

Performance Improvement*



The Digital Hospital

*connectedthinking

Introduction

Healthcare providers worldwide are dealing with aging facilities and antiquated equipment, cost pressures, more demanding and better educated patients, physician and clinician shortages and a need for improved efficiency and quality in clinical care delivery.

Technology offers healthcare organizations a way to address these concerns while improving operations, financial performance and clinical quality. Progressive facilities are beginning to incorporate technology upgrades into their organizational change and process redesign projects – and to do so from the very beginning in what is now called the Digital Hospital.

Importantly, Digital Hospital initiatives are being driven not by information technology professionals but by physicians and clinicians who see technology as an aid and are demanding better tools. This is not technology for technology's sake.

The Indiana Heart Hospital

The Indiana Heart Hospital (TIHH) – the world's first all-digital specialty cardiac facility – is the prototype for the Digital Hospital concept. It reflects how the Digital Hospital results from the needs of healthcare professionals and how complete commitment, a comprehensive approach and full operational integration can help realize technology's potential through the Digital Hospital model.

Located in Indianapolis, the 88-bed unit is a joint venture between a group of area cardiologists and cardiac surgeons and Community Health Network (CHN), an integrated regional healthcare system.

TIHH resulted not only from a desire to improve performance by leveraging technology but also from market demands. While highly competitive in both quality of care and results, CHN and its physician partners lagged regional leaders in market share. They sought ways to differentiate themselves from their competitors and improve their position.

The need to become more competitive increased during 2001-2002, as each of Indianapolis' four integrated delivery networks announced plans to expand their cardiac service facilities – three by building new hospitals and the fourth by consolidating cardiovascular services in a newly-renovated facility.

The CHN-led partnership decided that its point of differentiation would be an all-digital facility. Such a Digital Hospital would provide it with an environment in which facility design adds to efficiency; information is available where, when and how needed; and physicians and clinical staff have full ownership for the design and delivery of patient care.

The Digital Hospital concept allowed TIHH to articulate a vision of a completely digital environment, one that is paperless and film-less. This digital strategy could systemically increase patient safety while also reducing inefficient, ineffective and redundant documentation and simultaneously expanding access to needed clinical information.



Technology also could help address a shortage of cardiologists, anaesthesiologists, nurses and other clinicians, both by improving the productivity of current staff and by enhancing recruitment and retention through a better working environment.

Finally, the vision offered a tremendous selling point to sophisticated and demanding patients who understand the importance of information: A facility dedicated to obtaining, analyzing and sharing accurate and relevant patient data in real time. The result is instant accessibility to more of the information resident in agencies' systems for more robust analysis and better-informed decisions. It also provides an ability to aggregate information for any reporting or analytical purpose almost instantly and offers the benefit of tighter, more proactive controls.

Creating the Digital Hospital

The TIHH partners began to realize this vision by benchmarking services at other cardiac facilities and surveying the state of the art in relevant technologies. They determined what was desirable competitively and what was feasible technologically – now and in the future.

Visits to other providers made it clear that implementing new technology without redesigning care delivery processes yielded marginal benefits for patient safety and financial return. Significant redesign of care delivery generated greater improvements for patient safety and financial return – but still only marginal productivity improvements.

The main ingredient needed for productivity enhancements was tight integration of medical devices and clinical information. Without such integration to significantly reduce data redundancy and streamline clinical documentation processes, it would be highly difficult, if not impossible, to improve productivity.

Therefore, the TIHH team decided to define the Digital Hospital in a novel way, viewing technology not merely as a tool but as an integral and fundamental part of the overall business strategy, to be applied to every facet of clinical and business operations.

The team took a holistic approach to technology, encompassing not only core healthcare information and ancillary systems but also the full spectrum of medical equipment, communications devices and networks and other systems – even extending to hospital lighting and HVAC systems. Information for these systems would be digitized, reside on a single, facility-wide data network and be integrated into each patient's longitudinal record.

Industry standards, such as the Clinical Context Object Workgroup (CCOW), and federal legislation, such as the Health Insurance Portability and Accountability Act (HIPAA), would be leveraged to enhance connectivity with stakeholders and business partners beyond the hospital walls.

If realized, this vision will result in the optimization of clinical and business operations and dramatic improvements in patient safety and operational and financial performance. The figure below graphically shows how technology solutions align along a competitive spectrum:

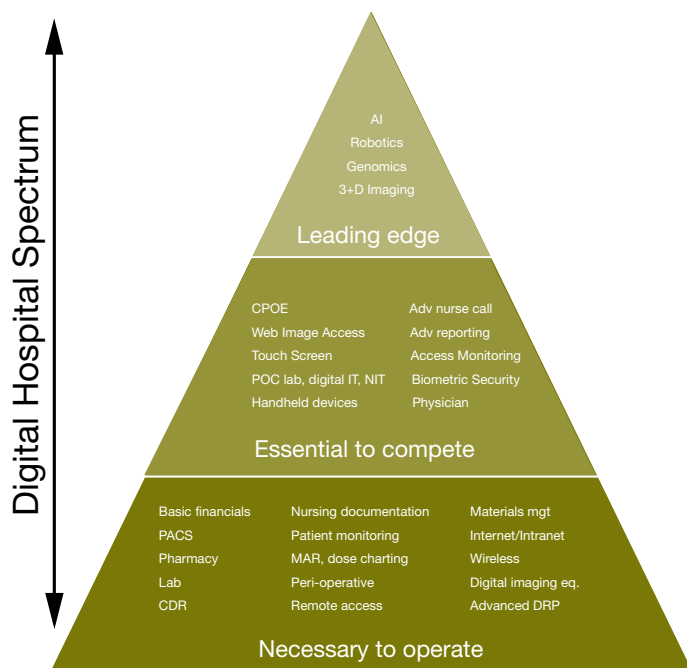


Figure 1: Digital Hospital Elements

To enhance planning and ensure that current efforts would be scalable and allow for continued progress, the TIHH group also coined the term “Digital Health” to describe the next level of electronic interaction. This vision would encompass not only individual facilities and providers but also the entire healthcare community, including insurers, government agencies, accreditation agencies and other business partners. The graphic below captures the essence of this digital spectrum:



Figure 2: Digital Healthcare Spectrum

Building the Digital Hospital

The construction of a truly Digital Hospital and deployment of technology on the scale of the TIHH is a tremendous logistical challenge. To do so effectively, the TIHH group focused on three strategies.

