

*Health facilities get a face-lift  
with 10 principles of design criteria*

# DESIGNING BETTER PERFORMANCE

BY TIM STANSFIELD AND DAVID VERNER



## 1. Understand all of the flows

**H**EALTHCARE ORGANIZATIONS ARE AT A CRITICAL crossroads in terms of performance, growth and survival. Healthcare CEOs know that they must deliver more with less, so they are establishing a direction for future performance improvement. One significant hurdle to a quantum increase in performance is how the physical facilities of these organizations are designed.

The modern healthcare management team must accept the challenge of new facility design that allows medical professionals to deliver quality care and allows a process of continuous improvement for our healthcare systems. The design will strongly influence or even dictate performance, customer perception, capacity and improvement for a very long time — at least 20 years.

What is often missing is a critical data-driven analysis. This analysis requires a true working relationship between the design and medical professionals.

Our research has indicated that the healthcare facility design of the future must follow some critical thinking to take it to the next level of healthcare performance. This critical thinking has been analyzed using more than 200 surveys provided by medical professionals, key interviews with healthcare leaders and designers and specific case study experience. The resulting summary has established the following 10 principles for high-performance design results. The intent of these principles is to provide a framework for facility design as our healthcare system continues to evolve. These principles can guide a medical leadership team while ensuring that professional facility design personnel understand the unique aspects of each healthcare facility design and the potential impact on care performance.

The myriad flow of patients, professionals, staff, visitors, materials, etc. into and out of a healthcare facility is the major driver of all decisions the team evaluates during the facility design process. Other customer flows within the facility include visitors, clergy, florists, outside food services and physicians. In addition, there is an array of important business process flows that actually affect how much time the patient spends at each stopping point. All of these flows must be understood and ideally measured in an existing facility to optimize the overall healthcare performance of a new facility. This understanding forms the foundation for process improvement.

A facility design for a new critical care building that expanded an organization's service into a new geographical area was a conceptual clone of a sister facility from a different area of the country. Analysis of all of the flows of the current facility offered insight and specific design changes that greatly enhanced the new facility design.

Centralized examination rooms were decentralized toward the appropriate functional areas of critical care equipment. The physical location of business processes was made more open to the various functional areas providing the capability to flex to meet different demand conditions. Support services were located near an entrance and exit to minimize traffic for critical care customers. Signs for parking and entrances ensured minimal traffic and confusion for patients. Separate parking and entrance for employees ensured controlled flow and security.

The resolutions ensured all flows were prioritized and designed to minimize conflicts, reduce intensity of constraints, control security and ensure a higher level of customer satisfaction.





## 2. Understand current performance

Every healthcare facility has performance metrics. These metrics are often used in the design process but traditionally are taken as the only possible sources of measurement. While this information is vital to understanding some opportunities for improved design, these metrics are not intended to capture improvement prospects that can be facilitated by the physical design of the building.

Objective identification, measurement and understanding of current performance factors that will impact the design of the new healthcare facility can be provided by an experienced IE working with other members of the design team. The measurement data obtained will depict aspects of current performance properly beyond current management reporting. This requires a level of data collection and dedication beyond the tools of lean and Six Sigma programs. Work measurement, asset measurement, flow intensity, crewing and loading are production terms that are still new to healthcare improvement.

Healthcare management must understand that a disruptive and relatively unpredictable demand pattern can still be statistically modeled and simplified through this critical engineering effort.

A long-term healthcare facility design team recently designed and built an entirely new facility for a growing community demanding these services. The leadership team engaged IEs to ensure proper depiction of improvement opportunities.

The final facility design was built with the same overall capability; however, the performance expectations were raised from an average of 86 percent census to 92 percent census and offered a significantly higher level of service and quality care.



## 3. Understand perceptions and performance

Healthcare staff work hard, and goals to increase productivity often seem unrealistic. The key perception for management is understanding that to increase performance it is necessary to modify the process, not simply to ask the team to do more of the same. Healthcare organizations collect demand and loading information. Using this information, we can compute current and future requirements of space, personnel and capital. However, all of this data is colored by the perception of current performance and the constraints of current processes. Unless more specific engineered data is collected, analyzed and used, overall productivity will not be optimized.

Recent studies regarding first-case-on-time-starts for a traditional surgical unit of a full-service hospital demonstrated nearly 40 percent performance. This is near the industry average for this performance parameter. The performance of this facet is critical to the scheduled capacity of the entire surgical wing to ensure customer service and care quality. A new facility design for this surgical unit planned for an overall capacity to double the current performance and targeted a level of 50 percent first-case-on-time-starts. A detailed analysis of the performance gap in the current system identified a decisive factor to driving this performance up significantly. This factor was the input of the surgeon during the scheduling process. A scheduling incentive system was designed for the physicians to ensure their cooperation to support first-case-on-time-starts and subsequently drove this performance to nearly 80 percent. The new facility design was adjusted to reduce the quantity of new surgical rooms and adjust the number of surgeries per room for the new facility.





