HEALTH CARE AT THE CROSSROADS:

Guiding Principles for the Development of the Hospital of the Future

With support from Aramark

The Joint Commission

ARAMARK Healthcare

Health Care at the Crossroads:

Guiding Principles for the Development of the Hospital of the Future

Joint Commission Public Policy Initiative

This white paper emanates from The Joint Commission's Public Policy Initiative. Launched in 2001, this initiative seeks to address broad issues relating to the provision of safe, high-quality health care and, indeed, the health of the American people. These are issues that demand the attention and engagement of multiple publics if successful resolution is to be achieved.

For each of the identified public policy issues that it has addressed, The Joint Commission already has relevant state-of-the-art standards in place. However, simple application of these standards, and other one-dimensional efforts, will leave this country far short of its health care goals and objectives. Thus, this paper does not describe new Joint Commission requirements for health care organizations, nor even suggest that new requirements will be forthcoming in the future.

Rather, The Joint Commission has devised a public policy action plan that involves the gathering of information and multiple perspectives on the issue; formulation of comprehensive solutions; and assignment of accountabilities for these solutions. The execution of this plan includes the convening of roundtable discussions and national symposia, the issuance of this white paper, and active pursuit of the suggested recommendations.

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Preamble

The concept of the hospital has evolved over the centuries. In his history of the U.S. hospital system, Charles Rosenberg writes that in the 18th century, the last place any respectable person would want to find themselves was in an "almshouse" – the predecessor to the hospital.[1] Almshouses housed the indigent, orphaned, mildly criminal, and the sick for whom there was no other place to go. Overcrowded, chaotic, filthy and teeming with those considered to be depraved, almshouses provided unwelcome company for respectable citizens who were alone, ill and down on their luck. For this reason, Benjamin Franklin agreed to cofound the Pennsylvania Hospital in 1752, the nation's first hospital, to replace almshouses in serving the "poor and deserved."[2]

For the next hundred years, even as hospitals became closely aligned with medical education, they continued to mainly serve the poor and those desperately ill who could not avoid what was widely considered to be "medical experimentation" conducted in hospitals.[3] It was not until after the Civil War – when military medical care sped advances in clinical techniques as well as methods for safely treating patients in high volume -- that hospitals began to resemble modern-day hospitals.[4]

By the late 19th century, hospitals were becoming part of the fabric of their communities and sources of civic pride.[5] Hospitals were large institutional buildings by this time, which helped to foster the growing perception that hospitals were cold and impersonal places to receive care. Indeed, during the Progressive Era (1890-1920), critics warned that hospitals had "an increasing concern with acute ailments and a parallel neglect of the aged, of chronic illness, of the convalescent, of the simply routine."[6] They warned of a socially insensitive and economically dysfunctional obsession with inpatient care at the expense of community-oriented care.[7] An understanding of the patient's social and family environment, these critics contended, was necessary to fully understand the cause of illness and to prescribe its remedy.[8] The overarching sentiment of the time was that medicine had to be brought out of the hospital, into the community, and into the home to the extent possible.[9]

A century later, contemporary hospitals find themselves with similar challenges as well as opportunities. Long since their origination, hospitals today are leaders in the development and delivery of care to patients. Indeed, hospitals are the stewards of health professional education and are actively engaged in promoting better health in their communities. Hospitals, which pool health care talent from across all professional disciplines, are significant progenitors of major clinical innovations that save the lives of so many. While there is much variation in the size and scope of hospitals, all hospitals have the opportunity to lead in the improvement of health care delivery so that the right care is delivered in the right place at the right time for every patient.

The call for hospitals from a century ago echoes today. The rise in the number of patients who are aged and those who are chronically ill, challenge hospitals to extend the parameters of hospital-based care from inside the medical center, to the community and into the home.

Introduction

Human lives weigh in the balance every day in hospitals. For hospital patients and their families, the hospital experience is often a central point in their life – where their child was born, their beloved died, where they received life-saving treatment, rejuvenating therapy or care to overcome an episode of illness. The hospital is the setting of oft-told tales among friends and family through the generations. It is no wonder that hospitals are often used to depict human drama – and even comedy -- for popular consumption across the panorama of entertainment media.

In reality, hospitals are the setting where cutting-edge medical advances relieve suffering, and bring healing and even new life for those whom, even a few short years ago, there would be little hope. Featherweight babies, born eight weeks prematurely can now survive and even thrive. Minimally invasive surgeries allow patients to heal quickly with less risk of complication, and speed their journey home. The evolving science of organ transplantation brings a second shot at life for an increasing number of people whose lives would otherwise be foreshortened.

In addition to their impact on human life, hospitals are a major driver of the U.S. economy. The hospital industry is the second largest private-sector employer in the U.S. and contributes nearly $2 trillion of economic activity.[10] In many small communities across the country, the local hospital is the largest employer and most valuable economic asset.

Consumer attitude toward hospitals waxes and wanes, seemingly with some dependence on hospital news that makes headlines,[11] such as traumatic medical errors, rampant hospital-acquired infection, and unscrupulous billing practices. There is no doubt that hospitals face greater scrutiny over the issues that can erode public trust. In order to secure the public's trust, hospitals will need to become highly reliable -- ensuring patients' safety, providing clinically effective care, and embodying the ethical ideal that has long been the expectation of the public.

Hospitals will have to meet the high expectations of the public and all stakeholders in an increasingly challenging environment. There are many issues with which hospitals must now contend. These include escalating health care costs that are no longer publicly – or politically – tenable, changing trends in reimbursement for services, demands for transparency of cost and quality data, and workforce shortages. At the same time, the conditions and care needs of hospitalized patients are more complex. The rise in patients with chronic illness, older age adults, and medical interventions and therapies, are already influencing hospitals today and that influence will deepen well into the future.

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The importance of hospital-based care will not diminish in the future. However, changes in the social and economic environments in which hospitals operate, as well as medical and technological progress require hospitals to be equally transformative as the future unfolds.

There has been a hospital building boom underway – fueled by increasing demand for health care services and increasingly obsolete hospital plants. Though economic conditions are expected to slow its pace, the continuing investment in hospital construction offers the opportunity to remake the hospital -- its design, culture and practices – to better meet the needs of patients and families and the aspirations of those that provide their care. But, unless there are principles to guide the development of the hospital of the future, hospitals may simply freeze into place the status quo of today.

In order to identify these principles, The Joint Commission appointed an expert Roundtable panel comprising hospital administrative and clinical leaders, as well as experts in technology, health care economics, hospital design and patient safety. The Roundtable was charged to evaluate the current health care environment and identify the elements of the future hospital that will position it to play an appropriate role or roles in meeting the needs of patients and publics. Among specific issues that were addressed by the Roundtable were socio-economic trends, technology, the physical environment of care, patient-centered care values, ongoing staffing challenges, and the global confluence of these issues and their impact on the hospital of the future.

This white paper represents the culmination of the Roundtable's discussions. The proposed principles for guiding future hospital development are summarized below.

Principles to Support Economic Viability:

- **Encourage the alignment of hospital measurement and payment systems to meet quality and efficiency-related goals**
- **Apply process improvement tools to improve efficiency and reduce costs**
- **Pursue coverage options to ensure patient access to, and affordability of, health care services**
- **Address the disequilibrium between the burdens of general acute hospitals and specialty hospitals in fulfilling the social mission for health care delivery**

Principles to Guide Technology Adoption:

- **Establish the business case and sustainable funding sources to support the widespread adoption of health information technology**
- **Redesign business and care processes in tandem with health information technology to ensure benefit accrual**
- **Use digital technology to support patient-centered hospital care and extend that care beyond the hospital walls**
- **Establish reliable authorities to provide technology assessment and investment guidance for hospitals**
- **Adopt technologies that are labor-saving and integrative across the hospital**

Principles to Guide Achievement of Patient-Centered Care:

- Make adoption of patient-centered care values a priority for improving patient safety and patient and staff satisfaction
- Incorporate patient-centered care principles into the activities of hospital oversight bodies and transparency initiatives
- Address barriers to patient and family engagement, such as low health literacy and personal and cultural preferences
- Eliminate disparities in the quality of care for minorities, the poor, the aged and the mentally ill
- Improve the quality of care for the chronically ill through adoption of care models that encourage coordinated, multi-disciplinary care
- Use robust process improvement tools to improve quality and safety, and support achievement of patient-centered care

Principles to Address the Staffing Challenge:

- Address the maldistribution of health care workers across the globe by instilling fair migration and compensation policies for affected countries
- Expand health professional education and training capacity to accommodate the growing demand for health care workers
- Create work place cultures that can attract and retain health care workers
- Support the development of health professional knowledge and skills required to care for patients in an increasingly complex environment

- Educate health professionals to deliver team-based care and promote teamwork in the hospital environment
- Develop the competence of health professionals to care for geriatric patients

Principles to Guide Design:

