Conclusion

At present, AHI leadership must sort out the service line situation and the alternatives ahead. Fortunately the clear consensus is that patients like Amanda Jones cannot suffer from poor service or poor care quality because of issues related to problems with misaligned incentives, poor collaboration, or inadequate coordination. Leadership realizes that it must continue to provide both clinical and nonclinical staff with the resources and education tools they need to be able to provide the best care possible. Yet introducing some of these resources and tools has proved difficult in many circumstances. Neither the employees nor the staff should get caught up in the challenges affecting the service line, but even under the most optimistic of circumstances, a new building for the AHI would not be available until 2015.

Case Questions

1. What problems and issues result from the way AHI is currently organized?
2. How are design issues exacerbated by power conflicts between and among physicians?
3. What are the issues that a new building for AHI might be able to solve? What issues might still plague AHI?
4. What would you recommend that AHI leadership do now? Who would you involve in making decisions about the future for AHI?

Case I
Selling an Evidence-Based Design for Waterford Hospital

Nathan Burt and Ann Scheck McAlearney

Campeon Health is a Midwestern healthcare system composed of five hospitals, ten affiliated hospitals, and an extensive ambulatory care network. Given favorable demographics and a strong bottom line, Campeon Health has recently decided to construct a new hospital in Waterford, a suburb of the larger Grouse Creek metropolitan area. In all, Grouse Creek currently contains three major hospital systems and a children's hospital, but despite steady population growth, new hospitals have been scarce. The Campeon Health facility would be the region's first newly constructed hospital in more than 22 years.

The Waterford suburb was considered an ideal site for the new hospital due to the wealth of the surrounding area and the growing population. In fact, Waterford boasted the highest number of children per household for the Grouse Creek metropolitan area. Contributing to the location decision was the fact that Campeon Health currently drew few patients from the Waterford area to its other hospitals because of the presence of closer competitor hospitals. Campeon's projections suggested that Waterford Hospital could draw 70 percent of its patients from among those presently receiving service outside the Campeon Health system. In addition, Campeon predicted that the new hospital would be received favorably by local physicians, including those practicing at other Campeon Health facilities. Planned to be a 90-bed community hospital, Waterford could serve as a feeder hospital for the system's large flagship hospital, Lakeside Hospital, while accommodating the preferences of physicians interested in expanding their practices to include the Waterford community.

The Charge

Prior to breaking ground for the new facility, Katherine Humphries, RN, had been appointed president of Waterford Hospital. Humphries had worked as CEO of another Campeon Health hospital for three years, and had established a strong reputation as a transformational leader. She has been charged by the board of Campeon Health and the Campeon Health CEO to lead the initiative to design, construct, staff, and operate the new community hospital in Waterford. At the present time, the Waterford Hospital site is nothing more than a field, located across the street from an existing Campeon Health ambulatory care center.

Humphries has been given relatively free rein to design the hospital. Humphries's years of experience as a registered nurse and as an operations leader have given her valuable insights into the delivery of care and ways that it can be improved. She is aware that elements of evidence-based design have been shown to improve care quality for patients and workplace climate for caregivers, and she is eager to consider this approach.

Evidence-Based Design

Evidence-based design is increasingly being used by hospitals that are trying to improve staff morale, patients' experiences, and the outcomes of care provided. Evidence-based healthcare designs are specifically used to create environments that are therapeutic, supportive of family involvement, efficient for staff performance, and restorative for workers under stress. Ultimately,

evidence-based healthcare designs should result in demonstrated improvements in the organization's clinical outcomes, economic performance, productivity, customer satisfaction, and cultural measures. However, this healthcare design approach is a relatively new concept. The pool of available research and information will rarely fit a hospital's situation precisely, thus requiring critical consideration of specific design modifications and project goals.

In healthcare, the application of evidence-based design is particularly appropriate. Physicians are accustomed to practicing, at least in part, using evidence-based clinical guidelines and measures, thus the notion of applying evidence to facility design may be well received. Further, design principles focusing on the physical characteristics of facilities design that may reduce patient stress and contribute to the healing process appeal to patients and families who are likely familiar with the stressful and often frightening experiences that are common to hospital stays. Hospitals themselves have been shown to benefit economically from reduced costs and increased organizational effectiveness when applying the principles of evidence-based design (Saba and Hamilton 2006).

Evidence-based design principles include many elements of building design, several of which have been demonstrated to be effective. In particular, exposure to sunlight, access to nature through direct access or views, acuity-adaptable rooms, and decentralized nurses' stations are design elements that hold promise. For instance, studies have shown that climate and exposure to sunlight can influence the length of a patient's stay. One research group randomly assigned some bipolar patients to sunny rooms and others to rooms with less exposure to sunlight. The patients who were exposed to greater amounts of sunlight had a mean length of stay 3.67 days shorter than the control group. Similarly, patients recovering from abdominal surgery had shorter hospital stays if they had a bedside window view of nature rather than windows that looked out onto a brick wall (Ulrich et al. 2004).

