

### *Executive Summary*

*A U.S. regional critical care referral and medical teaching hospital and regional lab fundamentally transformed its operational productivity and costs using critical constraints analysis of key processes together with an industrial engineering approach to redesign its internal patient logistics.*

- *This reduced the average length of stay from 5.2 days to 3.8 days.*
- *It created a 23% increase in available beds with no additional capital investment.*
- *It reduced the breakeven population for hospital profitability nearly 20%.*
- *The estimated value for this virtual 100-bed capacity increase was in the range of \$95 - 110 million.*

*Key elements of the transformation included reduction in patient wait times for diagnostics, surgery, therapy and other bottlenecks that typically constrain the flow of patients in a hospital. Other realized benefits included more accurate staff planning, fewer diagnostics ordered, no beds waiting in hallways and a more reliable schedule for physicians to do their rounds, surgeries and patient discharges.*

- *Satisfaction ratings by all key “customer” groups of the hospital improved dramatically.*

### *Healthcare reform - “the big shift” creates the need to reform*

Hospital administrators find themselves searching for ways to protect their business in response to Health Care reform. The heightened risk of re-admission, concerns about patient satisfaction ratings and the need to remain attractive for physicians puts hospital revenue at risk and forces the need to improve service levels while keeping costs down and minimizing major capital investments. Hospitals need a fundamental shift in thinking to achieve service level and efficiency breakthroughs beyond just working harder.

More benchmarking of the competitive landscape and squeezing of the current system might just make things worse, particularly if it further irritates physicians, the major source of patient referrals for hospitals. On the service side, patients will have more leverage to choose their healthcare provider based on publically available quality and experience information. Wall Street has show little enthusiasm in their pricing of public hospital stocks recently, apparently doubting they will add significant shareholder value in the near future given these challenges and risks.

### *Hospitals as systems to be optimized*

Hospitals have been described as desperate islands of excellence where great work is done in a system that is slowly sinking of its own weight. As an example of such isolated excellence, when the operating room doors are closed, everyone in the room knows their job and things work on a very tight schedule. However, once a patient exits the operating room, they are back in an environment that is much less organized and has many overlapping processes, resource conflicts and poor information flow.

As another example, diagnostics testing areas try to pull patients in for tests on a scheduled basis, however the patients and nursing units are many times unaware of the other demands on the patient. Dietary, lab, respiratory and physical therapy may all be moving to the patient at the same critical time. The phlebotomist needs to take timely draws for orders previously sent, but may have to wait until the next cycle to have access to the patient. This lack of coordination results in patients who are in the wrong place, diagnostic results that are not ready, and a cascade of delays and backups throughout the system.

Despite excellence at a micro-level, or perhaps because of it, the hospital as a system may actually be sub-optimized. Putting tighter constraints on each area can actually reduce the overall flexibility of the hospital,

increasing “white space” delays and costs and contributing to sub-par satisfaction ratings. It is rare that improvement initiatives take the overall optimization of the hospital as a system into account.

A systemic transformation can enable a hospital to remain viable and competitive in its market. “Systemic” means an optimization of the entire landscape of preventive care, diagnostics, acute care, in-patient care and post-discharge monitoring. Such a system requires integration and alignment of multiple stakeholders, including patients, primary care physicians and specialty/subspecialty physicians. Given the complexity of such an undertaking, hospitals need to correctly sequence and align their initiatives to assure that effective change leads to realization of business value.

### *Transformation and the prospect of change*

Even the thought of change can be terrifying to hospital executives and onerous for most other stakeholders. Many are concerned with their organization’s ability to be nimble in their decision-making and flexible in their execution of decisions. Hospitals with deteriorating physician relationships wonder how to create alignment with this key customer group. Common complaints from physicians include the slowness and indecisiveness of an approval process that is cumbersome to navigate. Many organizations are controlled by Boards of Directors who are not equipped with the data they should have to make informed decisions. Hospitals truly need a holistic perspective of the overall system, with accurate information about how to optimize it.

### *Models of success to be considered*

While hospitals may appear to be unpredictable, highly complex and unsolvable conundrums, there are fundamental similarities with other industry sectors that have accomplished huge quality gains and overall cost reduction by solving analogous systemic optimization problems. Examples of such transformations include:

- Overnight package logistics has demanding customers on both ends of a complex network. The system has been engineered for high reliability of service, optimal staff and facility planning and low cost.
- Manufacturers have analyzed their systems to find constraints, then significantly expanding capacity within the existing infrastructure and continuously improving delivery of high quality at a low price.
- Passenger airlines are highly complex networks of processes, equipment and facilities with overlapping information flow. Over time, thoughtful design and optimization has yielded a remarkable productivity level, safety record, planning capability, scheduling reliability and efficient cost structure.

*Using an approach that is proven in these other industries, our case study hospital was able to resolve many critical process constraints and design a system for patient logistics that is achieving similar breakthrough improvements.*

### *Our Transformation Approach*

The initial phase of work is an assessment of the hospital’s current situation, i.e. where they are, what their real issues are and where the major bottlenecks are causing the system to malfunction. This assessment is conducted in parallel with a stakeholder analysis to clarify the various roles, implications of change, as well as the desired and feared objectives each stakeholder may have. The key to the approach is to follow the path of patients.

