design, and construction. The goal is to promote awareness, educational exchange, and advancement of the overall project delivery process, building products, and medical progress that affects all involved in those fields.

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The Decentralized Station: More Than Just Patient Visibility

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ABSTRACT

Since the landmark study in 2004 by (Hendrich et al., 2004) investigating the impacts of patient visibility on reductions in morbidity of patients, healthcare designers, clinicians, and regulatory agencies have embraced the importance of patient visibility, particularly in the critical care environment.

The decentralized station was a physical change in patient units to move care to the bedside, while creating a space for staff and increasing the visibility of the most critically ill patients. This increase in patient visibility for critical care units is now part of the FGI Guidelines and code mandated in many states.

What began as a trend for the patients in the critical care environment is more recently expanding to medical / surgical patient care spaces. Little research has investigated the impact of the decentralized station on staff workflow and the design of the medical/surgical environment, and specifically the effects beyond patient visibility. To explore the impact of the decentralized station on the medical/surgical environment, the team conducted a post occupancy evaluation (POE) of the Penn Medicine Chester County Hospital.

The team found dramatic impact on staff travel distances, time spent providing patient care, and patients' overall perceptions of quality of care all of which positively aligned with the presence of decentralized care stations in the medical/surgical environment. This case study explores the impact of the decentralized station across three different patient populations, and highlights additional benefits realized from the design evolution of the decentralized station beyond patient visibility.

Introduction

Beyond patient visibility

In a project completed in 2015, Ballinger architects designed a hospital addition at Penn Medicine Chester County Hospital. Spanning three floors and 72 patient beds, the addition included three medical/surgical patient care units with decentralized caregiver stations between each pair of patient rooms. The design assumption was that staff would spend more time at the patient bedside and patients would receive better care as a result. To validate this hypothesis, a POE investigation monitored, assessed, and compared the clinical staff travel distances and use of the decentralized stations, then correlated the results with the health outcomes of the patients who stayed on the new units. Additionally, the study investigated the impact of the decentralized stations on satisfaction levels of caregivers and patients through survey questionnaires and HCAHPS scores.

The team first used data, information, and responses collected from both patients and staff through Survey Monkey in a multiple choice format with fill-in-the-blank options for clarifying information. Secondly, clinical staff, administrative leadership, and facilities department personnel participated through additional onsite interviews. As a third prong of investigation, the team did onsite observations of each of the four units. Penn Medicine Chester County Hospital provided additional information related to their fall rates, Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores, and infection rates on the units both pre and post move for comparison. To limit any internal biases, the research team included additional members of the firm who were uninvolved with the initial planning and construction of the project.

The team investigated the patients and staff on the Ground West unit (constructed in 1962, with a cosmetic renovation in 1998) for a baseline. Ground West was also the location of the same orthopedic patients and staff patients who transferred over to the third floor of the new Lasko Tower building. The Ground West unit was built as a double loaded corridor of rooms with a single nurse station, no decentralized station, and limited support space for staff, compared to the new Lasko Tower units that featured a central work core. By isolating the staff and patient populations, the team could more closely link correlations to the physical changes in the new unit.

The new Lasko Tower units used decentralized stations between every pair of patient rooms, two large stations for collaborative care discussion, and a physician dictation room on the fourth floor for six additional staff members. The second floor post-partum unit required a 16-bed nursery, which displaced some of the clinical staff and created smaller opportunities for nurse stations within the core.

The fourth floor had a total of 30 seats within the central core for a telemetry unit, 24 seats on the third floor for an orthopedic unit, and 12 seats on the second floor for a post-partum unit. The reduction in seats available on the successive units likely encourages caregivers to use the decentralized stations more. The interviews with staff also suggested that on the fourth floor, which has three locations for staff within the core, there were increased problems with locating physicians, who could be at either of the two stations or in the small dictation room.

By posing the same questions for patients in Ground West and Lasko floor three, the investigators were able to identify differences based solely on the infrastructure and facilities changes, as the patient population and nursing staff were consistent before and after the move. The subtle differences in the nursing layouts over the floors and similar finishes on floors three and four of the Lasko Tower allow for comparison between standard units and varied patient needs. Lasko second floor and its contrasting layout of caregiver station within the core, as well as the shift to only 12 centralized seats, creates another level of detail for comparison while maintaining a control for finishes and aesthetics.