- Incorporate evidence-based design principles that improve patient safety, including single rooms, decentralized nursing stations and noise-reducing materials, in hospital construction
- Address high-level priorities, such as infection control and emergency preparedness, in hospital design and construction
- Include clinicians, other staff, patients and families in the design process to maximize opportunities to improve staff work flow and patient safety, and create patient-centered environments
- Design flexibility into the building to allow for better adaption to the rapid cycle of innovation in medicine and technology
- Incorporate "green" principles in hospital design and construction

I. Economic Implications for the Hospital of the Future

The High Cost of Doing Business

In 2007, the national expenditure on health care was over $2.2 trillion, or $7,500 per U.S. resident.[12] Health care spending accounts for 16.2 percent of Gross Domestic Product (GDP). More than one-third of national health spending is for hospital care, compared to approximately 20 percent for physician services and 10 percent for pharmaceuticals.[13] While health care costs are rising globally, in no country are costs rising at the high rate of those of the U.S. Overall, U.S. per capita health care spending is more than 50 percent higher than any other country.[14] Among the most significant reasons for this contrast are higher income and higher medical prices in the U.S.[15] Indeed, the U.S. pays much higher prices for pharmaceuticals, hospital stays and physician visits.[16] For its level of investment, the U.S. does not receive a more favorable rate of return as far as higher quality care, patient satisfaction or population health status compared to other industrialized nations.[17]

Higher health care costs that are borne by health care purchasers, payers, and consumers are becoming untenable. As a result, health care purchasers are focusing on health benefit cost containment strategies, mainly by shifting more of the cost burden to employees. Job-based health insurance premiums rose 10-times faster than incomes from 2001 to 2005, according to a report from the Robert Wood Johnson Foundation.[18] The amount employees paid for family coverage rose 30 percent, while their incomes rose by three percent. Fewer private-sector businesses offer coverage (-30,000) and as a result, 4.1 million fewer employees are working in private-sector jobs that offer health insurance. Overall, 2.4 million fewer people have private health insurance, a drop of six percent. Year to year more people are uninsured. Today, that figure stands at approximately 47 million people.

Meanwhile, public health insurance programs are experiencing the squeeze of the current economic scenario. High health care costs, a poorly performing U.S. economy, diminished tax revenue, a booming Medicare-eligible generation, as well as growing ranks of uninsured are factors in the expected insolvency of the Medicare program by 2019.[19]

More Red Than Rosy

While many hospitals are today enjoying relative prosperity – in one survey, hospital systems reported an increase in patient revenues of nearly 8.5 percent in 2007 from the previous year[20] -- the conditions upon which these gains are made are expected to dramatically change in the coming years. And, while some hospitals experience healthy profit margins, an uncomfortable number of hospitals continue to be unprofitable. There is a growing gap between have and have-not hospitals that may very well widen as the future unfolds.

Hospitals are not invulnerable to current economic conditions. While health care has long been thought to be "recession-proof" because of an endless supply of sick patients and reliance on government payment, health care organizations are as vulnerable to the tightened credit market as any industry. According to a report in *Modern Healthcare,* even before the economy started to falter this year, hospital and health system bond rating downgrades were on the upswing, while upgrades were on the downswing. In fact, about 50 percent of short-term, acute-care hospitals are either insolvent or near insolvency, according to a recent report from Alvarez & Marshal Healthcare Industry Group.[21] Financial issues are mainly arising from the instability of funding sources, including government subsidies and charitable contributions.[22] Moreover, hospital capital expenses are underfunded by up to $20 billion.[23]

By and large, many hospitals are able to achieve a positive bottom-line through cost-shifting – subsidizing services that do not cover costs with more favorable remunerative services. For treating Medicare patients, hospitals receive $.91 of every dollar expended; for Medicaid patients they receive $.86 per dollar.[24] Uncompensated care accounts for approximately six percent of hospital costs on average – in 2006 that amounted to $30 billion.[25] Yet, from private payers, hospitals receive $1.22 for every dollar spent.[26] Hospitals depend on having robust numbers of privately insured patients in order to be able to treat the under- and uninsured and still remain in the black.

This scenario will be increasingly difficult to sustain. With the demographic trend pointing to a growing elderly population, hospitals can expect to have more Medicare patients. Absent any major health reform, with the continuing decline in employer-sponsored insurance and unabated growth in the numbers of uninsured, hospitals can expect more Medicaid patients and uncompensated care. In essence, there will be more competition for the fewer patients to whom costs may be shifted.

There is another wrinkle in the cross-subsidy fabric. In order to address escalating health care costs, stakeholders are demanding transparency of the costs and quality of care. For its part, the federal government has been taking steps to encourage price and quality transparency as one way to spur competition and encourage value-based health care purchasing decisions. An August 2006 Executive Order requires federal agencies that administer or sponsor health programs to make information available to consumers on the quality and costs of services provided by doctors and hospitals. The Executive Order also requires agencies and their contractors to promote the use of interoperable health care information technology products so that data can easily be shared. The Order further requires federal agencies to offer health insurance programs that reward consumers who choose health care providers based on value and quality.

Based on the Executive Order, the Health and Human Services Secretary launched the Value-Driven Health Care Initiative, the agenda for which includes four "cornerstones" – transparency of quality information, transparency of pricing information, promotion of health information technology adoption, and creation of incentive mechanisms to promote quality and efficiency.

Transparency of pricing will likely foster what is now absent in health care – a price-sensitive consumer. While it is unclear how hospital pricing – and all of its irrational complexity – will be translated for consumer understanding, the net effect may be a flattening of health care pricing, and diminished opportunity for cross-subsidization to cover money-losing procedures and patients.

Transparency in both price and quality may, however, boost the market position of specialty hospitals. Specialty hospitals act as "focused factories," serving a subset of patients to perform specific procedures, such as cardiac care and orthopedic surgery. As such, they focus on delivering well-paying services to an insured pool of patients. Without departments such as emergency, trauma and intensive care, specialty hospitals are free of the regulatory and social obligations that general hospitals are held to. And, with high margins, focused expertise and high volume, specialty hospitals can be very competitive on price and quality.

The market and financial advantages of specialty hospitals have not gone unnoticed, and even spurred a moratorium on any new development for awhile. Now that the moratorium has been lifted, the Centers for Medicare & Medicaid (CMS) has proposed correcting inequalities by lowering the reimbursement rate for the diagnostic-related group (DRG) codes that attracted specialty hospital business in the first place. This could be an important leveler since surgery and procedure-related treatment has long been known to attract a higher financial reward than providing medical care, and has therefore created its own set of incentives. This action, though, will not require specialty hospitals to share in providing care that is solely for the public good. Further, it will lower the reimbursement rate that all hospitals receive for performing these same services and further erode future hospital revenue that provides coverage for mission-related services.

In the meantime, hospitals are readying for "no pay for preventable events." As of October 2008, Medicare no longer reimburses hospitals for a growing list of hospital-acquired conditions, such as surgical-site infection and pressure ulcers, as part of its Value-Based Purchasing Initiative. Private-sector payers are quickly following suit.

CMS is also looking at ways to equalize payment by using hospital costs rather than charges to set rates. It recently began adjusting payment to better recognize severity of illness and the cost of treating Medicare patients by increasing payments for some services and decreasing payments for others. Fiscal pressures will also keep the pressure on future Medicare and Medicaid provider reimbursements, and it is expected that CMS will continue to seek more avenues to not pay for "preventable conditions" that occur in health care organizations.

Beyond Borders

High health care costs and inadequate access to specialized care are fueling fast growth in medical tourism. Would-be patients in developed countries are traveling thousands of miles – most often to India and Thailand -- to receive high-quality care at dramatically lower costs and with no wait. Medical tourism is now a multi-billion-dollar industry. In years past, a medical tourist was someone seeking services that were not covered by health plans, such as cosmetic surgery. Today, a medical tourist is as likely to be seeking full or partial joint replacement, cardiac surgery or even stem cell therapy. Typically, U.S. citizens that have gone abroad have either been uninsured or under-insured and therefore, price-sensitive to the cost of their needed surgeries. The profile of the U.S. medical tourist is changing, however, as self-insured employers and third-party payers are beginning to add coverage for treatment received abroad as a means to lower their own costs.

Rather than wait months or years for an elective surgery, patients in some European countries are crossing borders for more immediate care. As a result, some European Union (EU) countries, such as the United Kingdom (UK), are reimbursing patients for the cost of acute care received outside of their country of origin on a case-by-case basis. For some European countries, shortening waiting lists may mean exporting patients to elsewhere in the EU, or it may mean importing health care services to bolster the volume of services provided and quicken turnaround times.

The phenomenon of the medical tourist seeking complex and necessary care for their well-being outside of their own "health jurisdiction" raises important concerns for the hospital of the future. On one hand, such medical tourism may represent an elaboration of an individual's right to choose. But, it may also exemplify the failure of a society to fulfill its social contract with its citizens.

A global health care marketplace is an increasing competitive threat for U.S. hospitals. A new study from Deloitte finds that the number of patients leaving the U.S. for medical treatment is growing at a faster rate than the number coming for treatment. The study projects that U.S. health care providers will lose nearly $16 billion in revenue this year to outbound medical travel.[27] That figure is expected to grow to $68 billion by 2010, a 325 percent rise.[28]

Hospitals depend on having robust numbers of privately insured patients in order to be able to treat the under- and uninsured and still remain in the black. This scenario will be increasingly difficult to sustain.

