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Mission of the Academy Journal

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 healthcare architecture, planning, design, and construction. The goal is to promote awareness, educational exchange, and advancement of the overall project-delivery process and building products.

About the Academy

The Academy of Architecture for Health (AAH) is one of 21 member communities of the American Institute of Architects. The AAH is unique in the depth of its collaboration with professionals from all sectors of the healthcare community, including physicians, nurses, hospital administrators, facility planners, engineers, managers, healthcare educators, industry and government representatives, product manufacturers, healthcare contractors, specialty subcontractors, allied design professionals, and healthcare consultants.

The AAH currently consists of approximately 6,954 members. The mission of the Academy is to improve both the quality of healthcare design and the design of healthy communities by developing, documenting, and disseminating knowledge; educating design practitioners and other related constituencies; advancing the practice of architecture; and affiliating and advocating with others that share these priorities.

Please visit the Academy's Website at www.aia.org/aah, for more information on the Academy's activities. Please direct any inquiries to aah@aia.org.

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Increasing the Inclusivity of the Design Process for Transformative Design

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ABSTRACT

Orchestrating a collaborative and inclusive design process requires a wide range of perspectives, specifically those of the C-Suite, clinical and support staff, architect and contractor. By evaluating patient/staff flow, facility flexibility and technology integration, this case study of a new project at Reading Health System speaks to a multi-generational approach for the transformative design that helps caregivers provide the best patient care. The design team engaged beyond the typical stakeholders, and included members such as the EVS staff, Infection Control, and Transport in the early planning phases and through all 24 rounds of intensive user group sessions to fully understand design impacts on the processes of flow of patients, materials and staff. The goal of this inclusive design process was to transform the convoluted OR processes, consolidate programs from multiple buildings, introduce new patient and supply chain processes, and co-locate the surgery and procedural platforms in a single building with direct access to the ED and 150 new private Surgical Beds. This ambitious change from a process standpoint required a radically different approach and buy-in from all perspectives and representatives, but was rooted in a consistent 35 + year relationship. This deep knowledge base between the owner and the design team allowed for the continuous design evolution and, ultimately, a transformative design process and exemplary OR platform.

ARTICLE

Increasing the Inclusivity of the Design Process for Transformative Design

Expanding technology and a rapidly changing healthcare delivery environment requires the design team to engage the C-Suite, the clinical and support staff with the architects and the construction team holistically to create a collaborative and inclusive process. It is within the design process that an opportunity exists for all stakeholders to express their wide range of perspectives, and for the design team to respond appropriately in order to yield measurable improvements, and transformative patient care.

To further complicate the equation, current staff at most institutions spans a range of generations – from the Silent Generation to Baby Boomers and GenX, and soon GenY and beyond. This multi-generational workforce has a wide range of needs and often differing priorities that define a satisfactory work environment, and within each of these generational groups, participants in the design process have different styles of learning (Figure 1). When planning and designing new facilities, hospital leadership can globally address the needs of this variable workforce through an interactive planning and design process, which improves staff, and patient flow, functions efficiently and effectively, and incorporates flexible concepts to benefit both staff and patients.

Reading Health System has recently completed a planning and design process for a 465,000 SF patient care building that consolidates all surgical services, expands emergency medicine and cardiology capabilities, and adds 150 new private patient rooms to this urban

