

PODCAST 271: LEAN DESIGN IN HEALTHCARE

By Mark Graban



The East Tennessee Children's Hospital, Scripps Networks Tower, which now holds the hospital's Neonatal Intensive Care Unit (NICU), was designed using a Lean design approach.



*Isaac Mitchell,
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I had the opportunity to speak with Isaac Mitchell about Lean design in episode 271 of the Lean Blog Podcast. Isaac, who has been the Director of Lean Continuous Improvement for the East Tennessee Children's Hospital for the past seven years, shared some insights on Lean design from a unique perspective. Isaac worked on a manufacturing shop floor when he was a teenager, cutting clothing drawstrings with a hot knife machine, and also worked at Toyota in an industrial engineering role when he was fresh out of college. The Toyota

Production System (TPS) of course being the core of the Lean manufacturing methodology.

The Toyota Experience

"Toyota was just an outstanding learning experience. Of course, I had read all the books, *Lean Thinking* and *The Toyota Way*, before I'd started there, but to see it firsthand, again, was just a unique experience. They write about a lot of these things in the book, but you can't really understand it until you're in there and living it," Isaac explained. "One of the things that has really

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For Isaac, this was exemplified after completing his first big project at Toyota. After he had presented positive results, the first thing his boss and mentor did was ask what

he had learned from the project.

"They were proud of me, but they also wanted to know what I learned from the project and what I would do differently next time. It was really them starting to teach me to be a thinker, a thinking problem solver," Isaac said. "That was one of the biggest things, that constant culture of reflection, being humble, and getting better day in and day out, that culture of continuous improvement. It was just neat to be a part of that." That's the culture that people like Isaac and I are working to create in healthcare.

If there was ever a problem, Isaac said his leaders at Toyota never gave him direct answers, but instead coached him through it, helping him develop critical thinking skills along the way.

Lean Thinking in Healthcare

Today, Isaac works on a variety of Lean projects within the hospital, and helping to change the thinking of hospital staff is of course part of that work. I asked Isaac what he does when he hears people in healthcare assert that patients are not cars, and that hospitals are different than manufacturing.

These moments make him reflect on why the question is being asked and the thought process behind the question. Isaac said that, for example, he may ask, "What are some of your concerns about the work we're working on?" Or, "Where do you see that there might be some issues or opportunities?" It's true that patients are not cars, but what helps is focusing on the work of healthcare, instead of focusing on the differences between factories and hospitals.

The switch to Lean thinking seems to be going well at his hospital, and staff are now even leading

improvement projects, both large and small, on their own.

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"My favorite work that we've done here has been really sparked by your book *Healthcare Kaizen*. Five or six years ago, we started implementing these unit-based continuous improvement boards," Isaac said. "Staff members on the frontline are leading projects and seeing great results. Every time I see a project completed and sustained, and I've had nothing to do with it, that's what really makes me happy to see" and to have "that work being grown throughout the hospital."

Isaac also finds it helpful to have a dedicated resource in each department that understands Lean teaching the frontline.

"It's not learning this Lean tool from Isaac the engineer. It's learning this improvement problem solving methodology from Bill the nurse," Isaac explained. "I'm here to support Bill the nurse to help the frontline staff in doing their improvement work. That goes to help speed up the progress as well."

Isaac also added an RN to his team, Marti Jordan. As Isaac explained, Marti had worked as an ER nurse for 10 years and, therefore, understands what it's like to be on a hospital's shop floor, which in turn helps her to show frontline staff how Lean principles are applicable, guiding them through the process.

One of Isaac's favorite projects, which was lead by a frontline staff team in the Pediatric Intensive Care Unit, was a redesign of the direct admit process, which reduced patient length of stay from 17 hours to 10 hours just by mapping out and evaluating processes, and then removing anything within the process that didn't add value.

Lean Design in Healthcare Expansion

Another recent project of Isaac's, and the main topic of our conversation, was Lean design work for a new tower addition at the hospital, which now holds the NICU and preoperative service. This was the second new building project of his career, though it was his first in healthcare. Isaac explained that he was very lucky to not have much convincing to do as everyone was on board to design the addition in a Lean manner right from the start.

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"Once the decision was made to build, we were involved after that in the project four or five years ago, working with the architects, working with staff from across the hospital, everyone that was affected by the change. I was in there, in the meetings with the architects through each design phase of the process and going through it. It was a great opportunity." Isaac said.

One phase of the design work, the schematic design, included a full-scale mock-up of the interior space uncovered many details that might have been overlooked in a traditional design process.

