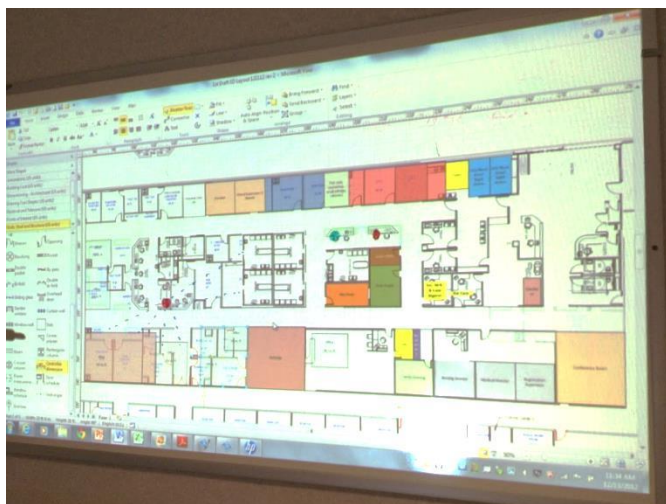


Lean Design helps Golisano Children's Hospital of Southwest Florida avoid \$3 million in construction costs and achieve 16,000 square feet in space reduction.

Before starting construction on a new 7 story facility, Golisano Children's Hospital of Southwest Florida, part of Lee Memorial Health System, enlisted the help of Opus Solutions to review its architectural plans from a Lean perspective. An Opus Solutions' Consultant working along with teams from across the hospital developed and identified improvements expected to result in \$3 million in cost avoidance plus untold benefits due to improved patient, staff, and material flows.



Design layouts were projected onto dry erase boards to facilitate mapping of work flows by staff and allow for real-time adjustments

New Opportunities

Midway through the schematic design process for the Golisano Children's Hospital of Southwest Florida, Dan Fink, Chief Administration Officer, realized they needed outside help if they were going to maximize the opportunity they had to build a new facility with new ways of working. While the focus has always been on making things better, "We realized with Lean there was a new opportunity to look at efficiencies while realizing the playing field in Healthcare is always changing. We wanted to think outside the box of the traditional design approach, be creative and not do things like we have done in the past."

Project Scheduling Obstacles

As the existing project schedule had no allowance for conducting a Lean design review, it would take strong leadership to change course quickly despite the risk of delays to the construction schedule. "My primary role in respect to this work was not to try to tell them how to design a NICU or do the detailed work, my role was to stick my neck out and say 'we're going to do Lean', to bring in those leadership concepts," recounts the CAO. Eric Anderson, Construction Manager for Golisano Children's Hospital could see the benefits as well, "Although I knew it may slow down schematic design phase, I also knew that it should speed up the design development process as well. We will gain ground back because we've already had the discussions regarding design development through working on process flows in schematic design."

The goal of the Lean design review was multi-fold, to ensure the new space was being used in the best possible way. Mr. Anderson also expected that designing the right space would likely reduce the space required as well, noting "it wasn't what was contracted for, but knowing in the back of my mind that I've never seen a discussion on efficiency that says you need more space."

Lean Training and Staff Commitment

As a first step, Opus conducted an intense 2-day Lean Design training course to provide awareness to key hospital leaders and introduce basic Lean concepts into the design process. "This was such a different approach. We had an in-depth training so the leaders got to know the consultant, there was a trust relationship built. So when they had to go into these design meetings there was already a relationship," explained Mr. Fink.

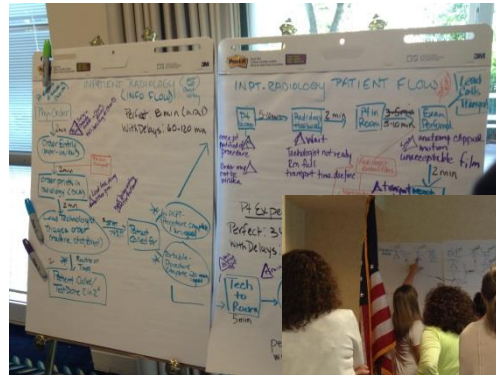
The Lean design process consisted of an Opus consultant working alongside a dedicated team with key staff members from each department collectively learning and using Lean principles while developing new designs for their area. Kathy Bridge-Liles, Vice President, Women & Children's Services says,

"I knew it would be challenging to pull my Nursing Directors out of operations for a short period. I was hoping to hold off on Lean training until after the schematic design phase. However, after going through the training and our benchmarking trip to another hospital that went through the Lean design process, I had a whole new perspective and understood the value of the work."

ED Design

The first department to undergo Lean design was the Emergency Department. A dedicated departmental team was developed consisting of ED directors and staff, as well as other supporting functions. The team worked to gather performance data, evaluate current processes, and initiate deep discussions on what was important to them from a design standpoint. Amazed by the Lean analysis, Mr. Anderson says, "I never knew the level of calculations and detail that go into good Lean design."

Rather than simply building a newer version of their current ED, the team decided to challenge key assumptions such as whether patients needed to be tied to a specific exam room for their entire stay. ED Medical Director for Pediatrics, Dr. Myrian Alea describes a change in the new vision, "we will be moving the patients through the system and not holding them to the exam room when they can actually wait in an observation unit."