FIGURE 1

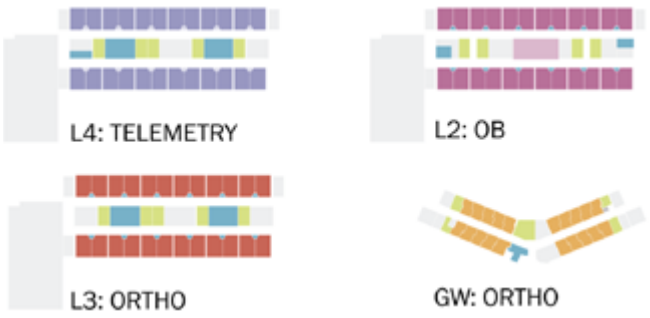


Image credit: Ballinger

FIGURE 2

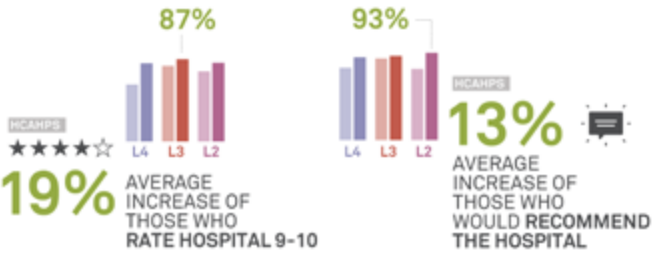


Image credit: Ballinger

Findings

Across all units, the hospital had a dramatic increase in their HCAHPS scores for groups before the move to after the move into Lasko Tower, with average increases of 13–18% over their pre-move units. All of the units in the existing conditions were similar to the Ground West in that they were built as a double loaded corridor of rooms with a single nurse station, no decentralized station, and limited support space for staff. Though it is difficult to contribute all of the increase to the inclusion of the decentralized station, it should be noted that through the survey and interview process, both patients and staff consistently included mention of the decentralized station in their remarks related to satisfaction, perception of care, and work-flow improvements.

Insightful findings were collected related to staff impressions of the decentralized station on their ability to deliver patient care, as well as data indicating that 91% of patients felt that the decentralized stations improved the way in which they were cared for within the unit. This statistic corroborated previous anecdotal evidence of patients requesting their doors be kept opened, or wanting to feel as if someone could help them if they needed assistance. With the decentralized stations, the staff expressed improvements in their ability to check on patients at night without needing to enter the room and disrupt patients' sleep.

Each of the three floors studied in Lasko Tower had subtle differences in their total locations for charting and their use of the decentralized stations. Yet despite Lasko's second floor unit having 18 fewer locations where they could sit and access the EMR, the staff reported consistent and exceptional levels of satisfaction related to accessing the electronic chart.

Staff reported 97%, 94%, and 100% levels of satisfaction across the units for Lasko floors four, three, and two respectively. Lasko floor two, with the least number of seats within the central core for staff, had the highest level of staff satisfaction related to charting locations. This suggests that the needs of the staff were met by the decentralized stations with computer access, the charting station within each of the rooms, and the smaller centralized stations for collaborative group work.

The staff of Lasko floor three had six fewer seats than Lasko floor four staff, which resulted in an additional reported increase of 31% more time spent at the decentralized station. Lasko second floor staff had18 fewer seats on their unit and reported an additional 71% increase in time spent at the decentralized station and a 16% increase in time spent at the patient bedside over Lasko floor four.