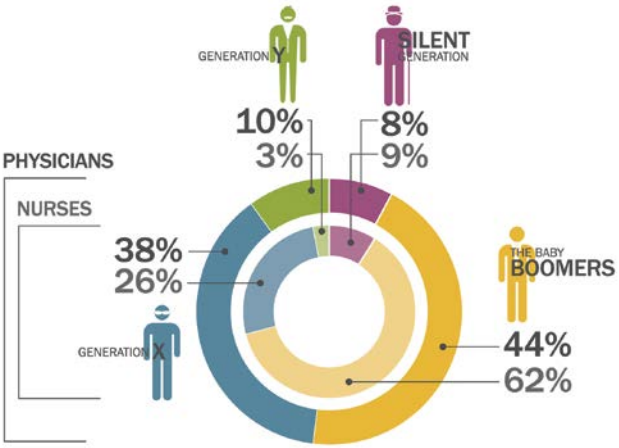

FIGURE 1: Staff by Generation

FIGURE 2: Transformative Patient Care

institution. Through its early engagement of multi-generational and diverse user groups, the Hospital shows its commitment to design for the future while simultaneously providing an excellent work environment for staff. Early on in the process the team worked to develop guiding principles for transformative patient care including: 1st Class Patient Care, Operational Efficiency, Financial Stewardship, Facility Modernization, Balancing Flexibility with Standardization, and Supporting Integration (Figure 2).

These guiding principles became the foundation for all discussions and framed the goals of the facilities and the design process. Throughout the design process these guiding principles acted as a lens to evaluate and refine decisions beginning with early planning and even during the current CA process. The focus on consistent goals and transformative patient care allowed all of the stakeholders to participate in the design process from their unique vantage points, thus contributing to the goal of the Hospital, and ultimately refining the building.

User group meetings involved not only the executive level, but representatives throughout all disciplines of the Hospital to thoroughly understand clinical flow of staff, supplies, patients and information. With 24 rounds of meetings, and 42 distinct user groups, the process included representatives of 10,800 staff hours of direct user group discussions. The inclusive user group process lead to many discussions between clinicians, administration, and materials management regarding how the supply chain of materials and the physical environment affected the clinician's ability to deliver the best possible clinical care for patients.

In addition to addressing the varied perspectives of the staff the design process sought to reach all four learning styles within the user groups: Visual, Auditory, Tactile, and Kinesthetic (Figure 3). For the Visual learners, the design team actively utilized drawings, renderings, and plans. With the Auditory learners the focus was on group interaction during the user group meetings, including ways to incorporate discussion within the presentation on a continual basis.

Physical to-scale 3D models were constructed of the entire site, along with 3D printed models for many of the primary OR rooms. All equipment, OR tables, and scale figures were printed and able to be re-configured by the user groups to establish the best relationships between

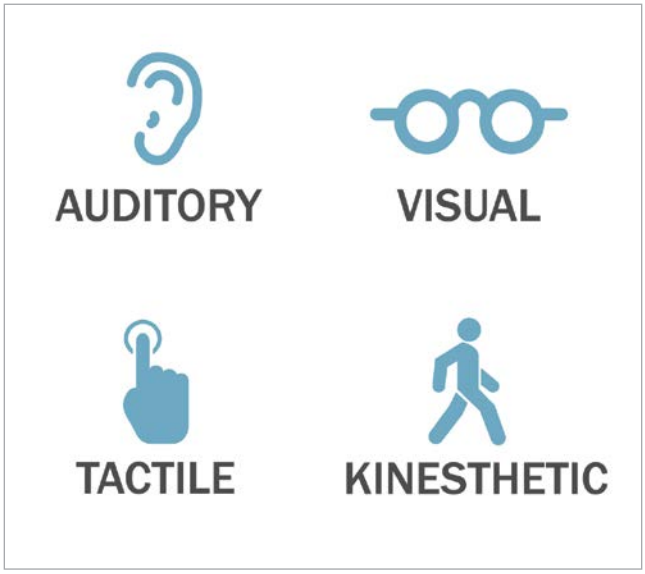

FIGURE 3: Learning Styles

the fixed architecture of the space, and the mobile equipment for various procedures. This process was geared toward the tactile learners, and created opportunities to increase the flexibility of the standard ORs, because different constituents could readily see and change the set-up of the rooms. In order to connect with the Kinesthetic users, physical full size mock-ups were used to engage the staff in tight collaboration with the administration to accommodate new developments in healthcare delivery options.