### 4. Get medical professionals appropriately involved

This step is an obvious point in any new facility design; however, the operative word is *appropriately*. The methodology of getting medical professionals involved should follow a strict discipline of data collection, education, evaluation and review. Architects, working with medical leadership teams, develop concepts based on past experience that appeal to the desires and budgets of the institution. These concepts are then progressed through an interview process with the rest of the medical team to understand the specific needs of each department and identify issues that can be overcome through new facility design. This can be handled through a steering committee's direction, focus group's assessment and individual input. The educational piece requires the ability to summarize and seriously critique this input, evaluate it against observations of current operations and drive toward data-driven consensus.

The evaluation process requires an open dialogue between the designers, managers and users that ensures input is used, decisions are understood, priorities are met and all team members feel their voices have been heard. A timely review process over a reasonable period of time will ensure that everyone involved understands the priorities and decision making process. Time between reviews will ensure that team members have an opportunity to formulate responses and support to the design criteria and decisions.

The stumbling block faced in most design efforts has been with the physicians. They hold significant decision making and influential power in this process but are often the least accessible members of the medical team. A critical role of the design leader is to help hospital leadership manage physician input so that it is received at the right time and achieves final buy-in.



### 5. Drive team input via performance measurement and data

Healthcare system performance is not easy to measure. Fluctuations in patient care demands, crisis management, employee decisions, regulation and reluctance to change have made the design process evolve based on average or peak requirements. But none of these criteria will balance appropriate care and cost effectiveness. Start data collection in accordance with steps one, two and three. An engineered approach to measurement and data collection will ensure the gap between demand-appropriate resource planning is minimized yet still responsive to the varied demand by day and hour.

A recent pharmacy renovation was directed at meeting the needs of increased flow and concerns over patient privacy. The new pharmacy had design criteria to manage twice as many customers and offer privacy. Simple data collection pointed toward segregation areas and increased space as the solution. However, objective demand data collected for multiple samples of workdays and shifts and projected over historical records of past performance identified the need for flexible support to the pharmacy professionals. Peak work periods could be predicted that offered a time for functional support in terms of stocking, checking, administrative staffing and support. The nonpeak working periods required a more traditional use of the pharmacist, who was expected to perform a wider range of patient consultations and medication preparations.

The new physical arrangement resulted in less actual queuing of patients and became more directed toward critical flow and constraint management. Pharmacy professionals needed to be present, but their roles varied throughout the day. The support areas needed to allow this flexing requirement combined with the needs of safety, security and privacy.





## 6. Timely team education

The progression of facility design takes architects and engineers time to assess, conceptualize, render, review and ultimately develop drawings for managerial review, cost estimating, board approval and construction. This design process also offers the opportunity for a parallel process of healthcare team education in lean and Six Sigma concepts ensuring the design decisions are understood by the team members and targets for improvement are achieved. Team members can offer significant support to correct facility cost decisions by offering options centered on important design criteria that affect ongoing costs. The education process will accrue benefits well after the new facility design and construction is complete. Lean efforts direct a very common sense approach to waste elimination, and Six Sigma black belts can ensure employees are looking at activities in a mathematically measured approach on an ongoing basis.

A hospital had been transitioning through a significant Six Sigma effort. A new emergency department (ED) design offered the opportunity to enhance the use of this team member education process through further education and application in the redesign efforts. The management design team had extensive experience in facility design, continuous improvement tools and team dynamics. This ensured that the design efforts were an application of the previous educational process supplemented with necessary temporary expertise to ensure proper application of tools toward the challenging goal of ED improvement. The overall objectives of capacity and capability improvement had to result in higher quality care and performance and more efficient utilization of all resources. Weekly team working sessions provided tremendous insight and guidance to the ED design and final facility arrangement.



## 7. Keep design simple

One of the most important business improvements of the 21st century has been simplification. For healthcare facility design, this includes simplification of entrance, assessment, visitation, flows, signage, way finding, segregation, support functions, parking, business processing, employment services and the wide range of medical functions.

Simplification can provide clarity of function and make one of the most complex systems, the healthcare environment, easier to understand. In addition to first costs, simplification can also reduce training and maintenance costs over the life of the facility. Finally, simple design is often inherently elegant and aesthetically pleasing.

A major medical center commissioned a healthcare real estate investment trust to provide a freestanding comprehensive cancer center. The cancer center would be an off-balance sheet project partially leased back from the real estate investment trust. The medical center desired both a state-of-the-art beautiful healing environment and the lowest rent possible. The rent cost was driven by a combination of construction costs, operating costs and building efficiency.

The design of the building was based on a very simple rectangular form, thus holding the overall construction costs down. The building core was compressed through providing a split occupancy classification, resulting in an 84 percent efficiency factor. The entrance corner of the building was slightly modified, resulting in a strong public image while maintaining the simple basic form. Interior layout was direct and very easy for patients to understand.





## 8. Design for flexibility

The results of new “flexible” facility designs often involve duplicate functional rooms or larger rooms. This solution results in bloated facilities that drive up the overall cost of care. Since 1980, operating rooms (ORs) have increased in size by 53 percent, acute-care patient rooms by 77 percent.

