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Ready for day one

How Zuckerberg San Francisco General Hospital designed optimal patient and care flow prior to the grand opening of its new hospital and Level 1 trauma center

Background

To meet California earthquake readiness requirements for acute care facilities, Zuckerberg San Francisco General Hospital and Trauma Center (ZSFG), a Level 1 trauma center serving San Francisco and northern San Mateo Counties, constructed a new, seismically isolated hospital and trauma center. The nine-story facility has 284 general and acute care beds, a 59-bed emergency department, and 13 state-of-the-art operating rooms.

Challenge

Following voter approval of a bond issue, construction of the $887-million facility began in 2009. Although the walls and utilities were in place, hospital leaders recognized in late 2013 that the lean mindset and methodology could help eliminate waste, streamline the delivery of patient care and improve the overall patient experience from the opening day.

Countermeasure

Rona Consulting Group (RCG) facilitated a series of multi-day 3P workshops that included patients, care providers and staff representatives from across the hospital. They worked together to analyze and optimize the flow of patients and care. The teams created a visual care plan, nursing care model, interdisciplinary rounds model, bed capacity and patient flow plans; streamlined the admission and discharge processes; and used 5S to organize.

Results

Going into opening day in May 2016, hospital administrators began to implement some of the new processes including an acuity-focused patient nursing care model and a fast track for the ED, and they had simulated the colocation of several services within the OR. The new workflow takes into account the unique physical configuration of the new building, with 90 percent private patient rooms, a larger Emergency Department, and new equipment and services. They were ready to make the transition successfully and to achieve radical improvement in patient care.

What if you could work out most of the kinks before opening a new hospital, or any kind of health facility? Think about the staff aggravation, time and money you could save, and the patient goodwill you could earn through better patient experiences and outcomes.

Zuckerberg San Francisco General Hospital and Trauma Center has done just that. As with many hospital building projects, the plans were created a number of years ago, and some of the key people involved are no longer with the organization. However, by leveraging the power of the 3P design methodology to optimize the flow of patient care, the people involved now did everything they could to prepare for a successful transition to a new hospital and trauma center. As a result, some of the outcomes of this project included the creation and implementation of a patient nursing care model that will flex according to each patient's acuity needs; implementation of a fast track for the ED (created through value stream mapping and kaizen work in the existing department, which was integrated into the new space); and colocation of interventional radiology, gastroenterology and pulmonary procedures within the OR.

Officially opened in May 2016, construction of the $887-million, seismically isolated facility began in 2009. But it wasn't until late 2013, with the utilities and walls of the new facility mostly in place, when the administrators realized that the lean mindset and methodology they were using elsewhere could streamline the delivery of patient care and improve the overall patient experience in the new facility from opening day.

> *"We couldn't move into a new hospital with the same old ways of doing things,"* says Patricia Coggan, Nursing Director, Surgical and Procedural Services at Zuckerberg San Francisco General. *"A lot of the standard work that we had created over the years evolved from the limitations in the current facility, which was built in the 1970s."*

Pulling in participants from different departments in the existing hospital—from physicians to supplies replenishment personnel—and patients, Rona Consulting Group (RCG) coordinated a series of multi-day, 3P workshops. Different teams analyzed, modeled and optimized the flow of patients, clinicians, medicine, supplies, equipment and information. Among other achievements, they created a robust visual care plan, nursing care model, interdisciplinary rounds model, bed capacity and patient flow plans, and streamlined the admission and discharge processes.

The 3P process itself breaks down functional barriers by gathering everyone together away from the day-to-day work to explore what their ideal work environment would look like. In the process everyone was able to get to know their co-workers better.

> *"I've been a nurse for 25 years. I have never had an institution give us the gift of sitting down with surgeons, hospital administrators, people from billing and materials, nurses and other frontline staff to work together toward a common goal,"* says Coggan.

What is 3P?

Adapted from lean manufacturing methodologies, 3P (which stands for production preparation process) is an intensive workplace and workflow design method that applies lean principles to make radical improvements and minimize "waste." Waste is any activity that requires resources and adds costs without providing value. In a healthcare environment waste takes the form of unnecessary movement of staff and patients, wait time, mistakes and errors requiring rework, excess inventory, unevenness, overburdening, and underutilization of people's skills.

With a focus on design or major redesign of processes, the core benefits of 3P include:

- Staff collaboration and extensive cross-functional input into process design.
- Rapid testing of ideas and workflow iterations.
- Ensuring quality is built into the workflow.
- Reductions in construction and transition costs.

The design and construction of any new healthcare facility present opportunities to make radical improvements in efficiency and patient care. The traditional design process revolves around hospital administrators, architects and builders. Of course they try to incorporate the input of caregivers and staff, but there's a limit to how many people can be actively engaged.

Designing new workflows with 3P

RCG facilitated three initial 3P workshops at Zuckerberg San Francisco General. The first focus was on redesigning the flow of inpatient services, including patient flow and staffing models. Another 3P team worked on the emergency department, where they optimized patient flow, triage, staffing, communication, and the admission process. As the level 1 trauma center for the area, the ED team also looked at mass casualty and disaster management workflows for the new building. The third 3P workshop looked at the patient, equipment and staffing workflows in the operating rooms.

When designing the OR workflows—including what type of surgery would take place in each pod, where equipment and medications should be located, and how many people the changing rooms would need to accommodate—the 3P team discovered some major flaws in the layout of the new space.