Hospitals are "flattening" for a variety of reasons in addition to globe-trekking patients. The outsourcing of services to offshore entities, such as for radiology, is another way in which hospitals are becoming more global and horizontally configured. But, there are domestic factors that are influencing the flattening of hospitals, as well. Specialty hospitals "disaggregate" hospital services that were once integral to the hospital. In response, hospitals are striking up partnerships with physicians in these ventures so that they can retain some share of the market.

The Home Team

Despite the impact of globalization and "disaggregation," hospitals have a mission to fulfill to society. No new specialty hospitals or offshore services are being developed to serve the poor, elderly and under- or uninsured. With the coming squeeze on health care pricing and increased competition, hospitals will need to adapt. They will have to learn to do more with less by squeezing out inefficiencies in care delivery. Without the prospect of higher reimbursement rates, hospitals will have to reduce their costs in order to achieve equilibrium in the ratio of payments received to costs expended.

There are some seemingly irrational health care expenditures, that on the surface, cry out for a more efficient approach. End-of-life care is an oft-mentioned example. In the U.S., highest per capita health care expenditure occurs in the last months of life. Several other countries perform markedly better by this measure and spend less on care at the end of life. However, "to do as they do" is not as easy as it seems. Differences in social norms, laws, regulations and litigation trends are among the reasons why there are no easy answers to this complex problem.

The national focus on health care cost containment strategies and increasingly unstable sources of funding are providing strong influence on hospitals to drive out waste and inefficiencies. Hospitals are increasingly relying on quality improvement tools such as Lean and Six Sigma to create efficient, high-quality care processes. In addition to improved patient safety and higher quality, many organizations are experiencing cost savings through these efforts. For whom these costs are saved remains an issue. Many of the savings, such as those derived from processes that reduce utilization of higher cost services, accrue to health care payers and are revenue losers for hospitals. A realigned and rational payment structure that provides incentives for waste reduction must accompany efforts aimed at creating an efficient – and equally effective – hospital industry.

New payment schemes, such as pay-for-performance, are providing hospitals with incentive to focus on specific priorities and maximize quality related to the various measures these programs track. These programs will increasingly focus on creating efficiencies in care delivery. But, more alignment of economic incentives with quality goals – such as improved care for the chronically ill -- is needed. The key challenge for the hospital of the future is to be able to fulfill its social mission in an environment of constrained federal payment while also investing in new technologies and capital improvements.

Principles to Support the Economic Viability of the Hospital of the Future:

- Encourage the alignment of hospital measurement and payment systems to meet quality and efficiency-related goals
- Apply process improvement tools to improve efficiency and reduce costs
- Pursue coverage options to ensure patient access to, and affordability of, health care services
- Address the disequilibrium between the burdens of general acute hospitals and specialty hospitals in fulfilling the social mission for health care delivery

For More Information on Hospital Economics:

- American Hospital Association, www.aha.org
- Health Care Financial Management Association, www.hcfma.org
- Center for Studying Health System Change, www.hschange.org

II. Technology for the Provision of Care

More Than the Building

"…no matter what your profession – doctor, lawyer, architect, accountant -- …you better be good at the touchy-feely service stuff, because anything that can be digitized can be outsourced to either the smartest or the cheapest producer, or both… 'Everyone has to focus on what exactly is their value-add.'"
-- from The World is Flat by Thomas Friedman

With digital technology, radiologists in Bangalore, India do not have to come to the U.S. to practice, U.S. radiology films can go to them. Even more profoundly, digital technology is changing the locus of care delivery and allowing for more care -- care that may fall under the umbrella of the hospital -- to occur outside of the hospital's walls.

In the U.S., the Department of Veterans' Affairs (VA) is on the cutting edge of using digital technology to better meet the needs of a growing number of military veterans, both those who are reaching their senior years and those newly returned from current conflicts. The VA's national Care Coordination Home Telehealth (CCHT) Program was first implemented in 2004 to bring about a transition of institutionally based care and chronic care management from hospitals and clinics to patients' own homes when indicated and appropriate. Telehealth applications combined with disease management methods and a comprehensive electronic health record (EHR) support VA care coordinators to remotely monitor patients and thereby enhance and extend care and management.

The emphasis of CCHT is on patient self-management and providing a program of care, rather than the traditional episodic approach to care. Remote

monitoring technologies enable disease management questions and objective data – for instance,

blood glucose levels of a diabetic patient – to be uploaded to their Electronic Health Record (EHR) daily. Care coordinators, who are usually nurses and social workers, use these data to prioritize who among their patients needs active care management. CCHT enables a single care coordinator to support a caseload of between 120 and 150 patients depending on case mix. In selected patients, videoconferencing capabilities even allow for virtual physician office visits in the home, which is especially beneficial for patients living in remote areas.

This application of technology is not intended to replace the high-touch aspect of care delivery. Because of the heavy emphasis on disease management and vital sign monitoring, CCHT helps to reduce disease complications, and allows patients and caregivers to recognize sooner when a doctor's visit or a hospital admission may be necessary. Currently, the CCHT program supports the care of 33,883 patients in their own homes. Outcomes data from a cohort of 17,025 patients showed a 20 percent reduction in hospital admissions and a 25 percent reduction in hospital bed days of care.[29]

The efficiencies and quality improvements gained through the VA's CCHT program are helping the VA to serve more patients and change the location of care in accordance with patient preferences. Veteran patients receiving CCHT care have a mean satisfaction score of 86 percent.[30] CCHT is part of a larger transition in the location of care for patients that is making care more accessible and convenient for veteran patients. In 1995, the VA system had 50,000 hospital beds; today it has 18,000 with the addition of over 1,000 sites of care in local communities that provide primary and ambulatory care. In the intervening period, the VA has become markedly more efficient with a relatively modest increase in clinical staffing, but a dramatic rise in the number of patients served – increasing from 2.5 million to 5 million in the same time frame. Like its counterparts in the non-federal health system, the VA has to do more with less.

The migration of care from the hospital bed and physician office to the home that is allowed through technology invites the redefinition of the hospital. Rather than being defined by its number of beds, the "value-add" of the hospital of the future may be its intellectual property. A hospital will be able to lend its expertise to the care of a patient located in a vastly different place than where its facility is located.

As an integrated, single-payer system, standardization and innovation is perhaps easier to achieve in the VA system than in hospitals and other health care providers that operate in a more fragmented environment. Implementation of new models of care like the CCHT involve changes in clinical practice, technology infrastructure and business processes. Given the underlying need to care for greater numbers of patients with chronic disease, telehealth and remote patient monitoring could have the same evolutionary impact outside of the VA as it has had within.

Mighty I.T.

At the core of the VA's Care Coordination Program is a comprehensive electronic health record system that is in standard use across VA health delivery sites, including remotely delivered care in the home. In fact, the VA has the largest enterprise-wide health information system in the U.S. Outside of the VA, only approximately 11 percent of non-federal hospitals[31] and 12 percent of physician practices[32] have implemented comprehensive electronic health records.

Rather than being defined by its number of beds, the "value-add" of the hospital of the future may be its intellectual property.

Many other countries, including the United Kingdom, Germany, Denmark, Australia and Canada have moved ahead of the U.S. in deploying health information technology. In fact, the U.S. lags a dozen years behind other industrialized countries in health information technology (HIT) adoption.[33]

In all of the countries that have implemented national HIT programs, the costs have been paid by the government and health insurers, and not by the health care providers.[34] These countries have viewed their investment in HIT as a public good, the benefits of which – reduced costs and improved quality -- will mainly accrue to health care payers and patients.[35] Implementation challenges in these countries are also far easier to overcome given their relatively simple payer structures and centralized decision-making capacity as compared to the U.S. With fewer payers – and in some cases, such as in the U.K., centralized vendor selection -- the ability to standardize nomenclature and build an interoperable platform is made easier.

In the U.S., attempts by payers, coalitions and oversight bodies to influence the rate of adoption of HIT have had mixed results. Following the IOM's release of *To Err is Human* in 1999, the Leapfrog Group – a consortium of large employers – established its first "leaps" in patient safety for hospitals serving their employees to meet. Among this first set of standards was the requirement that hospitals implement computerized physician order entry (CPOE) systems. Although this requirement came in 2000, still only about five percent of all U.S. hospitals have a CPOE system.[36] Clearly, this leap has fallen short. Leapfrog attributes this to the sheer cost of implementing CPOE and resistance by physicians.[37]

For its part in advancing the adoption of electronic health records, the federal government created the Office of the National Coordinator for Health Information Technology (ONC) within the Department of Health and Human Services (HHS). ONC's primary purpose is to coordinate the development of standards that will allow for interoperability between systems, and a national health information network through which health information can be exchanged.[38] In 2005, HHS created the American Health Information Community (AHIC). This federal advisory committee includes representatives from both the private and public sectors and is charged to provide recommendations to HHS on making health records digital and interoperable, as well as capable of protecting the privacy of patient information. HHS is now in the process of transitioning the AHIC to a successor organization under funding to the Brookings Institution and LMI Consulting. It is envisioned that the AHIC-2 will not start from whole cloth, but will learn from and enhance the work of the existing AHIC's efforts to promote electronic interchange of information. AHIC-2 is expected to be even more inclusive than AHIC and may also involve some regional loci for its work.