"We called it 'cardboard city,' where we started with the architects from Shepley Bulfinch and built individual rooms for each area out of cardboard. They printed out pictures of monitors, power outlets, all the things that you could possibly need in a room," Isaac said. "We found some great catches with this work."

One catch was not having power outlets beside family couches and chairs to charge devices. Another much larger catch in the design, caught early, was how the column grid was laid out in the perioperative services surgery area. Eleven rooms were, at first, destined to have columns in the center of the headwall, which would have limited space for beds and limited staff movement.

"I think it does take a unique firm to be able to accommodate this approach to focusing and working together to come up with the final design of the product," Isaac said. "They took those findings and they re-laid out the rooms to avoid having columns at the headwalls. Small things like that, that could have been disastrous on day one were avoided by investing this time in our staff, and building these 'cardboard cities.'"

Process Redesign

Another time investment that paid off for Isaac was basic Excel spreadsheet modeling to look at capacity needs, done because they were completely changing how they approached surgery.

"In the past, the patient would be assigned a room for the entire

day and that would be their room. When they were done with it, even if they're done with it at 10:00 in the morning, that room would not be occupied for the rest of the day. In this new design, we're having to flip these rooms around and use them throughout the day [for different patients]. There were lots of concerns from clinical staff," he explained. "Just doing some really basic modeling, looking at where the patients would be throughout the day in Excel, and showing them timestamps at 15 minute increments eased a lot of minds and fears from staff that this design will work. It's validated ahead of time and we can get past that hurdle of, 'This is new and scary,' versus, 'This is a different approach. It's going to work. Now let's get into the process design and talk about all the details of how it's going to work once we start.'"

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This was just one improvement to process the hospital made in the two years leading up to the move into the new space. This process also included a consultant to help with a drastic process redesign. One such drastic redesign centered on the hospital's electronic medical records program (EMR) system.

"Believe it or not, we are in the same hospital. We were two floors apart from where the patient was prepped and recovered versus where they're in surgery two floors above. We were actually on different EMR modules. A nurse in the OR could not see what was going on in the pre/post area in

the old system," Isaac shared. "This was a big thing that we worked through combining these modules in the EMR so we share information. It can get status of where the patient is and create priority about what's going on."

Working with the consultant, the hospital not only combined the modules, but stepped back and looked at every step of the process, finding that families were being asked the same questions over and over again.

Results So Far

"After we combined those modules and drilled that down to the questions that we had to ask, we reduced the total number of questions by a little over 60 percent and duplicate questions by 85 percent," he said. "You see it in the numbers, not only percentages but our times to prep the patient for surgery, from the time they arrive to the time they are ready for surgery were at an hour, and a little like an hour and 34 minutes. Just this week, we are averaging around 38 minutes to process the patient, get him ready for surgery from beginning to finish, from beginning to a time for operation. It's just really reassuring to see those results and again, do all this work that we can before we actually move into the space."

Aside from numbers, Isaac also shared a story about hearing positive feedback regarding the change from a parent and nurses also mentioned how they were able to go from staring at a computer screen and asking questions to actually interacting with patients, and getting to care for them more, which is the reason they became a nurse in the first place.

Though the NICU and clinics are in the new space and operating, at

the time of this podcast there are still a few months before surgery opens in the same space. Isaac and his team are still working away on things like signaling and communication between departments. In true Toyota fashion Isaac is also reflecting on the project and thinking of ways to improve the process for future projects.

Level Loading

One future project I asked Isaac about when wrapping up the podcast was level loading patient scheduling to better utilize capacity.

“They understand that we’re here and we need to operate and utilize this facility in the most cost effective, safe manner possible.”

“It’s definitely something still to come, but we have actually just started within this past month, really starting to focus more on the level loading because like you mentioned, typically you see majority of the patients early in the morning. Then, the utilization slows down throughout the day,” he said. “We’re certainly getting to that point. Right now, we’re starting to collect data on that, room utilization, types of patients. This is something we’re actually taking more of a physician led approach on.”

This approach, as Isaac explained, is utilizing a physician led committee to design the level loading process through peer driven conversation, while being coached by Isaac’s team.

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effective, safe manner possible.”

Society for Health Systems Process Improvement Conference

To hear more about these projects and the East Tennessee Children’s Hospital, I would like to invite you to attend the Society for Health Systems Process Improvement Conference in Orlando March 1-3, 2017.

Both Isaac and I will be at the conference as speakers, including a session we are collaborating on, which is an “Open Space Technology” facilitated session. This means that we will be inviting people to come and brainstorm different topics they want to talk about in different groups. Aside from the great lectures and sessions the conference is known for, I also hope you will attend to hang out and network with us.



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