This level of consistent commitment from the Hospital brought together all levels of staff in a single "war room" for vigorous and comprehensive user group sessions. Mock-up rooms were intentionally located next to the war room to create a living learning lab where design concepts could be tested in real-time with administrative, architect, facilities and caregiver input. While the full scale mock-ups were particularly effective, one option that resonated with all four types of learners was the live Revit mock-ups and fly-through of the working model. Since this project was produced in Revit, the design team was able to bring a copy of the working model to the user groups and make real-time adjustments.

All MEP disciplines were active in the model, and users could comment and adjust equipment, millwork, light switches, as well as walls. More importantly the entire group could engage with a 3D virtual reality that is cost prohibitive to accomplish for a full scale mock-up of every room. Elements such as the hand sanitizers were included in a three-dimensional way, so that the Infection Control staff, the clinicians, and the EVS representatives could all participate together in the discussion of where to appropriately locate the hand sanitizers to encourage the greatest compliance of use.

Incorporating Flexibility into OR Standardization

Today's workforce, particularly in the healthcare sector, is made up of members from the Silent Generation to Baby Boomers and GenX, and ever expanding GenY and beyond. Many of those in senior administration are in the Silent and Baby Boom generation, which typically has a very different attitude toward work, life, and the importance of the physical environment. Gen X and Gen Y, tend to focus more intently on how to balance work and life with greater ease, and have different demands of their physical environment largely driven by the fact that they are digital natives, and prefer a more collaborative work environment.[1] These perspectives are particularly evident in the design of the OR platform, and the integration of new technology and surgical procedures.

More experienced surgeons were taught techniques which did not require any computer technology to accomplish, while the surgeons entering the workforce today typically rely heavily on DaVinci robots, or other interoperable modalities. In a 2009 review article entitled "The Problem of the Aging Surgeon," Orthopedic surgeon Ralph Blasier wrote that "essentially every treatment technique taught 25 years ago has been abandoned and replaced (and) All surgical specialties have had similar turnover of treatment methods."[2] This dramatic shift in how surgeries are performed has an incredible impact on the physical space and layout required to perform them. Compounded with the digital integration and robotic emergence within the OR platform, the design team must work with the multi-generation workforce to design an OR platform that is simultaneously effective for experienced surgeons and those from other generational vantage points. This intense, collaborative user group process resulted in fresh design ideas that incorporate future flexibility while balancing the needs of standardization.

This project replaces the entire fragmented OR department from multiple buildings, an outdated Central Sterile area, difficult way finding for patients and families, and challenging clinical sterile flows. The design process began with the guiding principles: 1st Class Patient Care, Operational Efficiency, Financial Stewardship, Facility Modernization, Balancing Flexibility with Standardization, and Supporting Integration. To fully transform the Operating Room platform, everyone from the EVS team to senior administration participated in process discussion, design discussion, and consensus building.

Overarching decisions such as standardizing the ED treatment bay with the Cardiology Prep and Recovery bay were instrumental early in the process and were driven initially by the desire to modernize the facility. As the user groups began discussions about the nuances of the typical room layout, detailed discussions emerged from the EVS group and the distribution of clean supplies and linens. The design moved away from built in cabinetry at the headwall for personal belongings and supplies, and instead focused on the opportunity to use mobile carts for ease of cleaning and stocking. This decision allowed the rooms to become standardized, and at the same time more flexible for the individual departments.

The same approach to standardization was applied to the Operating Rooms: designating 6 rooms as hybrid / robotic rooms capable, 11 rooms as general ORs, and