Another promising feature of evidence-based design is the potential for well-designed rooms and buildings to improve clinical outcomes. In fact, the list of examples such as lower rates of acquired infections, fewer medication errors, fewer patient falls, and reduced patient stress are growing (Ulrich et al. 2004). Something as simple as placing an alcohol hand rub dispenser at the patient's bedside can yield significant improvements in practitioners' handwashing practices, thereby reducing contact infection rates. Evidence-based design can also help to reduce medication errors by focusing on care delivery elements such as lighting, environmental distractions, and workflow interruptions that may increase medication administration errors. Patient falls can also be reduced when patient rooms are well designed, and good building design can reduce noise levels, thereby reducing stress levels for patients and their caregivers (Ulrich et al. 2004).

Acuity-Adaptable Rooms

A key component of evidence-based design in hospitals is the acuity-adaptable room. While the more common universal patient room has gained popularity because of its potential to accommodate clinical needs and new technologies as future care delivery innovations are introduced, such patient rooms are still used in the traditional clinical manner, necessitating patient transfers between rooms, units, and floors when patient acuity changes. In contrast, the acuity-adaptable room is designed to accommodate a wide range of patient acuity levels, thus reducing the need to transfer patients and change the care delivery workflow (Brown and Gallant 2006).

Acuity-adaptable rooms are private rooms that are composed of a patient area, a staff area, and a family area. Evidence-based design principles are applied to the layout of acuity-adaptable rooms, thus maximizing the likelihood of care improvements to be gained from these principles. For example, a private room is quieter than a shared room, thereby potentially reducing patient and caregiver stress. Space dedicated to a family area permits social contact with family and friends to further improve the healing process (Brown and Gallant 2006). Bathrooms are situated on a headwall with rails leading to them, potentially reducing the likelihood of patient falls. In addition, the accommodation of family and friends within patient rooms on a 24-hour basis reduces the possibility of patients falling, and can also reduce patient stress.

An acuity-adaptable room design helps solve some of the problems with bottlenecks in patient flow that occur daily in most hospitals. These bottlenecks can have several negative consequences, including diversions to other hospitals or warehousing patients in hallways without adequate monitoring and nursing care. Within traditional hospitals, patient flow revolves around nursing units, which are generally organized by diagnosis type. Diagnosis type is, in turn, influenced by three factors: (1) the headwall capability to accommodate lines and gases, (2) the clinical skills of the nurse to treat different levels of acuity, and (3) the historically variable reimbursement from the Centers for Medicare & Medicaid Services (Hendrich, Fay, and Sorrells 2004). This mix of considerations about diagnosis type and nursing unit results in assignment of patients to units based on the unit's capacity to accept patients with a particular diagnosis and level of acuity. As a result, this traditional nursing unit–centric model contributes to situations where a bed may be available, but it is not the "right" bed for that particular patient. This then causes a patient flow bottleneck. Further, because many patients experience variable levels of acuity during a hospital stay, the nursing unit–centric model may also result in patients being transferred three to six times during the course of their stays (Hendrich, Fay, and Sorrells 2004). The additional coordination required by multiple transfers then increases the complexity of patient flow

within the hospital and further contributes to bottlenecks. Also, as explained by Brown and Gallant (2006), "the transfer process is not a clinically benign process and has been shown to cause physiologic and psychologic distress that could lead to negative clinical outcomes." By targeting areas such as bed placement, communication, and housecleaning efficiency, slight improvements can be made within the current model of care, but a different model must be adopted to permit large gains in quality and efficiency (Hendrich, Fay, and Sorrells 2004).

A Growing Evidence Base

Improvements in clinical and patient satisfaction outcomes associated with the introduction of acuity-adaptable rooms were starting to be documented. In particular, Humphries was intrigued by two examples reported in the recent research literature where adoption of acuity-adaptable rooms had been linked to positive outcomes. These examples are described in "Examples of Acuity-Adaptable Models in US Hospitals."

Decentralized Nurse Stations

Another opportunity that has emerged out of the principles of evidence-based design is to develop decentralized nurse stations. In practice, the layout of hospitals has not changed much in decades, despite the jobs of nurses, physicians, and other caregivers having changed significantly. According to one recent study, nurses spend approximately 30 percent of their time walking around the hospital, and less than 60 percent of their time on actual patient care (Ulrich et al. 2004).