Patients usually enter a hospital through the emergency department or via surgery. Understanding the actual patient itinerary from entry point to the various locations a patient visits before discharge requires mapping of hospital processes, clarification of the interfaces between each area and recognition of the bottlenecks. It was found that the “micro” process and capacity of each area actually set the rules for how things worked and limited the system at each step. There may be a backup of beds in a hall due to radiology, or a physician’s rounds may be disrupted due to a patient who has gone for physical therapy, etc.

To overcome this problem, the case study hospital established a planned patient itinerary with key milestones and expected timeframes. This created a pull for necessary tasks to be performed at the right time and to assure appropriate coordination to avoid delays. Rather than having “white space” gaps and lost information at the interfaces, a patient itinerary allowed all the service personnel to work from the same page. Once the optimized system was understood, appropriate information technology could be designed and implemented to sustain and improve the flow. A lot of time and money had been put into existing information systems, which often didn’t support the needs of patient logistics or enable service providers to have what they needed when they needed it.

### *Transformation impact on staff planning and productivity metrics*

In the initial assessment, hospital staffing was found to be at the mercy of changes in demand and unpredictable patient flow. In particular, the handoff from night shift to day shift (and vice versa) was very disorganized. It could take 1 to 2 hours to figure out what level of staffing was actually needed for the shift. Additional staff might often be called in, or sometimes the staff that had been allowed to leave might need to be called back. By smoothing out the patient logistics and clarifying the interfaces between areas, the patient flow and staffing needs were much more predictable. Analysis of historic patient population trends and knowledge of local events further enhanced forecasting as a key driver for planning, integrating and optimizing the hospital system for productivity and cost.

To accurately measure the system for productivity and efficiency, the traditional metrics of adjusted discharges, admission rate, hours spent, etc. had to be optimized using new overarching metrics of integrated cost per service hour, physician revenue per attending hour and patient satisfaction ratings. Rather than reinforce the isolated behaviors of each separate area, these new metrics created alignment and attention to the overall performance of the hospital as a system. Following assessment of the actual metrics used in the hospital and of the behaviors caused by them, the most appropriate new metrics were clarified and aligned to the strategic objectives of the hospital. A careful change management process was followed to assure that metrics were used as positive feedback for learning and continuous improvement, rather than as a hammer to punish people. A new identity and culture for the hospital started to take shape and was reinforced by regular review of the “system” metrics.

### *Modeling the economics of transformation*

Economic modeling of the transformation enables clear prioritization of the initiatives having the highest value. It also assures that the board has the information to make informed decisions about the necessary investments. Ideas are quantified in terms of what it would take for investment, cost, productivity and alignment with the logistics of the hospital as a system. The benefits for the system are also quantified in economic value terms. This creates the confidence that a full set of alternatives is considered and the value of making each investment and change is defensible. Sensitivity analysis of uncertainties and risks allows the group to focus on things that really matter, and avoid analysis paralysis of issues that may be tying up the conversation, but have little real impact on the system.

The difference in the level of success for this holistic, quantitative approach is dramatic for complex business decisions and change. Audits have shown a **90% success level** for such a collaborative approach versus a 40% success rate for the traditional advocacy-based business case approach. By identifying the root cause for failure in the traditional methods, this approach has been designed to address the sticky issues during the design process, rather than after things are well down the path and nasty surprises start happening. It takes some work on the front end, but results in clarity about the choices and confidence in the path selected without the normal revisiting decisions every time a new issue comes up. The approach requires expertise from mid-level leaders in each area to participate in process mapping, IS modeling, change management planning, etc. External resources are most effective as independent facilitators, strategic advisors and partners for implementing information technology tools.

## *Operating philosophy of transformed hospital*

Each statistic has a patient's name on it. This drives the focus on the logistics of their movement and experience within the hospital instead of wasting time on traditional massive reports of all the micro-components of the system.

A set of objectives that reflects this philosophy includes:

- **Quality** – creating patient-focused metrics and adherence to evidenced-based care paths
- **Experience**– assuring physician and patient time and experience are optimized
- **Design** – enabling effective patient flow with documented throughput metrics
- **Reduction** - eliminating cost and wasted time in the system
- **Improvement** – prioritizing initiatives based on insights from key metrics
- **Negotiate** - working strategically with accountable partners
- **Growth** – building a sustainable, profitable business

The ideal operational design is much like the hub and spoke system with enabling technology to link things together. There is a dispatch control center like an airport with spoke control linked seamlessly to each key operation. This provides central process visibility and control with standardized information and reporting. A visual control system improves clinical decision times and reduces patient care delays for patient flow, patient care quality and patient satisfaction. The information technology supports the process engineering and optimization, assuring integration, adaptability and sustainability over time. An asset tagged real-time location system enables matching of assets to patient movement and volume fluctuations. Over time, these devices with standard operating procedures lower the cost to serve with better utilization and visibility of unneeded or unused expensive devices.

## *How to make the rubber meet the road*

Leaders are in the best position to align all the separate initiatives happening within a hospital into a strategic transformation that can result in an optimized system. Every journey begins with a single step, although some first steps feel like a stroll in the park and others like bungee jumping. How to start is usually a matter of urgency, leadership style and the appropriate risk tolerance for investment and change. The time to begin is when you don't need to. That's not always possible, so solving immediate problems by capturing the low hanging fruit when things become urgent is a usual path for transformation. This may help a single area, but it can exacerbate the overall system complexity and sub-optimize performance.

We can help you solve your immediate problems and assure they align with your overall strategic plan. We will help you prioritize your initiatives with proper sequencing of the urgent need areas into a fully optimized system.