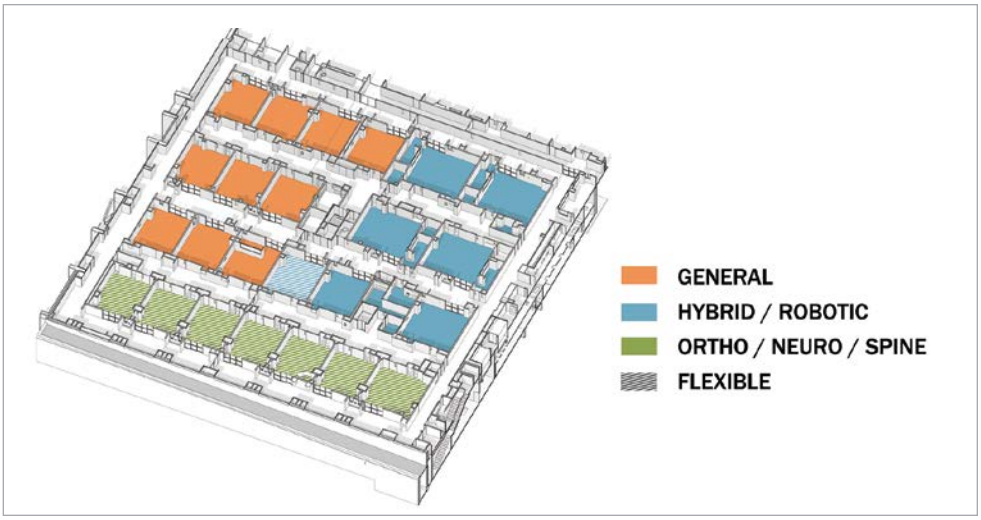

FIGURE 4: OR Platform Organization

seven Ortho / Spine / Neuro Rooms (Figure 4). Currently the platform is designed with two Zeego rooms for interventional imaging capabilities, and all six rooms are adaptable for the Zeego, bi-plane or other specialty equipment. Two rooms also accommodate DaVinci equipment with provisions for a third room. The zones of pre-investment allow the platform to grow and change overtime with new technological advancements.

Within this structure of standardized room types, the case cart system, OR integration systems, and block scheduling allow additional flexibility between surgery types to maximize utilization of all of the rooms at an operational level. This level of coordination between architectural decisions, and operational issues was aided by the user group meetings attendees beyond the traditional constituents for a construction process. Additionally, a prefabricated flush filtered diffuser system in all 24 ORs and three of the procedure rooms, which includes lighting, sprinkler system and integral structural support, allows these rooms to be quickly converted and adaptable to future technologies. The offsite pre-fabricated system is estimated install in one-sixth of the traditional field built system.[3]

Collaborative Space for Improved Clinical Care

Each generational cohort has a different vantage point and thus a different perspective. In addition to the generational shifts, the focus is no longer on a fragmented, provider centric, fee for service treatment of disease, but rather an integrated, patient centric, pay for quality approach to wellness. Layering the needs of each generational group with Evidence Based Design goals incorporates the generational resonance of design elements for both the staff and the patients (Figure 5). While some design elements such as a desire for minimized travel distances apply to all different generational groups, there are scales to the rank.

The American Association of Nurses in 2012 listed the average age of employed RNs at 44.6 years,[4] with a 55% of the nursing population over 50.[5] For the Baby Boom and Silent generation nurses, minimizing travel distances means less physical stress and more time at the bedside with their patients. These same sentiments were frequently discussed in the user group meetings, and deeply affected the design process.

The public entry point to each of the five patient bed floors is in the center of the unit with a central clinical hub, decentralized nursing stations between each pair of mirrored patient rooms, and team rooms located in the central core at both ends of the units. This layout and variety of work space provides a multitude of benefits to the clinical staff by limiting staff travel distances, and offering a variety of work environments to accommodate changes in treatment and technology.

In addition to a variety of locations throughout the unit, the work spaces such as the central clinical hub has three levels of work zones: a public front desk, a central gathering area for groups, and a quiet enclosed zone for dictation or other single provider work. The public front desk is minimized to limit gathering of staff at the desk and thus lowers the sound transmission of conversations, and reduces the possibility of disrupting patients. The central gathering area has a standing height table and stools to encourage group discussion, but segregates this zone from the main part of the patient floor. The third zone is enclosed for dictation and other work which requires greater privacy.