> *"When we initially sat down and talked with the architects about what the space was going to be like seven years ago, that level of detail was never considered,"* recalls Coggan. *"We talked about where the locker rooms and ORs would be, and the square footage requirements, but the workflows hadn't been thought out until we started the 3P work."*

For example, the original plan for the surgery areas did not include cardiology, which was located on a different floor. Going through the 3P process revealed that this arrangement was problematic. The 3P team demonstrated the benefits of colocating cardiology and the OR.

Mock-ups optimize future layouts

ZSFG's 3P objectives

The 3P design process coordinates the flows of medicine so that:

- Patient care goals are understood, and expectations are communicated early.
- Care is delivered by respectful, highly functioning, cohesive care teams.
- Patient care needs are visible to all care team members.
- There are no waits or delays in care.
- Decision making is guided by transparent information.
- Electronic medical records, data systems and business intelligence are integrated.
- Processes are built around the patient, with services brought to the patient whenever possible.
- Staffing and support models expand and contract according to fluctuations in demand and acuity.
- Reliable processes utilize mistake-proofing concepts to eliminate defects.
- Staff have exactly what they need to do their job.
- The environment is safe, clean, comfortable and quiet.

More benefits of 3P

Going through the 3P process also helped to manage expectations and allowed everyone to understand the tradeoffs that would have to be made. In the OR, for example, surgeons wanted everything arranged to fit their specific needs. Anesthesiologists had a different point of view on what would work best, and nurses had their own needs and requirements. Then there were housekeeping and materials management to consider. Working to balance these conflicting needs and priorities pulled everyone together as team.

> *"Our surgeons, prior to this, were partners with us, but they weren't active partners,"* says Coggan. *"They would come in, go into an operating room, do their case, and leave. We've actually engaged them in a different way by working on the front end to create the ideal OR environment within our limitations."*

Some of the surgeons and other clinicians who work at Zuckerberg San Francisco General also care for patients at other facilities in the area, including another new hospital. Participating in

the workshops, they recalled all of the unanticipated problems, confusion and headaches on the opening day at the other facility, and how many of those issues were being addressed and solved through the 3P process.

In the end that's the core benefit of the 3P work at ZSFG, according to Coggan. Going into the move, they knew they had thought carefully about everyone's needs, especially the needs of patients, and they had implemented and trialed as much as possible in their existing facility to ensure a smooth startup in the new facility. Administrators were confident that they had a good plan for making the transition and continuing to provide high-quality patient care.

A deeper understanding of 3P for hospital design

3P leverages the Japanese concept of kaikaku (radical change over a short period of time) to create radical changes in an existing process, or to design a brand-new process. The 3P methodology, which stands for *production preparation process*, was first introduced to the U.S. by Chihiro Nakao. Nakao worked under Taiichi Ohno, the originator of the Toyota Production System, and founded the Shingijutsu Company, a training and consulting company.

In healthcare, 3P workshops are used for process and facility design or redesign. The approach is also used to design new services and guide the installation of new equipment or information systems. The goal is to enhance flow while simultaneously improving quality, affordability and turnaround times.

The core steps of a 3P healthcare workshop are:

1. Defining the process design objectives: the core customer requirements that must be met.
2. Diagramming the workflow: use of fishbone diagrams, string maps and process flow maps to visualize the seven flows of medicine.
3. Understanding the key functions of each step in the process.
4. Studying how processes in nature provide similar functions, and applying the learning to generate healthcare delivery ideas.
5. Try-storming: comparing, consolidating and refining ideas based on full team input and design criteria.
6. Mock-ups and simulation: simulating the preliminary designs to see if they support smooth flow and meet the critical design objectives.
7. Design review: after the final design is developed, it is presented to all stakeholders for feedback.

Made up of representatives from all levels and departments, 3P teams typically spend five days developing new process flows for patients, clinicians, medicines, supplies, equipment and information. They evaluate these workflows based on key criteria, including quality, costs and service levels. They then test design iterations using tabletop models and full-sized cardboard mock-ups.

The key is in understanding functions and envisioning the final product before designing the process and facility. The process and facility must support the delivery of the key functions. In cases where the facility has already been designed and cannot be altered, the value is in

understanding how to optimize flow in the pre-existing layout, understand the vulnerabilities and develop countermeasures proactively.

About the new Zuckerberg San Francisco General Hospital

Zuckerberg San Francisco General Hospital was built from the ground up to withstand a major earthquake. As a Level 1 trauma center the new Zuckerberg San Francisco General Hospital and Trauma Center must be prepared to sustain operations and treat people with life-threatening injuries in the event of a natural disaster. Updated California regulations now require acute care hospitals to meet strict seismic standards. The old facility, constructed in the 1970s, did not meet the new standards.

The new ZSFG building is nine stories tall, including two basement levels. As of its opening in the spring of 2016, it has 284 general acute care beds; the size of the emergency department has increased from 26 to 59 beds; and the number of operating rooms has increased from 10 to 13.

The new building has 115 base isolators that allow the hospital to “glide” 30 inches in any direction in the event of an earthquake.

About Rona Consulting Group

Rona Consulting Group (RCG) is a management consultancy serving integrated healthcare systems, hospitals and clinics, medical suppliers and governmental organizations. We develop lean leaders and assist in transforming organizations through educating, training and coaching executives, managers, clinicians and frontline staff. RCG is committed to partnering with and helping organizations achieve the highest quality through zero defects, increased patient satisfaction, empowerment of staff, and improvement in financial performance through the application of the Toyota Management System.

Based in Seattle, Washington, USA, we maintain offices in Atlanta, Houston, Los Angeles, Minneapolis, New York, Oakland, Phoenix, Portland, Raleigh, San Diego, San Francisco and Seattle.