FIGURES 3 AND 4

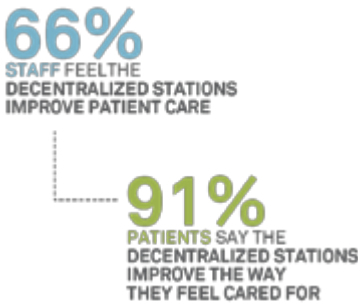


Image credit: Ballinger

FIGURE 5

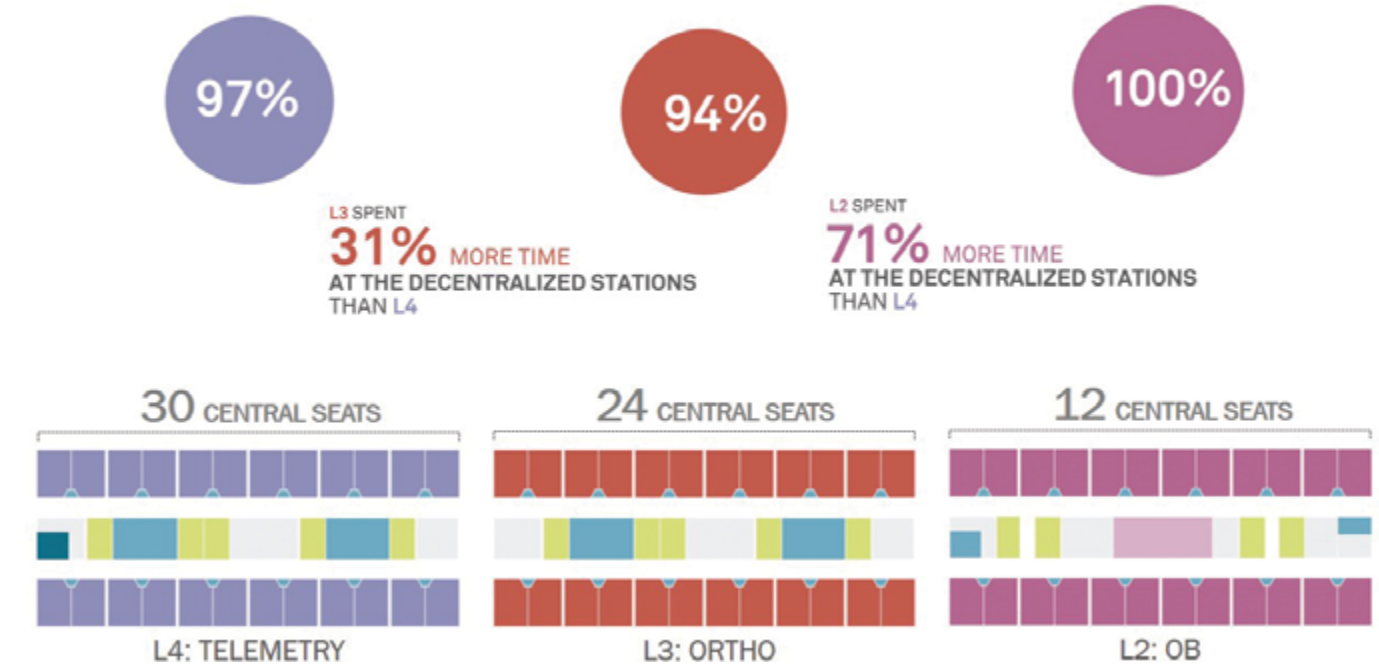


Image credit: Ballinger

Discussion regarding the value of the decentralized station often focuses on the critical nature of the patients and the care level required to adequately care for them. The trend to building critical care units with a direct visualization is now a mandate in the 2014 FGI Guidelines. Little discussion has focused on the value of this design intervention for the less acute patients, and as such, many institutions only build the decentralized model for the acute care environment.

However, with 91% of patients reporting increased satisfaction in the care they receive with decentralized stations and staff reporting a 16% rise in time spent providing patient care, the decentralized station proves to be a valuable addition regardless of the patients' care level. The additional increase in the HCAPHS scores shows that patients in these units appreciate the care being delivered, which translates to financial incentives for the institutions.

After noticing the 16% rise in time spent providing patient care, the team investigated possible drivers in how this additional time could be found during the busy shift of the caregivers. By looking at the floor plans of the three floors, the investigators created a Proximity Index. The Proximity Index used the Y axis to list the 24 patient rooms on the floor, and the X axis to denote various other rooms on the floor such as the clean supply or storage rooms. By then measuring the distances and setting a color gradient to the distances, the team could visually assess the distance discrepancies between the patient rooms and the typical support rooms on the floor. As part of the POE, the team evaluated the fetching distances of staff who

were presumably starting their trip from the central station compared to that of staff with a similar roundtrip beginning from a decentralized station. The team then compared each of the sets across the three floors of new construction.

Lasko floors three and four had similar locations for the soiled, clean, meds, and equipment storage. When evaluated with the Proximity Index, they showed as equal. Each trip was considered in feet traveled initially from the central station to a patient room, and then to fetch an item from each of the locations (soiled, clean, meds or equipment storage) before returning to the patient room. This roundtrip for the nursing staff was then applied to each of the typical unit locations. However, instead of starting and ending the trip at the main nurse station, the distances were recalculated using the decentralized station as the origination point and the end point of the trip.

The team reviewed the scores individually, before averaging and comparing their results. In the Proximity Index, the results were color coded with the cooler blue tones denoting trips under the ideal of 140 feet, with those reaching longer distances in the more yellow tones up to a maximum of 270 feet.

For Lasko floor four, a model with the soiled, clean, meds, or equipment storage ran typically from one corridor to the other corridor through the core, with access employed from both corridors into the rooms. In this model, a single soiled room and single equipment rooms showed the longest travel distances for both trips from the central station or from the decentralized stations. Both the clean holding room and the meds rooms were duplicated on the units and showed consistently shorter travel distances.

For Lasko floor two, a model with a cross-corridor through the core and the rooms opening off this corridor was used in a blended model where these frequently accessed rooms were decentralized. Two soiled rooms and two meds rooms were both off the cross corridor. Two additional clean supply rooms used the coast to coast model, and a single storage room was located near the far end of the unit.