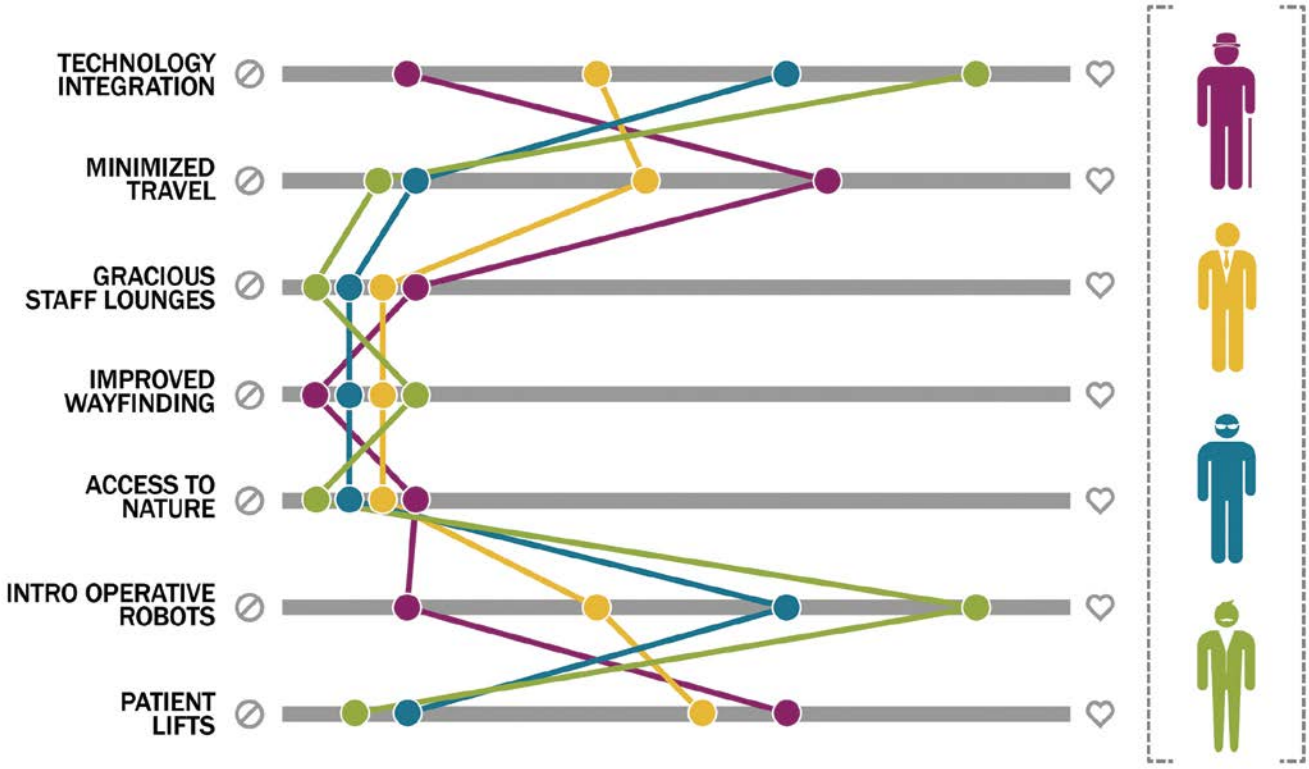

FIGURE 5: Generational Resonance

This entire hub is centrally located and allows easy access from both ends of the unit, and provides much needed areas for staff to access EMR records, test results, and sit physically together to collaborate on patient care. In addition to user group input, in 2009, the hospital and design team experimented with this type of configuration on a renovation of a two existing patient units in the 'C' Building. Many of the user group members have used these existing units as a living mock-up, and through their experiences have refined the current configuration.