The first involved proactively coordinating the multiple interests involved. The management team organized a systematic approach to activities ranging from facility construction to deployment of clinical and medical equipment to installation of information technology infrastructure to negotiations with service providers and integration of ongoing operations.

The second included managing the organizational change demanded by such a non-traditional hospital. Physicians, clinicians and other stakeholders faced changes in how they functioned and interacted. The TIHH management group assisted physicians and clinicians in migrating from traditional operating and information processes to digitally-based systems.

Finally, the TIHH group managed the implementation of new processes and technology. To do so, it replicated key high-risk areas within a 5,500 square-foot model of the hospital. In this environment, the technology and redesigns were assessed in parallel to exiting operations and in concert with comprehensive testing and training programs.

This painstaking process resulted in the effective implementation of the first digital cardiac facility, with measurable benefits.

Results

In the past, returns on technology investments often have been meagre. Yet, for competitive reasons, it was critical that TIHH demonstrate returns quickly after opening. As it approaches its first anniversary, the benefits of TIHH's vision are being realized.

Doctors and nurses are able to work more safely with better access to the patient's chart. More time is being spent with the patient at the bedside and productivity has surpassed goals. Metrics as diverse as patient safety, quality of care, documentation compliance and payer reimbursement compliance show significant improvement. The following chart summarizes how these benefits are being realized:

Metric	Before	After
Physician Satisfaction Increase	25% Satisfied	75% Satisfied
Adverse Drug Events	18/Month	3/Month
Medication Selection Errors	20/Month	5/Month
Med Administration Errors	5/Month	2/Month
Utiliz. Management Reporting Accuracy	65%	95%
Denial Mgmt Reduction	45/Month	20/Month
AR	80+ days	>60 days
Physician Chart Completion	15 minute/chart	5 minute/chart
Transcription & Dictation	30,000 reports	2,000 reports
Chart Management Cost Reduction	\$15/chart	\$3/chart
Temporary Nursing Costs	25%	5%

Figure 3: Benefits Realized at The Indiana Heart Hospital

Applications of the Digital Hospital Model

Although TIHH is successful, there is lingering doubt about the whether the digital model is applicable beyond smaller specialty hospitals.

However, the experience with general acute care hospitals indicates that size and specialization are not the sole determinants of success, and that larger facilities also have significant potential. Some ongoing efforts are even more ambitious, and include large, geographically disparate healthcare organizations or, in one case, an entire country's healthcare system.

No matter the type of facility, what matters most is the commitment to being fully digital. Any hospital and every specialty has its own patient issues, clinical protocols, and dispositioning paths. But, if existing processes and technologies can be analyzed and benchmarked, and if emerging technologies can be incorporated into planning, then digitalization becomes a viable option.

Nor is the Digital Hospital model confined to new facilities. While it is easier to design a fully-digital building from the ground up, extending the TIHH model to an existing facility requires vision and the ability to adjust future investment plans – qualities that may not be universal but are realistically within the reach of most hospitals.

Existing hospitals can become digital over an extended time frame – perhaps three to five years – but to do so requires that they articulate their Digital Hospital vision at a fairly granular level, define integration standards and hold to them consistently. Once this vision is defined, a staged acquisition and integration strategy can be developed to ensure an incremental movement towards a digital strategy – perhaps on a department-by-department basis.

Increasing Global Interest in the “Digital” Hospital Concept

Information systems that automate clinical care have been around for some time, but are finally mature enough that large, geographically dispersed organizations and even entire countries are announcing enormous investments in advanced clinical information systems.

In the US, numerous major healthcare organizations have recently announced, multi-year planned investments in clinical information systems totalling \$100 million or more.

In England, the multi-year, multi-billion pound National Programme for IT is underway to improve clinical care efficiency and quality and improve patient choice. Initiatives such as an Electronic Booking Service for tests and appointments and Electronic Transmission of Prescriptions will offer enhanced accuracy and convenience.

And in Qatar, the Specialty Teaching Hospital at Education City is envisioned as the world's first all-digital academic medical center.

Conclusion: Eight Lessons

The TIHH experience and observations from Digital Hospital projects underway around the world yield seven lessons for those considering similar initiatives:

1. The customer is always the patient, physicians, and hospital staff; every aspect of the design should serve the needs of at least one of these customers
2. Clinical workflow typically requires complete transformation, and process redesign needs to be part of a comprehensive approach
3. Physicians and clinicians must be bought into the design process from the start
4. Sufficient resources and management attention must be assigned early in the process
5. The design team must have a complete understanding of regulatory requirements, especially how they can be leveraged to create synergies and efficiencies
6. Medical devices and clinical information systems must be tightly integrated
7. Clinical information systems and back-office systems must be tightly integrated
8. Costs will be more than anticipated: Budget for overruns

The Digital Hospital's care model is increasingly relevant in today's rapidly changing healthcare environment. The time to implement the Digital Hospital concept is now: By doing so, we can simultaneously improve operational performance and clinical care quality.

About the Author

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