While flexibility offers tremendous opportunity for productive performance, responsiveness to the varied demand of capital and human resources, and a potential response to growing demands, the solution is not more of the same. Every aspect of a healthcare facility must be understood and analyzed, including the space and room design, storage patterns, flow, shift manning, capital utilization and staffing. Often, business processes to support clinical care are perceived to be secondary. The reality is that both processes are necessary and control overall healthcare performance.

An ED renovation was driven by the need to ensure that every customer who entered the hospital was greeted and triaged in a timely manner. This required a receptionist, an experienced ED nurse and a range of emergency medical responsiveness capabilities. The customer’s issues included walk-ins and EMS delivery, as well as visitors and general personnel entry into the facility. This demanded special security concerns.

Analysis and observation determined that a different level of flexibility was demanded by the ED staff under different circumstances of customer care and burden. Urgent care and emergency care facilities and rooms needed to flex throughout the day; medical and business personnel roles were functional at times but often required flexibility based on current demand. Triage facilities needed timely measurement to ensure constraint management. To resolve these needs, business processes were designed in open areas to provide overlapping support of customer reception.



## 9. Design for measurement

For any business system to perform at an optimum level, it will need a system of measurement. Measurement has been proven to ensure significantly higher levels of productivity. The key is to identify the key metrics for success, at both an overall and department level, as part of the overall design process, and then design the facility with measurement in mind. During the design process, the methodologies for ongoing data collection should be identified and implemented on day one. These performance metrics can supplement normal regulatory and financial reporting that is reviewed on a regular basis. Critical to overall healthcare performance is to provide feedback on a timely basis.

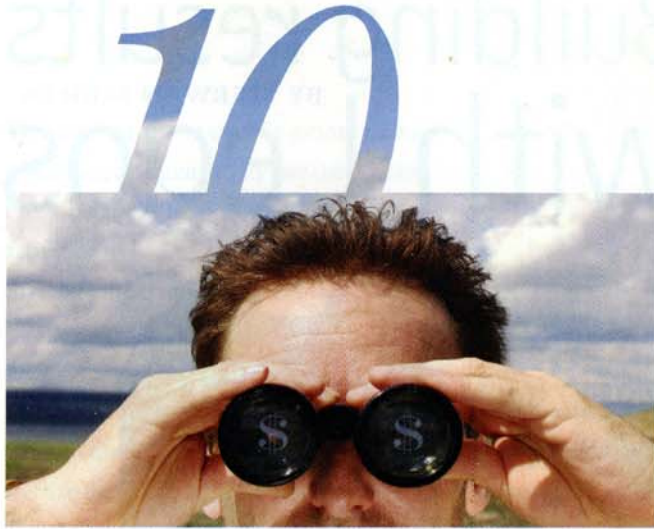
A wide range of performance measurement plans are depicted throughout the healthcare industry. Two essential factors to performance measurement are simplicity and visualization. The use of andon boards and lights combined with kanban restocking systems provides simple performance measures that immediately identify issues and constraints. These tools ensure immediate feedback and decision support for individuals and departments. Often combined with a brief team huddle and review, these simple tools have been shown to improve healthcare system performance by 20 percent.

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## 10. Design for the near future

This is certainly the most difficult principle to put into practice but, if properly considered, it can ensure the lengthy useful life of any new healthcare facility design. Design for the distant future requires the entire team to examine the current processes, flows, patient mix, government influences and market considerations and assess what this might look like in the next five, 10 or even 20 years.

The consideration of these future possibilities requires every team member to look beyond her current expanse of responsibility. However, strong leadership can guide the team through critical thinking about new healthcare liberties and constraints.

A number of forward thinking teams have met this challenge by ensuring the location of the ED offers long-term security as the only 24/7 entrance to the hospital for critical care, employment and visitors.

Critical care departments are often adjusted by demographics or market aging. New technologies require exterior access due to equipment sizes. Communication channels offer opportunities and security risks that can be challenged by physical arrangements.

A new design can use team affinity exercises to assess and prioritize these possibilities and make design changes when the cost of reconstruction is not a factor. Redesign teams that have used some of these traditional tools of team communication will circumvent short-term issues and sustain long-term opportunities that can offer tremendous competitive advantages for the responsive and forward-thinking healthcare facility.

## Conclusions

New facility design is only one of many parallel paths required of the contemporary healthcare management team to achieve stellar performance within the 21st century's market expectations. Other paths, including medical procedures, medicines and equipment, are left for the scientist and researchers to continue their successful progression. The business and clinical processes of the contemporary healthcare organization can be greatly influenced by facility design. The physical environment can limit performance, or it can support a sustainable improvement over time.

These 10 principles are not intended to be a completely unique list of healthcare design criteria. However, they do offer a culmination of principles of facility design evaluations that have ensured that healthcare performance continues to improve and meet the ever-increasing demands of care, service, speed and cost effectiveness. These principles require discipline, an engineered approach and managerial openness to achieve the extraordinary benefits and performance levels for the next generation of healthcare facilities. These 10 principles of high performance are intended to show significant insight and guidance for the healthcare design team striving to create the system of the future. These principles provide a framework for critical design as our healthcare continues to grow. They can ensure that our service demands, regulation pressures, cost considerations and level of care continue to be the best in the world. ~

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