In the meantime, HHS has launched demonstration projects through which it provides financial incentives for health care practitioners to use HIT. The Medicare Care Management Demonstration, in part, provides additional payment to physicians who use an EHR certified by the Certification Commission for Healthcare Information Technology (CCHIT) to electronically submit performance data on 26 measures. The most recent demonstration project allows CMS to make bonus payments to small physician practices that use a certified EHR for clinical documentation and e-prescribing. Payments are determined based on the practices' performance on specific quality measures.

It may be that many hospitals still need to be convinced of the value of HIT. While there is a strong evidence base supporting claims that such HIT systems yield significant benefit for the safety and quality of health care, there has been insufficient research conducted to support the return on investment from HIT.[39] And, the level of required investment can be substantial. Initial implementation costs may range from several hundred thousand dollars for initial implementation in a physician office to millions in a community hospital to tens of millions of dollars in an academic medical center. Annual maintenance of the systems can cost tens of thousands to several million dollars.

Many are also wary of the work flow disruptions that a full-scale IT implementation can cause. Enhancing work flow and care process redesign needs to be part and parcel of the implementation plan. Failure to do so can serve to codify already broken or defective care processes. Involving clinical staff who will be using the technology – at the patient's bedside, in the office, pharmacy, lab and home – in its development and providing follow-on training are key to its success.

Issues of interoperability remain generally unsolved as of today. While health care policymakers and standards bodies hammer out solutions for achieving interoperability of systems that will allow for data sharing between separate entities, many health care providers see this as a reason to wait to invest in HIT. Unsolved issues around data privacy and fear of system obsolescence further fuel their hesitancy. In the meantime, lack of interoperability between HIT systems and medical devices that have an HIT component – such as hospital beds that take readings of vital signs but do not integrate with the EHR – slow the workflow of care providers. Indeed, nurses are often the "integrators" of patient information between HIT systems. As new technologies are added to the workplace, it is essential that they be labor-saving in order to conserve already stretched professional resources.

Buy or Beware

With a well-funded biotechnology industry, new technologies are constantly being created with the hope of creating a new disease market or need. This constant barrage of technology purchasing decisions may be difficult to navigate since any new purchase creates an opportunity to increase costs – and waste -- in the system. Adding certain new technologies into the health care work place can be very disruptive to work flow and exacerbate inefficiencies. Technologies that are not integrative with other technologies add very little value to the patient's care and the health care worker's practice.

With a plethora of cutting-edge information and clinical technology purchasing decisions to be made under a tight budget, health care professionals could use an objective authority to help guide their value-based investments.

From 1974-1995, the Congressional Office of Technology Assessment (OTA) provided Congress with objective analysis of contemporary issues involving science and technology. OTA reports were highly authoritative and well respected.[40] Similar functions in other countries were even modeled after the OTA.[41] But, these reports were sometimes unpopular, especially when their conclusions ran counter to the interests of affected industries. The OTA lost its funding in 1995.

The loss of the OTA has left a void. In 2004, a new bill to re-establish some of the capabilities of the OTA was defeated; however, many feel that Congress would benefit from expert analyses of many of the complex scientific and technological issues that are often a source of debate.

Though there are private-sector sources for information to support technology decision-making, the OTA served as a public source for much-needed information.

Principles to Guide Technology Adoption for the Hospital of the Future:

- **Establish the business case and sustainable funding sources to support the widespread adoption of health information technology**
- **Redesign business and care processes in tandem with health information technology to ensure benefit accrual**
- **Use digital technology to support patient-centered hospital care and extend that care beyond the hospital walls**
- **Establish reliable authorities to provide technology assessment and investment guidance for hospitals**
- **Adopt technologies that are labor-saving and integrative across the hospital**

For More Information on Hospital-related Technology:

- **Office of the National Coordinator for Health Information Technology, www.hhs.gov/healthit/onc/mission**
- **American Medical Informatics Association, www.amia.org**
- **Health Information Management Systems Society, www.himss.org**
- **Health Technology Center, www.healthtechcenter.org**

# III. Achievement of Patient-Centered Care

The Main Point

At Cincinnati Children's Hospital, family members are included in patient rounds in the pediatric intensive care unit and the hospital encourages family-centered rounds on all of its clinical units.[42] MCG Health System in Augusta, Georgia relies on its Patient and Family Advisory Council to inform the physical design of its care environments and even its compliance with Joint Commission National Patient Safety Goals.[43] Across its various advisory councils, the University of Washington Medical Center recruits patient and family member volunteers to interview and select residency candidates, and to develop patient educations materials and other supportive programs for patients and family members.[44]

As a result of revelations concerning patient safety, hospitals have had to look inward at practices, policies and even the cultures and attitudes that are prevalent in their delivery settings. In so doing, there is now renewed emphasis and acceptance that it is the patient who is at the center of care. Not only is the patient the main point, but the patient has the greatest stake in their care and as such, should be respected as an equal partner in their care. The elevation of the patient to partner is not a ceremonial title bestowed for a "feel good" moment, but has significant implications for the quality and safety of patient care.

When it comes to their health, patients often do not act alone on their own behalf, but their health care decisions are intertwined with those closest to them – their family members or others to whom they are emotionally tied. Family, then, is the third part of the triumvirate in the health care partnership.

The Institute for Family-Centered Care defines the core concepts of patient-centered care as:[45]

1. ***Dignity and Respect*** – Health care practitioners listen to and honor patient and family perspectives and choices. Patient and family knowledge, values, beliefs and cultural backgrounds are incorporated into the planning and delivery of care.

2. ***Information Sharing*** – Health care practitioners communicate and share complete and unbiased information with patients and families in ways that are affirming and useful. Patients and families receive timely, complete, and accurate information in order to effectively participate in care and decision-making.
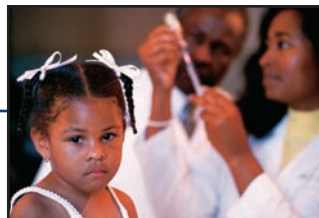
The elevation of the patient to partner is not a ceremonial title bestowed for a "feel good" moment, but has significant implications for the quality and safety of patient care.

3. ***Participation*** – Patients and families are encouraged and supported in participating in care and decision-making at the level they choose.

4. ***Collaboration*** – Patients and families are also included on an institution-wide basis. Health care leaders collaborate with patients and families in policy and program development, implementation, and evaluation; in health care facility design; and in professional education, as well as in the delivery of care.

Another resource for patient-centered care guidance is Planetree. Planetree is a non-profit organization that provides education and information to health care organizations to facilitate the delivery of patient-centered care. Planetree's Patient-Centered Care Designation Program recognizes hospitals that meet its criteria for patient-centered care. These criteria have been compiled based upon the experiences of hospitals who have achieved patient-centered care, as well as the feedback of patients. The criteria are used to measure organizations' structures and functions that support patient-centered care concepts; human interactions; patient education and community access to information; family involvement; nutrition; the architecture and interior design of the healing environment; art programs; spirituality and diversity; integrative therapies; community health; and measurement.[46]

Nothing Without Me

Engaging patients in their care has real implications for the quality and safety of patient care. A large study of adult patients with chronic or serious conditions who were engaged in a collaborative care model had better control of their blood pressure, blood glucose levels, and serum cholesterol than patients who had less confidence either in their doctors or their ability to care for themselves.[47]

Another study of patients hospitalized for acute myocardial infarction found that patients who rated hospitals poorly on Picker Institute measures of patient-centered care had poorer health outcomes than those who experienced more patient-centered care.[48]

The experiences of MCG Health System in Augusta, Georgia attests to the prospects for patient-centered care in improving quality and safety. In 2003, the health system redesigned its intensive care unit for neuroscience patients to allow patients' families to stay with them at all times.[49] The observances of family members were valued by the unit's clinical staff. Owing to these insights and improved communications, medication errors in the unit decreased 62 percent, length of stay decreased 50 percent, and the staff vacancy rate fell from 7.5 percent to zero.[50] Patient satisfaction ratings increased from the tenth percentile to the 95th.[51] In the words of an MCG staff member, the families "helped us help their loved ones." [52]

Engagement of patients and families empowers patients to participate in care decisions, provide self-care, and protect themselves from potential harm. In fact, The Joint Commission's National Patient Safety Goal 13 specifically requires health care organization staff to encourage patients' active involvement in their care as a patient safety strategy. Goal 13 further requires staff to identify ways in which the patient and his or her family can report concerns about safety and encourage them to do so. The rationale for this goal states that "communication with the patient and family about all aspects of care, treatment, and services is an important characteristic of a culture of safety. When the patient knows what to expect, he or she is more aware of possible errors and choices. The patient can also be an important source of information about potential adverse events and hazardous conditions." The aspect of patient empowerment within patient-centered care has led to the notion of "nothing about me, without me."