A typical nursing unit has a central nurse station with the rooms laid out in a double corridor rectangular pattern around the nurse station. This nurse station typically houses a unit clerk, provides an area for nurses to do their chart work, and accommodates the medical records of the unit's patients. A change in the layout of a floor can increase the amount of time nurses are able to be involved in direct patient care by reducing requirements for walking around. In fact, nurses working in a radial unit walk much less than nurses working in a rectangular unit (Ulrich et al. 2004). Nurses on a floor with decentralized nurse stations walk even less than those nurses working in a radial unit, as long as supplies are decentralized as well. This decentralized nurse station model thus presents many opportunities to improve the quality and efficiency of care provided, by reducing the amount of wasted time nurses spend walking around and freeing nursing time to provide direct patient care.

Examples of Acuity-Adaptable Models in US Hospitals

An Acuity-Adaptable Comprehensive Critical Coronary Care Floor at Clarian Health

Clarian Health, based in Indianapolis, Indiana, switched from a traditional model of care to an acuity-adaptable model in coronary care by building an acuity-adaptable comprehensive critical coronary care (CCCC) floor. The acuity-adaptable CCCC is capable of performing all necessary care in one room, from admission to discharge (Brown and Gallant 2006). Using a pre-post design to evaluate the success of this model, Clarian recorded two years of baseline data and then compared clinical outcomes after CCCC adoption with these baseline data.

During the baseline period, the two units that were to become the CCCC had an average of 200 intraunit transfers per month. The time spent coordinating transfers, processing paperwork, and transporting the patient was all considered to be non-value-added activity that would be better spent in direct patient care. In addition, these 200 handoffs per month elevated the risk of medical errors associated with handoffs.

After moving to an acuity-adaptable model of care, intraunit transfers were cut by 90 percent (Hendrich, Fay, and Sorrells 2004). Also noteworthy, medication errors were cut by 70 percent, likely due at least partially to the reduction in patient handoffs and transfers. Finally, patient falls decreased to a national benchmark level, and patient satisfaction increased overall (Hendrich, Fay, and Sorrells 2004).

An Acuity-Adaptable Model Implemented at Celebration Health

Celebration Health, based in Orlando, Florida, implemented an acuity-adaptable model within its new facility and saw marked improvements in clinical outcomes. In particular, patients' lengths of stay for most diagnosis-related groups (DRGs) declined significantly after introduction of the acuity-adaptable model. Comparing data with another state, Celebration Health reported that the average length of stay for five specific DRGs in its system was 5.4 days, compared with 9.5 days reported in the state of California. Thirty percent of Celebration Health patients with those five DRGs were discharged within four days. These length-of-stay improvements occurred with simultaneous reductions in nursing hours per patient day (Gallant and Lanning 2001).

Implementation Challenges

Evidence-based design options such as acuity-adaptable rooms and decentralized nurse stations have tremendous potential to improve the quality of patient care, but there are also substantial challenges associated with implementation. In particular, staffing using an acuity-adaptable model of care can be difficult. Nurses tend to practice within a specialty because they enjoy the specialty. For instance, a critical care nurse is typically very good at handling urgent situations, but often lacks the skills required to manage large numbers of patients, including providing required patient education and communicating with families. Similarly, telemetry nurses are often skilled at managing large numbers of patients, providing patient education, and dealing with patients' families, but they may lack the skills necessary to handle high-acuity patients (Brown and Gallant 2006). Critical care nurses staffed to work in an acuity-adaptable environment with decentralized nurse stations may feel uncomfortable if they do not have another critical care nurse within sight in the event that an emergency arises, or if they want to consult with another comparably trained nurse about a complex patient.

The Role of Technology

Technology can help overcome some of the challenges surrounding implementation of evidence-based design options such as acuity-adaptable rooms and decentralized nurse stations. For instance, in order for a decentralized nurse station to be successful, it must be completely independent of the central nurse station. All required supplies and technology, including computer access, must be available at the decentralized nurse station. Wireless communications, automated patient call and alarms, medication administration, and even linens must be available at the nurse station (Brown and Gallant 2006). Technology solutions can help to support these requirements, but their use has not yet been widespread.

In practice, a robust computerized physician order entry (CPOE) system can help to overcome some of the challenges presented by decentralized nurse stations. A CPOE system that is linked to all areas of the hospital can house test results and facilitate physicians' ordering of required tests and studies while also helping nurses to manage their patients effectively. While a unit clerk in a centralized nurse unit coordinates tests and studies with other departments, a CPOE system eliminates the need for this unit clerk on the

nursing floor, thus reducing some of the barriers associated with adopting a decentralized nurse station model.