For post-partum patients, the largest needs expressed by the clinicians were centered on the meds, soiled, and clean supply rooms, with little use of equipment. This drove the shift in the core design and contributed to the request of an additional soiled utility room. Lasko floor two shows significantly longer travel distances to the storage room, and this was discussed as a trade-off for this floor. In exchange, the travel distances to the soiled rooms is much shorter than those on Lasko floor four.

After investigating each of the travel distances compared to the adjustments in the core layout between the two units, the team began to look at the overall differences between the central station and the decentralized station usage. Surprisingly, there was a 26% reduction overall in travel

FIGURE 6

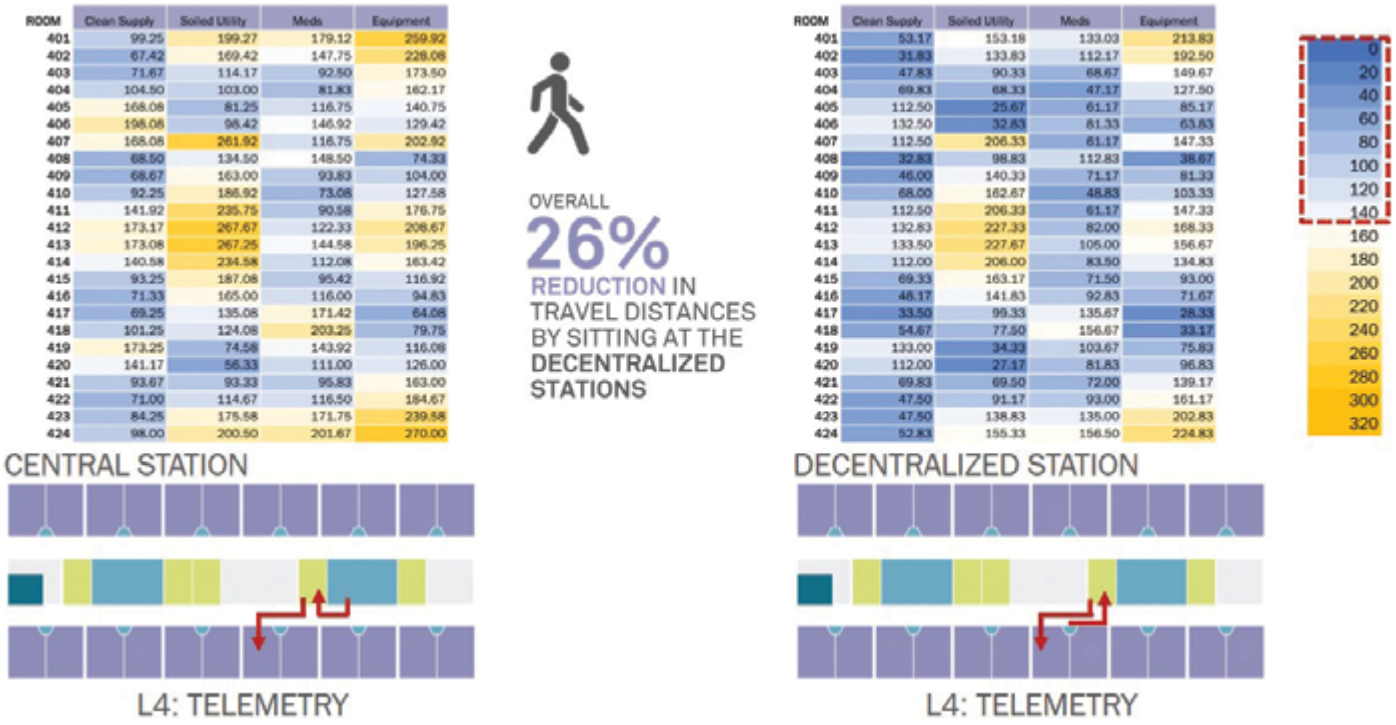


Image credit: Ballinger

for the staff if they were typically using the decentralized station instead of the central station on Lasko floors four and three. The same results were compared on Lasko floor two, which had a slightly different arrangement of the support space off a cross corridor. This layout provided a 41% reduction in staff travel distances overall.