Momentum

In addition to Joint Commission standards and safety goals, other organizational and professional accrediting bodies increasingly emphasize the importance of engaging patients in the delivery of care. In the U.S., the inclusion of information pertaining to patients' perspectives of care on the CMS Web site, *Hospital Compare*, provides a powerful incentive for hospitals to better meet the expectations of patients. The survey – called H-CAHPS – addresses issues such as the quality of nurse and physician communications with patients, discharge instructions, and medication education. In the international arena, the U.K. National Health Service (NHS) is requiring its hospitals and primary care clinics to engage patients and family in quality improvement efforts.[53] Across Canada, patients are

being similarly engaged.[54] The World Health Organization (WHO) has also made patient and family engagement in patient safety improvement a major priority of its World Alliance for Patient Safety, launched in 2004.[55]

Patients and families are also driving momentum. Several patient advocacy organizations, such as Partnerships for Patient Safety (p4ps) and PULSE are organized around the goal of advancing patient-centered care and improving patient safety.

Social momentum for patient-centered care is also likely to increase with the growth of consumer-directed health plans and health savings accounts (HSAs). Such health plans increase the health care consumers' responsibility for making value-based health care purchasing decisions.

Technology is another momentum-building factor. The advent of personal health records (PHRs) will provide patients with "point and click" access to their own health records as well as enhanced communications capabilities with their care providers. Technology that is allowing patients to receive higher levels of care in their homes underscores the need for a patient-centered approach to care, especially as their role as "partner" in care delivery becomes a 24/7 endeavor. These patients and families need personalized education and training, as well as a professional support system so that the transition to home-based care is safe and effective for all involved.

Custom and Culture

While momentum is certainly building and the concept of patient-centered care is widely embraced, much is still getting lost in the execution. There are barriers, not the least of which is the heightened need for patient education when practitioners seemingly have less time to spend with patients – ala the 10-minute office visit. There are also issues of health literacy – in the U.S. alone, nearly half the population lacks the skills necessary to obtain, process, and understand basic health information and services needed to make appropriate health decisions.[56]

The focus in patient-centered care on transparency can make hospital risk managers uneasy. Yet, several studies have revealed that what patients really want – open disclosure, communications and collaboration – nurtures, rather than harms, patient and caregiver relationships.[57]

It is also important to underscore what patient-centered care is not. In some countries, the term is a euphemism for a lower tier of care, where the de facto caregiver is the family – not in partnership with practitioners – but on their own. There are other cultural differences to patient-centered care. In Thai culture, the family will stay at the patient's bedside round-the-clock and help with feeding and personal support. But, neither a Thai patient nor family member will generally participate in decision-making -- that is the province of the physician, whose level of education is held in high esteem. In any country, it is also important to recognize that not every patient wants to be a partner in their care, nor do they wish their family to be. The level of partnership may vary – some patients may wish to be 50/50 partners, others may wish for much less.

For the hospital of the future, care must be increasingly customized to the personal expectations, cultural beliefs and traditions, and language needs of the patient. In eliciting patients' needs and expectations of their care, hospitals may need to perform an intake interview that covers these topics at the time of admission.

Instilling patient-centered care is not just about changing policies and practices; it is about changing culture, which is never easily done. For staff to be empathetic to patients, the hospital must also have an empathetic culture for staff. Staff members need to be supported through systems that protect them from harm – and from doing harm. In the absence of such cultures and work environments, staff members may become overburdened and increasingly demoralized. To achieve a culture that is patient-centered and supportive of staff, hospital leadership and staff must share common beliefs and values. Coming to these common beliefs and values may be the hardest part of achieving cultural change.

Serving the Underserved

In the U.S., there are specific populations who are the least likely to receive patient-centered care. For minority groups and the poor, disparities in health care quality and access persist. The 2007 National Healthcare Disparities Report issued by the Agency for Healthcare Research and Quality reveals that, overall, disparities have not been reduced despite the growing body of evidence of their existence, though there have been small gains.[58] Positive examples include the adequacy of hemodialysis for Black and for White patients, and the hospital admission rate among Hispanics and the poor and their White, affluent counterparts for perforated appendix.[59]

These small gains are offset by the persistence of wide disparities in health care quality that have resulted in disproportionate numbers of minorities and poor who have AIDS, lower immunization rates, and lack access to prenatal care, among other examples of unequal treatment.[60]

Sometimes it is the provenance of their illness that creates disparate access to quality health care for patients. Mentally ill patients are perhaps the most underserved patient population today. A report from a special commission to President Bush claims that half of Americans who need mental health care are not getting it, even if they have sought it.[61] Mainly due to a payment system that does not support the provision of psychiatric care, many hospital-based and free-standing psychiatric services have closed or reduced their number of beds.[62] In fact, from 1995 to 1999, the number of psychiatric beds in this country shrunk by 38 percent.[63] All the while, demand for inpatient psychiatric care has climbed,[64] leaving the mentally ill often with nowhere else to turn but to the hospital emergency department for care. In fact, emergency departments across the country report an influx of mentally ill patients coming through their doors.[65] With so few alternatives to place these patients in a psychiatric bed, the emergency department often holds these patients for hours, even days.[66] Though the roots of the problem began more than a decade ago, it is a problem that worsens year to year. In a 2007 AHA survey, 42 percent of hospitals reported an increase in boarding behavioral health patients in the emergency department.[67]

The boarding of psychiatric patients brings its own particular strain and costs. Crowded emergency departments, with staff and resources stretched thin, cannot provide the intense care and monitoring psychiatric patients in crisis need, which is best provided in an appropriate setting and by specially trained health care workers.

On The Rise

Today, half of all hospitalized patients have one or more chronic condition, such as diabetes, heart disease and asthma. The prevalence of chronic illness is expected to steadily increase. By 2030, it is estimated that 171 million people will have at least one chronic illness.[68] By this same year, older adults will account for more than 20 percent of the population.[69] While older adults are expected to live longer, this will not be without personal health challenges. More than 75 percent of adults over age 65 suffer from at least one chronic condition, and many have multiple conditions.[70] Among current Medicare beneficiaries, 20 percent have five or more chronic conditions.[71]

For the hospital of the future, providing patient-centered care means better meeting the needs of all of its patients, including the underserved, the aged and the chronically ill who will fill its beds in greater numbers.

Aging is not the only factor driving the burgeoning ranks of the chronically ill. Owing to its significantly higher rates of obesity and smoking, the U.S. has a significantly higher rate of associated diseases – such as diabetes, hypertension and heart disease – than European countries.[72] According to the Centers for Disease Control and Prevention (CDC), 80 percent of diabetes, heart disease and stroke could be eliminated through reductions in smoking and obesity.[73]

There is widespread recognition that care for the chronically ill in the U.S. is falling short. An oft-cited report from RAND indicates that the chronically ill receive approximately half of recommended care.[74] At the root of this issue is the predominant organization of the health delivery and payment system to support the diagnosis and treatment of acute, or episodic, conditions.[75] Patients with chronic illness, especially those with multiple conditions, often receive care from multiple providers and take many medications.[76] Because this care is uncoordinated, patients may experience duplicative services and testing, avoidable hospitalization, and adverse drug events.[77] As a result, care is often fragmented, ineffective and costly for people with chronic diseases.[78] Optimal care for people with chronic diseases involves coordinated, continuous treatment by a multidisciplinary team of health care professionals.[79] These patients need education and tools to support self-management, and connections to community resources for their social, mental health and home health needs.

For the hospital of the future, providing patient-centered care means better meeting the needs of all of its patients, including the underserved, the aged and the chronically ill who will fill its beds in greater numbers.

Patient-Centered Transformation

To increase their reliability in delivering patient-centered care, hospitals can turn to the process improvement tools -- such as Six Sigma and Lean, among others -- that have proved effective for transforming other industries. A glimpse of that transformation can be seen at hospitals like Virginia Mason Medical Center in Seattle, which has applied these tools to improve the quality of care for patients with low back pain and other conditions, increase adherence to evidence-based care, and decrease costs.[80] In ThedaCare hospitals in southern Wisconsin, application of these methods to general medical units has allowed the hospitals to reduce medication errors, the average amount of time these patients are hospitalized, and the fees charged for certain procedures.[81] New York-Presbyterian Hospital used these tools to reduce average length of stay for patients undergoing cardiac and orthopedic procedures, reduce medication errors and patient falls, and increase patient satisfaction rates.[82]

Principles to Guide Achievement of Patient-Centered Care in the Hospital of the Future:

- Make adoption of patient-centered care values a priority for improving patient safety and patient and staff satisfaction
- Incorporate patient-centered care principles into the activities of hospital oversight bodies and transparency initiatives
- Address barriers to patient and family engagement, such as low health literacy and personal and cultural preferences
- Eliminate disparities in the quality of care for minorities, the poor, the aged and the mentally ill
- Improve the quality of care for the chronically ill through adoption of care models that encourage coordinated, multi-disciplinary care
- Use robust process improvement tools to improve quality and safety, and support achievement of patient-centered care

For More Information on Patient-Centered Care:
- The Institute for Family-Centered Care, www.familycenteredcare.org
- Planetree, www.planetree.com
- Partnership for Patient Safety (p4ps), www.p4ps.org
- PULSE, www.pulseamerica.org
- Institute for Healthcare Improvement, www.ihi.org

IV. The Staffing Challenge

Wide and Deep

Hospitals rank second as a source of private-sector jobs nationwide.[83] In urban areas, hospitals are among the top ten employers, and are often the largest employer in rural areas.[84] Health care, broadly, contributed more jobs to the economy than any other industry in the last several years.[85] Still, the demand for certain health professionals outstrips supply.