Technology can also help to improve communications in a decentralized nurse unit model. When patients have high acuity levels, communication between and among nurses may be problematic if nurse stations are decentralized within the hospital. However, technology can help caregivers communicate quickly and thoroughly with each other, even in a decentralized environment. For instance, new technologies such as smart beds, smart pumps, and specific clinical alarms can be adopted to improve patient monitoring and facilitate patient-related communications within this decentralized nurse unit model.

Financial Implications

Construction costs per square foot for an evidence-based design building are not much higher than for a traditional building, but increased costs should be considered. First, overall construction costs would be higher because of the modifications in architectural designs necessary to introduce sunlight within 95 percent of the building and the larger square footage required for acuity-adaptable rooms compared with traditional room sizes. From a design standpoint, introducing sunlight could be tricky for internal spaces. One solution is to build gardens within the core spaces of a building. While such gardens tend to be expensive, they do offer visible areas for community support and are often selected for their ability to contribute to the healing environment. Acuity-adaptable room sizes must be able to accommodate a large range of equipment and have space for family members. As a result, acuity-adaptable rooms may be 30 to 50 percent larger than traditional single-occupancy rooms.

Any differences in operating costs associated with an acuity-adaptable model of care are still unclear. While the skill sets required for nurses on acuity-adaptable units may be higher, those higher staff costs may be associated with shorter lengths of stay linked to improved patient well-being. A higher level of management may also be required to oversee complicated staffing needs associated with an acuity-adaptable model of care, but this may be offset by less demand for management given a higher level of skill among staff. In contrast to outstanding questions about changes in human resources costs, an evidence-based design clearly can reduce costs associated with utilities, because the availability of sunlight throughout the building will reduce electricity costs. Similarly, maintenance and supplies costs are typically reduced because of standardized equipment and supplies throughout the hospital.

Capitalizing on the Opportunity

Humphries is convinced that an evidence-based design model will be appropriate for the design of Waterford Hospital. Working with the hospital architect and contractor, Humphries has been able to outline an evidence-based design for Waterford Hospital that includes components such as acuity-adaptable patient rooms, decentralized nurse units, and liberal use of windows and open spaces to provide patients and their families with access to nature. The latest version of the architectural drawings features all private rooms for patients, with each room including a family area designed to contain a couch/bed, a refrigerator, and a separate television for the families. In addition, gardens are planned for both inside and outside the hospital, with easy access points for patients, families, and hospital staff. Staff and families will also have access to respite areas, which are spaces individuals can go to relieve stress and deal with difficult situations and decisions. Finally, all patient areas, and 95 percent of other hospital space, are designed to have access to direct or indirect sunlight.

Overall, Humphries is pleased with the preliminary plans for Waterford Hospital, but she knows she has a long way to go to convince hospital staff and physicians accustomed to working in traditional hospital environments that the evidence-based design model is sound and desirable. In fact, moving forward with an evidence-based design is risky if she does not get key stakeholders on board. She knows her next step is to build support for the application of an evidence-based design for Waterford Hospital, but she doesn't have much time.

Case Questions

1. Who are the key stakeholders who must support Humphries' vision for an evidence-based hospital design? How would you obtain their support?
2. What reactions might you predict from physicians regarding the use of evidence-based design at Waterford Hospital? How about from members of the Waterford community? The Grouse Creek community? Other local hospitals and health systems?
3. What challenges do you think Humphries and the leadership team at Waterford Hospital will face as they try to implement an acuity-adaptable model of care?

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Short Case 12
System Redesign to Implement an Accountable Care Organization

David Muhlestein and Ann Scheck McAlearney

Central Health System (CHS) is the largest health system in its region and includes ten hospitals (ranging from large tertiary care centers to smaller community hospitals) located across two states in addition to 41 affiliated physician clinics, a hospice program, a home health agency, and a nursing home network. As a not-for-profit organization it has the mission of "providing the highest-quality care to all people, independent of ability to pay." Currently, the system employs 300 physicians, and 900 more are contractually affiliated with it; there are also 9,250 full-time equivalent staff. The ten CHS hospitals are autonomous in maintaining their day-to-day operations, but strategic direction and any major operational changes are led by the system's C-suite. As director of operations, you work under the chief operating officer (COO) to implement corporate strategy throughout the system.

The ACO Challenge

The COO recently informed you that the board of directors has requested a feasibility study to determine the effects on CHS if the system were to become an accountable care organization (ACO). Specifically, the board wants CHS to apply for the Medicare ACO program and to seek out similar arrangements with private insurers. Under a shared savings program, such as the program sponsored by Medicare, a baseline expenditure amount will be calculated on the basis of historical usage, and then future expenditures will be projected. If actual expenditures are less than projected expenditures, then the difference between the two