It was unclear if the staff themselves noted that they spent less time walking when posted at the decentralized stations, or if the reduction in seats was the primary driver for additional caregivers on Lasko floor two using the decentralized stations more frequently. Regardless of what drove the clinicians to increase their use of the decentralized stations, both outcomes were dramatic and perceived by patients. This is especially considering that the staff on Lasko floor two reported sitting at the decentralized stations 71% more often than their Lasko floor four counterparts. Also noteworthy, when the staff were asked about their level of satisfaction related to the travel distances between staff work areas and patient care areas, the Lasko floor two staff were 22% more satisfied than their Lasko floor four counterparts. The correlation between a 41% reduction in travel distances if using the decentralized station, and a 71% greater use of decentralized station appears to be in direct relationship to increase in satisfaction from the staff.

Conclusion and implications

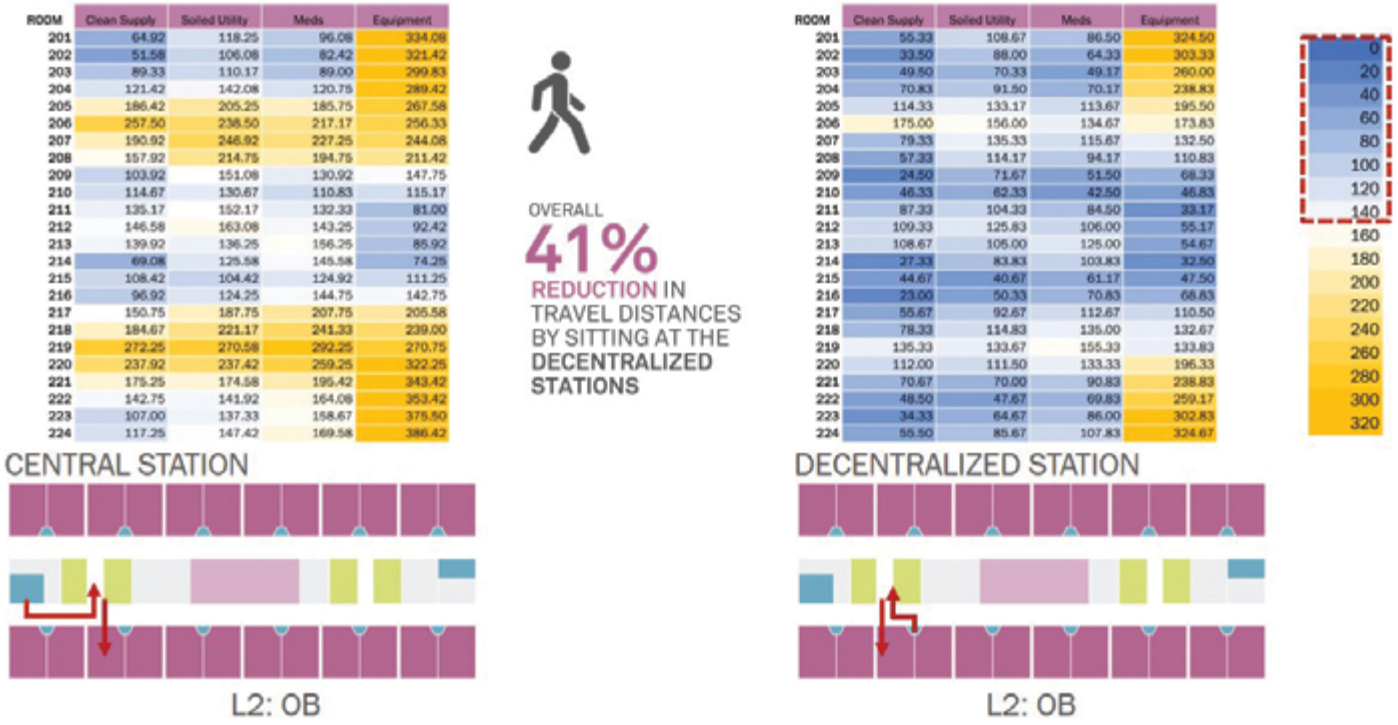
The POE of these units consistently supports the value of the decentralized stations within the medical/surgical inpatient environment. Patients are able to recognize the differences in care from the staff, and show this with a double-digit increase in HCAHPS scores. Staff reported spending extra time with their patients, increased levels of satisfaction, and up to a 71% reduction in walking distances and travel times when they spent more time at the decentralized stations.

All of these findings from the POE combine for a strong case for the decentralized station in all patient care environments, not just in the critical care units. For a relatively small additional first-time cost, these stations have shown that they provide improved patient care environments. The question should no longer be whether the decentralized station should be included in the medical/surgical environment, but how it might influence care delivery in other departments.

Reference

Hendrich, A.L., Fay J., and Sorrells A.K. (2004). Effects of acuity adaptable rooms on flow of patients and delivery of care. *American Journal of Critical Care*, 13 (1) 35–45.

FIGURE 7



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