Workforce shortages have persistently plagued hospitals over the last several years. In 2007, as well as in previous years, it has ranked in the top five issues confronting hospital CEOs according to a poll conducted by the American College of Healthcare Executives. Staffing problems are widespread across health care professions. Therapists – physical, occupational and speech – are in especially short supply and increasingly difficult to recruit from year to year.[86] Vacancy rates for these positions exceeded 11 percent by year-end 2006.[87] Registered nurses, pharmacists, nursing assistants, licensed practical nurses, and laboratory and imaging technicians all have vacancy rates in the range of six percent for technicians to eight percent for RNs.[88] There is also growing national concern over shortages of physicians – already a problem in several states – that is expected to worsen as demand outstrips supply. By 2020, the U.S. may be short 85,000 physicians.[89] It is not just the frontline clinicians that are difficult to hire and retain. Hospital executive positions have high turnover. As many as half of nurse executives,[90] and 14 to 18 percent of chief executive officers,[91] will leave their jobs in a year.

Pervasive staffing problems challenge the ability of the hospital to perform its most fundamental functions. Studies show that there is an association between registered nurse staffing and hospital-

relat-ed mortality, failure to rescue, and higher risk of complications, among other negative patient outcomes.[92] In addition, beds that are not staffed cannot be filled by patients, undermining the admissions process, especially admissions from the emergency department (ED). Nearly half of all hospital emergency departments report being at or over capacity, and the majority of urban hospitals experience time on diversion – when they are closed to incoming ambulances.[93] The primary reason for going on diversion is a lack of staffed critical care beds.[94] Staffing shortages, overall, are among the top five conditions that lead to ambulance diversion.[95]

In addition to ED overcrowding and diversion, about half of hospitals report that staffing shortages contribute to decreased staff satisfaction.[96] Decreased patient satisfaction, reduced numbers of staffed beds, increased length of stay, increased wait times for surgery, as well as cancelled surgeries also follow in the wake of staffing shortages.[97]

Low staff satisfaction is a persistent problem for many hospitals. Hospital-based nurses, for instance, have job dissatisfaction rates that are three to four times higher than the average U.S. worker.[98] Low dissatisfaction rates among nurses is not an American phenomenon, but occurs in other countries where it has been studied, such as Canada, England and Scotland.[99] Yet, the sentiment is not universal.

Nurses employed in facilities that have been awarded Magnet Recognition® from the American Nurses Credentialing Center (ANCC) report being more satisfied with their work. In addition to higher staff satisfaction, Magnet status strengthens nursing recruitment and retention efforts.[100]

Independent studies show that patients in Magnet hospitals have shorter lengths of stay, lower mortality rates and higher satisfaction, and benefit from a richer staff mix.[101]

A Global Predicament

As perhaps the most in-demand health care resource across the globe, plenty of nurses are being "in-sourced" into other countries. The U.S. has long depended on migrating nurses to fill its growing gap between nurse supply and demand. This practice also occurs in other highly developed countries, at the expense of the less developed, where many migrating nurses originate.

Nurses are not the only migrating health care worker. Physicians, pharmacists and lab technicians are on the move as well. The WHO reports that the situation of migrating workers is most desperate in poor countries and continents. Africa, for instance, holds 11 percent of the world's population, but it hosts 25 percent of the disease burden, and yet, it employs three percent of all health care workers.[102] Twenty-five percent of African-trained doctors work in wealthy Organisation for Economic Co-operation and Development (OECD) countries.[103] In Ghana, 40 physicians graduated in 2004 from the government-financed medical education system, but only two remained in the country.[104] The others left for either the U.S. or U.K. to practice.[105] The shortage of health care workers is exacerbating the devastation wrought by the AIDS crisis in Africa.[106]

According to the WHO, because of the shortage of health care workers at least 1.3 billion people around the world have no access to basic health care services.[107] In response, the WHO is pressing countries across the globe to address the ethical and financial impacts of worker migration, as well as efforts to retain workers within their country of origin.

The practice of health care worker importation and exportation is, of course, unsustainable. But, it begs the question: Who will staff the hospital of the future?

Stops and Starts

In the U.S., a poor economy is driving people back to work and providing some optimism for a more robust nursing workforce. New research finds that after a net loss of more than 10,500 nurses in 2004 and 2005, health care gained roughly 18,700 nurses in 2006.[108] In 2007, the industry added 84,200 nurses despite a drop in real wages.[109] Current projections for the shortage of nurses in the U.S. puts the number at 340,000 by 2020, which is significantly fewer than previous projections of 760,000.[110]

An important distinction of the evolving shortage is that the nurses who have stepped forward to help fill the gap are markedly older – in their late twenties and early thirties – whereas the number of new entries in their early to mid-twenties is at the lowest level in 40 years.[111] As the average age of the nurse moves upward, there are implications for hospital design and ergonomics that are needed to support the health and longevity of the nurse on the job.

During the first year on the job, the average voluntary turnover rate of new hospital nurses is 27 percent.[112] This likely reflects the combination of inadequate educational preparation of the nurse for the realities of practice, as well as longstanding work environment issues that have contributed to low satisfaction rates of hospital-employed nurses.[113] Among these issues are long shifts and persistent fatigue; lack of leadership that empowers nursing staff; unavailability of supportive technologies; and lack of innovation in redesigning and improving the role and workflow of the nurse.

A recent time and motion study to determine how medical-surgical nurses spend their time found that nearly three-quarters of nurses' time was spent on documentation, medication administration and care coordination, but only one-fifth of their time was spent on direct patient care.[114] Further, nurses walked between one mile and five miles every shift in an effort to "hunt and gather" needed supplies or information.[115] The inordinate amount of time spent on documentation – almost one-third of all of their time – points to the need to examine the role of the nurse and its inherent processes. Few nurses would cite "paperwork," as necessary as it is, as the reason they chose nursing as their profession.

A major bottleneck in efforts to add new nurses to the workforce remains a lack of capacity at the educational level. According to data from the American Association of Colleges of Nursing (AACN), enrollment in entry-level baccalaureate nursing programs increased by almost five percent from 2006 to 2007. While this increase represents a positive enrollment trend over the past several years, more than 30,000 qualified applicants were denied entry into baccalaureate nursing programs in 2007 due primarily to an intensifying shortage of nurse faculty. The gap between supply and demand in the nursing workforce will be difficult to fill without resolution of the crisis in nursing education capacity.

High Touch, High Tech

As patients' needs and health care delivery become ever-more complex, it is difficult for clinicians to keep pace. Hospitalized patients have higher acuity and are more likely to have comorbidities, while hospital stays have shortened. Average length-of-stay for hospitalized patients has declined by 25 percent since the 1980s.
Since the late 1990s, the Food and Drug

Administration (FDA) has approved more than 500,000 new medical devices. At the same time, ever-increasing developments in pharmaceuticals, biologics and genomics are expanding the knowledge demands of practitioners. While many advances in technology help to improve patient outcomes, the sheer volume of technologies and the attendant knowledge required has made health care delivery vastly more complex. Additionally, new technologies often provide new, sometimes unforeseen, opportunities for error.

The impact of this developing complexity weighs heavily on the hospital-based clinician. One way in which the nursing profession has responded is by the creation of the Clinical Nurse Leader™ role. The American Association of Colleges of Nursing (AACN) has developed this new nursing role to better prepare nurses for clinical leadership in all health care settings. These masters'-prepared nurses are expected to be direct caregivers, managing the care of patients within clinical microsystems. The Clinical Nurse Leader™ certification process ensures that these nurses bring evidence-based practices to care settings and are able to apply quality improvement principles to the measurement, assessment and improvement of patient-care outcomes. According to the AACN, currently about 60 colleges and universities offer the master's degree program that prepares the Clinical Nurse Leader.™

Scientific progress, such as new developments in biologics, genomics, robotic preparation and automated distribution, is affecting the level of technologic expertise that the hospital pharmacist must have. In fact, the profession raised the entry-level degree for a pharmacist to a doctorate (Pharm.D) to ensure a better-prepared pharmacist workforce. Many pharmacists who practice in hospitals also complete residency training.[116] The downside of this higher standard is that it created a roadblock for the entry of new pharmacy students. Indeed, hospitals surveyed by the AHA reported an eight percent vacancy rate for pharmacists at the end of 2006.[117]

The role of the hospital pharmacist is expected to change as well. Always a valued member of the health care team, the role of the pharmacist is likely to become more visible in patient-centered care delivery as a way to combat the high volume of medication errors that occur in the hospital setting. As hospital pharmacists become more involved in direct patient care, there is a requisite need to accommodate new learning in the education and training of pharmacy students. There are concerns that hospitals and health systems may not have the capacity to accommodate the growing numbers of pharmacy students who will require this experiential education.[118] The involvement of pharmacists in direct patient care has also resulted in a greater reliance on trained and certified pharmacy technicians, who assist with the preparation and delivery of medications.[119]

A Changing of the Guard

A changing of the guard has been occurring in hospitals over the last several years, a change that is likely to become the standard in hospitals of the future. Hospitalists – physicians who practice primarily hospital-base care – have been increasingly staffing U.S. hospitals. It is estimated that by 2010, 30,000 hospitalists will be staffing U.S. hospitals.[120] As hospitalists are gaining prevalence, the concept is also expanding from general practice and internal medicine to include medical and surgical specialists.