To further encourage collaborative care and staff time at the bedside, the decentralized stations allow for two caregivers to gather outside of each patient room. These stations are equipped with technology to allow for continuous telemetry monitoring, visual inspection of patients, access to patient records, and typical charting options. These decentralized stations work in concert with, the central clinical hub and the team rooms with gathering space for interdisciplinary groups are provided on both ends of the unit. The team rooms are group gathering areas with robust technology which can retrieve information from patient files, recent surgery procedures, and access to outside resources to assure the best patient care.

In addition to the desire for minimizing travel distances, these various stations evolved around discussions and integration of electronic medical records into the clinical work flow, and the ever increasing reliance on changing technologies. One example of the diverse user group working together included, the IT department, the clinicians, and senior administration all participating in the same meetings to address how to accomplish the digital needs of the clinicians. The result includes spaces throughout the building are linked through a robust data backbone, to insure that on day one the infrastructure provides the right information on patients in an easily accessible way to the clinicians, and over time the systems are as adaptable as the clinicians themselves are to the changing digital landscape.

Design Results of Collaboration

As architects, the design team is trained to strive for excellence, but as architects for health we must also focus on what excellence means to the C-Suite, the clinical and support staff. For the Hospital's new facility, particular attention is given to the design and final layout as driven by the user group sessions and pred-

icated on changes to healthcare delivery due in part to: EMR adoption, improved efficiencies, advances in technology, private patient rooms, decentralized nurse stations, team rooms, and new staff amenities.

Changes in technology, operational issues and healthcare delivery will continue at a rapid pace, and affect staff at all levels. Part of the design challenge is enhancing opportunities for speed and ease of adjustments over time. This project brought together all stakeholders from the supply chain, to the end users while preserving future change opportunities; utilizing prefabricated ceiling structures, connecting surgery video to the patient floor team rooms, and allowing flexibility within standardization extends the effective lifespan of the building.

Additional design opportunities that will allow the Hospital's multi-generational staff to excel include: minimized travel distances, team rooms, dual dedicated fiber optic backbones with pathway diversity, integration cabinets outside every OR and procedure room, intraoperative robots within the OR, patient lifts in every patient room, standardized support spaces, and technology charging stations within the decentralized nurse station. These physical changes affect the delivery of care differently for staff members dependent on their generational vantage point.

For those in the Baby Boom generation, shorter walking distances, decentralized nursing station, and patient lifts can physically ease the strains of the workday. For Gen X and Gen Y, access to the intraoperative robots and technology integration can serve to enhance their work environment. From an architectural and administrative standpoint, collaborative work areas begin to create physical space which can physically co-locate these disparate groups and bridge the gap between these two vantage points. All of these physical nuances help to create an environment for happier staff, which then provide better patient care and also drive HCAHP scores (Figure 6).

The goal of this inclusive design process was aggressive: to transform the disparate OR processes, consolidate programs from multiple buildings, introduce new patient and supply chain processes, and co-locate the surgery and procedural platforms in a single building with direct access to the ED and 150 new private Surgical Beds. This re-evaluation of the process and the institution from all vantage points generates a physical environment that motivates current and future caregivers, balances rising operational costs, and defines what excellence actually means in providing the best patient care delivery model.

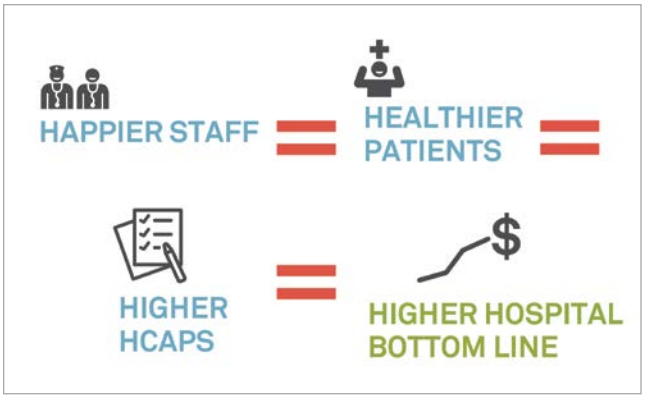

FIGURE 6: The Bottom Line

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