The recent growth of the hospitalist movement in the U.S. can be attributed to a number of factors. Fewer office-based primary care physicians choose to provide hospital-based care. Work hours for residents, who have traditionally provided 24/7 hospital care, have been reduced in recent years. Hospitalists fill these gaps by providing acute care expertise to patients throughout their hospital stay. A recent study in the *New England Journal of Medicine* found that patients cared for by hospitalists have average lengths of stay in the hospital and associated costs that are slightly reduced.[121]

As patients' needs and health care delivery become ever-more complex, it is difficult for clinicians to keep pace. Hospitalized patients have higher acuity and are more likely to have comorbidities, while hospital stays have shortened.

31

Team-Based Care

With staffing shortages still looming in the hospital of the future, hospitals may need to accomplish more with fewer health professionals. Well functioning teams can get more done than any one individual. Teamwork also has a significantly positive impact on the safety of health care delivery.[122] Studies show that well functioning teams make fewer mistakes than do individuals.[123]

Acquisition of team skills does not occur by happenstance. Health professionals must be educated and trained to value and demonstrate desired team behaviors. To that end, knowledge of teamwork components and the competencies required to effectively participate as team members should be introduced early in health care professional education and fostered throughout professional training and continuing education. Further, teamwork skills, knowledge and performance should be incorporated into the oversight and assessment of health professionals and organizations in order to ensure and sustain its widespread adoption. Both classroom and simulator-based methodologies can be used for team training.

In addition to team skills, members of the care-giving team must have the requisite knowledge and skills to effectively care for older adults and the chronically ill. Today, older adults account for 35 percent of all hospital stays, 26 percent of all physician visits, and 34 percent of all prescriptions.[124] Yet, less than one percent of registered nurses and pharmacists are certified in geriatrics.[125] While more than 7,000 physicians are currently certified in geriatrics, the need is much greater. By 2030, it is estimated that 36,000 geriatricians will be needed to care for the burgeoning population of older adults.[126]

As the number of older adults and patients with one more chronic illness rises, so too, must the competencies of those who provide their care. Hospitals play a key role in fostering the competence of all health care workers in caring for geriatric patients.[127] Hospitals must also increase the recruitment and retention of geriatric specialists and caregivers.[128]

Team-based care models may be expanded and bolstered by the potential payment model advocated by the Medicare Payment Advisory Commission (MedPAC). MedPAC recommends a bundled Medicare payment approach, under which physicians and hospitals receive a fixed payment for a select set of episodes of care. An episode is defined as the hospital stay plus 30 days after discharge.[129] Today, physicians and hospitals are paid separately under different payment schemes by CMS for hospital-based care. A bundled approach, it is believed, will reduce variation in costs and quality and encourage joint accountability. This concept will be tested by CMS beginning in January 2009 with its Acute Care Episode (ACE) demonstration, which will offer bundled payment for 28 cardiac and nine orthopedic inpatient surgical services in four states.[130] Among the many expectations for bundled payment is that it will influence physicians and hospitals to closely integrate their services, which will be necessary in order to accept bundled payments.

Principles to Address the Staffing Challenge of the Hospital of the Future:

- Address the maldistribution of health care workers across the globe by instilling fair migration and compensation policies for affected countries
- Expand health professional education and training capacity to accommodate the growing demand for health care workers
- Create work place cultures that can attract and retain health care workers
- Support the development of health professional knowledge and skills required to care for patients in an increasingly complex environment
- Educate health professionals to deliver team-based care and promote teamwork in the hospital environment
- Develop the competence of health professionals to care for geriatric patients

For More Information on Hospital Staffing:

- Robert Wood Johnson Foundation/Institute for Healthcare Improvement, Transforming Care at the Bedside, www.rwjf.org/applications/solicited/npo.jsp?FUND_ID=54244
- American Hospital Association, In Our Hands, www.aha.org/aha/resource-center/Statistics-and-Studies/ioh.html
- Institute of Medicine, *Retooling for an Aging America: Building the Health Care Workforce*, www.nap.edu/catalog/12089
- American Nurses Credentialing Center, Magnet Recognition Program, www.nursecredentialing.org/Magnet

V. Design of the Physical Environment

Safe by Design

Though the recent economic downturn and a tightened credit market has slowed hospital construction in the U.S., there has been a remarkable hospital building boom underway fueled by increasing demand for health care services and increasingly obsolete hospital plants. In 2007, $35.4 billion in health care construction projects were completed, more than a $10 billion increase from the previous year.[131] Projections foresee the health care industry among the only bright points for construction in the next couple of years.[132] This investment offers the opportunity to remake the hospital -- its design, culture and practices – to better meet the needs of patients and families and the aspirations of those that provide their care.

Building more of the same will freeze into place persistent problems with which hospitals must already contend -- such as unsafe care, hospital-acquired infection, and worker fatigue – that otherwise could be mitigated through the application of evidence-based design. Several hundred studies have revealed hospital design characteristics that work for improving patient safety and health care outcomes, and providing a supportive environment for hospital staff.[133]

Yet, most new hospitals are not being built "safe by design." New hospitals will increasingly care for more elderly patients. And, as more care moves out to ambulatory and home settings, hospitalized patients will be the sickest and most vulnerable. More than ever, hospitals will need to be designed to safely accommodate these fragile patients.

Prominent threats to patient safety – medication errors, patient falls, and errors made during patient transfers, among them – can be mitigated through evidence-based design. Better lighting and reduced noise levels can help avoid distractions that often lead to caregiver errors in the medication process. Decentralized nursing stations allow nurses to better see and hear the patients under their care and observe changes in skin color and breathing, as well as to prevent falls that occur when a patient is unobserved. Rooms that are designed for the patient bed and bathroom entrance to be seen from the hallway also enhance observation. Multi-acuity beds that reduce the number of transfers, or "hand-offs," of patients from one unit to another, in turn, reduce the opportunity for errors to occur.

The regulatory infrastructure can stifle design innovations meant to reduce the risk of patient injury. Though multi-acuity beds that allow a patient to remain in the same bed while their care level is stepped down from critical care to medical-surgical nursing may make sense, in some states they do not meet state licensure stipulations regarding patient bed designations and thereby are disqualified for reimbursement.

Single-patient rooms may have the single most important impact on patient safety. In addition to enhancing patient privacy, allowing for confidential discussions and accommodating family members, single rooms help protect patients' health.

Spread of infection is a daily risk in every of hospital. When patients are isolated from one another, there are fewer chances for microbes to be spread. In addition to patient-to-patient spread, caregiver-to-patient spread is common. Well-placed sinks and alcohol gel dispensers can prompt caregivers to wash their hands, which is an essential part of any infection control program. Single rooms further improve the rate of hand-washing when crossing the barriers between patient rooms prompts caregivers to wash their hands. Whereas, in a double patient room, the transition from one patient to the next is quick and barrier-free; too little time to stop and think about hand-washing. Single rooms also allow for better air quality management and can be more thoroughly decontaminated between occupancies.

Flat World Phenomena

Infection control, always a high priority for any hospital, becomes paramount in the face of a potential global epidemic. Emergency preparedness is a key priority to be addressed in the design of the hospital of the future.

In today's ever-flattening world, individuals are more globalized – they travel more, both virtually and in person. The supply chain is also more globalized and could easily be disrupted by a global epidemic: "…when the world is flattening –

when some 80 percent of the raw materials that go into pharmaceutical drugs sold in America come from overseas suppliers, and when the rubber that keeps surgical masks tight on your face comes through a just-in-time supply chain that starts in Indonesia or Africa, stretches through Europe, and then skips over to America – our ability to cope with any pandemic would be sharply reduced."[134]

Thanks to the ubiquity of airline travel, an infectious disease can move quickly in a flat world. Once SARS appeared in rural China, it spread to five countries within 24 hours.[135] In a matter of months, it had spread to 30 countries on six continents.[136] With the SARS epidemic, hospitals that were sought for care became the vectors for SARS transmission. Open bay intensive care units (ICUs), public waiting areas, and emergency departments all became central stations for contracting SARS. Tuberculosis has also been known to be similarly spread.[137]

The good news is that hospitals can be designed to mitigate these risks. The transformation of the physical environment of care must also take into consideration future needs such as achieving surge capacity in response to disaster.

The lengthy cycle of design and construction is often overtaken by the rapid cycle of innovation in medicine and technology. As a result, some buildings are partially obsolete when they open, and nearly every health care structure will be obsolete in some way before it has completed its useful life.

Standardized Flexibility

Standardization reduces complexity, which is important when flexibility is needed, as is the case for increasing surge capacity. Importantly, standardization is a key strategy in human factors design as a means to reduce the risk of error and improve quality.[138] Human factors design focuses on improving the human-system interface by designing better systems and processes. For hospitals, standardization of patient rooms, treatment rooms, equipment and care processes,[139] reduces reliance on short-term memory.[140] In room design, standardizing details such as the location of bed controls, light switches, and even, which cupboards store latex gloves, for instance, are important considerations for optimizing the human-system interface.[141]

The lengthy cycle of design and construction is often overtaken by the rapid cycle of innovation in medicine and technology. As a result, some buildings are partially obsolete when they open, and nearly every health care structure will be obsolete in some way before it has completed its useful life. Design for flexibility is a way to reduce the inconvenience and cost of these inevitable disruptions.[142]

- **Master planning strategies:** Every design should have planned zones for future growth. These can appear as a dotted line on the site plan, or may be developed as constructed but unoccupied shell space, or as structural capacity to allow for future vertical additions to a building.
- **Loose-fit design:** Many designs make an effort to design precisely to the absolute minimum square footage justified by the program of space requirements, yet such designs are the first to reveal difficulties when new programs appear, or existing programs grow or shrink. The concept of loose-fit is to design with larger spaces that can be used for more than the minimum function originally proposed, and to arrange them in departments or groupings that allow for future adjustments.
- **Adaptable flexibility:** Spaces can be designed to adapt to multiple uses. An example is a patient room that can be adapted for the purpose of simple procedures such as a line insertion. The different function can be accommodated by simply adapting the space because it has been planned to serve a range of possibilities.
- **Convertible flexibility:** Another type of flexibility is when, with relatively low effort, time, and/or cost, a space can be converted to another use. Examples of this type of flexibility include a storage space with a knockout panel in the slab to allow for a future elevator, or a patient room with plumbing, gasses, and electrical systems in the wall for future conversion to critical care.
- **Robust utilities:** In order to offer flexibility in design, the utility and communication infrastructure of a health care facility should be capable of expansion and upgrade. Availability of utility and network capacity simplifies and dramatically reduces the cost of future projects.
- **Plug-and-play infrastructure:** Just as all the utilities of the city are uninterrupted when one property undergoes a construction or demolition project, a hospital should be designed so that the utility and primary horizontal and vertical circulation infrastructure remains in service while departments, wings, or entire buildings are added or removed.

Place of Work

In addition to protecting patients, hospital design is integral to protecting hospital workers and enhancing the work they do.

About one-third of a nurse's time on shift is spent walking.[143] Not only is this time spent walking between the centralized nursing station and patient rooms, but on hunting and gathering various supplies. Decentralizing nursing stations and supplies – bringing both closer to the patients – would reduce wasted time and fatigue. Other physical stressors include noise, that when reduced, as previously mentioned, results in less fatigue and reduced risk of error. A great deal of heavy lifting, turning, and transporting patients goes on in hospitals that could be alleviated by proper hoists and other ergonomic technologies.

Involving staff in the design process is essential for creating a physical environment that improves work flow. In the future, the application of design improvements to time-consuming nursing tasks, such as medication administration and documentation, may yield new gains in efficiency. As pharmacists increasingly counsel patients on drugs and therapeutic regimens, the physical environment of the pharmacy must be made to accommodate these confidential discussions. New design concepts have been shown to give hospital clinical staff more time to spend with patients, while also allowing the hospital to expand its capacity to treat patients.

Designing a hospital with safety in mind helps to create a safety culture. Involving patients and families, in addition to staff, in the design of the physical environment also helps to assure the patient-centeredness of the organizational culture.[144] The culture of the workplace can be transformed by the physical demonstration that the organization embraces patient and staff safety, and collegial health care delivery.

Being Green

Global climate change and harm wrought from chemical contamination are no longer speculative. In congruence with their mission, hospitals in the future must be healthy places to be in and live near.

In 1996, the Environmental Protection Agency (EPA) declared medical waste incineration to be the greatest source of dioxin contamination in the atmosphere.[145] At that time, there were 5,000 medical waste incinerators. Today there are fewer than 100 still in operation. That momentum needs to continue and be broadened to include the elimination of toxic materials used inside the hospital.

The chemical compound polyvinyl chloride (PVC) is ubiquitous in the hospital environment. It is used in I.V. and blood bags, plastic tubing and an array of other medical supplies.[146] When PVC-based products, such as nasogastric tubes, are used invasively, they can leach toxic chemicals that enter the body. One of these chemicals has proven to be a reproductive toxicant, which led the National Toxicology Program to declare that infants in hospitals are at risk from this chemical.

PVC, which is also commonly used in hospital building materials, emits toxins into the air, putting patients and staff at risk. Interior exposure to PVC has been definitively linked to asthma.[147] With the prevalence of PVC exposure, as well as exposure to other noxious chemicals such as cleaning agents and pesticides, it is no wonder that poor air quality is the most frequent cause of work-related asthma in health care workers.[148]

Hospitals are huge consumers of energy – natural gas and electricity -- second only to the food-service industry in energy consumption.[149] The costs of such energy consumption will increasingly comprise an unaffordable portion of the hospital budget. These costs plus growing concern over global warming are influencing hospitals to use cleaner, more efficient sources of energy and to reduce their global footprint. Accordingly, hospitals will need to use fewer resources and produce less waste.

One hundred U.S. hospitals are finding it easier to be green by piloting the *Green Guide for Health Care (GGHC)*, standards modeled on those of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED), in their construction projects.[150] The GGHC standards actually exceed LEED standards and align environmental health considerations with health system priorities. The GGHC has received strong endorsement – Kaiser Permanente has committed to using it for building projects across its system, and the City of Boston is recommending it to city hospitals that are embarking on expansion plans.[151]

A healthy hospital environment also extends to the food that is served in that environment. Food that is served in hospitals should promote and not undermine health. Large health care systems, such as Kaiser Permanente and Catholic Healthcare West, have led the way in implementing policies that require healthy food choices for patients and also support sustainable farming practices – food production that is local, humane and environmentally protective.[152]

Designing a hospital with safety in mind helps to create a safety culture. Involving patients and families, in addition to staff, in the design of the physical environment also helps to assure the patient-centeredness of the organizational culture.

Principles to Guide the Design of the Hospital of the Future:

- Incorporate evidence-based design principles that improve patient safety, including single rooms, decentralized nursing stations and noise-reducing materials, in hospital construction
- Address high-level priorities, such as infection control and emergency preparedness, in hospital design and construction
- Include clinicians, other staff, patients and families in the design process to maximize opportunities to improve staff work flow and patient safety, and create patient-centered environments
- Design flexibility into the building to allow for better adaption to the rapid cycle of innovation in medicine and technology
- Incorporate "green" principles in hospital design and construction

For More Information on Hospital Design and Safety:

- The Center for Health Design, www.healthdesign.org
- John Reiling, *Safe by Design: Designing Safety in Health Care Facilities, Processes, and Culture,* published by Joint Commission Resources, and available through www.jcrinc.com
- Health Care Without Harm, www.noharm.org
- Leadership in Energy and Environmental Design (LEED), U.S. Green Building Council, www.usgbc.org

Conclusion

A century ago, people advocated for hospitals to be less institutional and impersonal in their approach to patient care. They worried about neglect of the aged and the chronically ill. The vision was expressed for a system of care, led by hospitals, which encompassed patients' family and social needs. People foresaw the need for hospital care to migrate from within the hospital's four walls, out into the community, even into the home.

Everything old is new again. The increasing prevalence of chronic illness among patients served by hospitals and an aging population should compel hospitals to pursue models of care that would best meet the needs of patients across the care continuum, wherever those services are delivered. In this, hospitals are ideally positioned to lead efforts to create a true "system" of care delivery.

In hospitals that embrace the concepts of patient-centered care and support the development of their workforce, no one should be neglected. The application of digital technologies is already extending the reach of hospital care into the community and into the home. The hospital of the future may one day be defined by its intellectual property, rather than its physical facility.

That said, the physical design of the hospital has significant implications for the ability of the hospital to meet its goals for care that is safe, patient-centered, clinically effective and collaboratively delivered. It also represents the physical manifestation of the hospital's commitment to environmental health and sustainability.

There are factors that will be -- to lesser and greater extents -- out of the hospital's control as the future unfolds. Fair and rational payment strategies that align with national quality goals can be advocated for, but they cannot be assured. In the meantime, hospitals must do their part to reduce error and waste, and increase efficiencies as a means of improving safety and containing costs. The principles put forth here are meant to guide the hospitals to be better prepared to accomplish what is being asked of them.

…hospitals are ideally positioned to lead efforts to create a true
"system" of care delivery.

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