Diverse teams came together to design the space they will use and support



Better room utilization and the ability to make rooms flexible helped increase the amount of patients that can be seen in the ED. The previous design had 20 exam rooms, which allowed for 20 patients. In the new design there are only 17 exam rooms, but flexible space that allows for treating up to 28 patients. In total, approximately 3,000 square feet were saved for \$450,000 in construction cost avoidance while also making the space more usable and enabling a better patient flow.

ED Nursing Director Stephanie Syska recalls, "I was very skeptical coming into this process, but I am a full believer now. We got the ability to be flexible and hold more patients in the new design than allowed from the previous design." At the beginning, the team all wanted more space, and thought they did not have enough. "By the end of the week, the team was looking for ways where they could save more space because they could see the value and gains in doing so," Mr. Anderson remarks.

Creating Flexible Layouts – Hematology, Oncology and Psychology

A critical area of the new children's hospital was the new Hematology and Oncology space. The new facility chose to combine 3 separate flows of Outpatient Infusion, Inpatient Unit, and Clinic onto the same level. The original design did not take full advantage of the ability to flex or share resources. The team conducted Lean analysis and successfully developed a robust design encompassing all 3 areas. For example, the original design had separate registration spaces for each of the areas and the new design holds one consolidated registration area.

Location of the Inpatient Unit and Outpatient Infusion center were moved right next to each other to allow for flip rooms to be created. The goal of the new design was to allow for flexibility of resources, rooms, and staff. The impact was approximately 1,000 square feet and in \$150,000 of construction avoidance savings.

Making a "Super" NICU Manageable

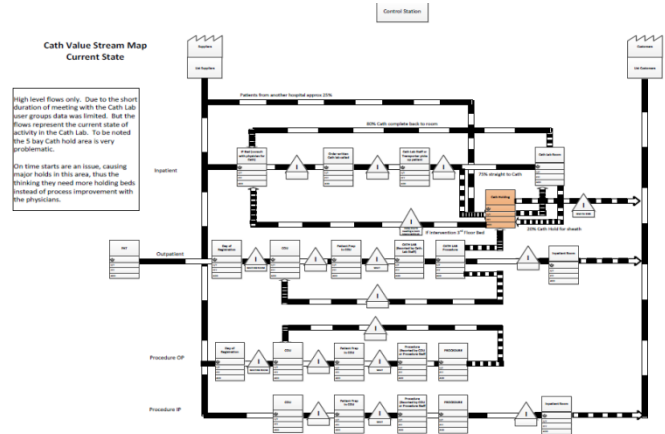
A decision had already been made to develop a 64-bed NICU unit all on one floor of the new facility, rather than NICU units originally planned to be located on two separate floors. The result would be space savings of 8,300 square feet and \$3.3 million in construction avoidance from the consolidation of floors.

Lean Design was crucial in determining how to make the best use of the reduced space. Despite the already limited space, the team was able to add huddle rooms to facilitate communication as well as additional medicine / clean rooms and key material storage locations. "We couldn't have made the 'super NICU' work to meet all the needs of the care providers, patients, and family without help," Ms. Bridge-Liles explained.

Lean Design Efforts in Other Departments

Lean design process reviews were also completed for PICU, Pediatric Units, Pharmacy and MRI / Sedation. Even though the space savings were minimal, the Lean work in these areas was about changing the way people work and creating synergies between nurses, doctors, materials, and patients.

In the PICU and Patient Units, one example was creating a new area for doctors and nurses to more effectively communicate issues and information. In Pharmacy, "it was the most awesome design; that they can do their work and check their meds without ever having to get up or walk," Ms. Bridge-Liles describes. The Pharmacy team saved 1,000 square feet with \$150,000 construction avoidance costs.

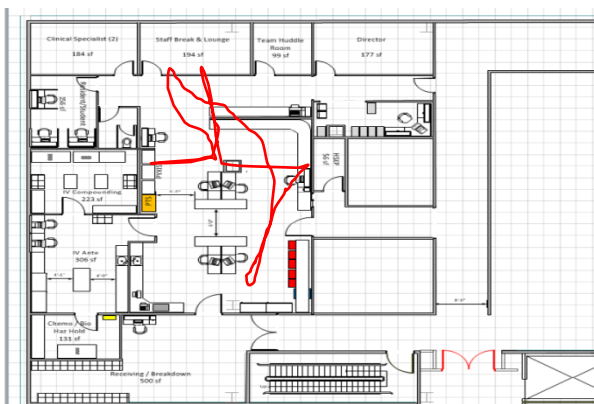


Cath Cases on 'Scheduled' Tuesday		EP Cases on 'Schedule' Tuesday	
Total Cases	#	Total Cases	#
Available Time		Available Time	
Time per Case		Time per Case	
TAT		TAT	
Total All Case Procedural Time		Total All Case Procedural Time	
Total TAT		Total TAT	
Total Room Occupied Time		Total Room Occupied Time	
Total Room Time / Available Time		Total Room Time / Available Time	
Takt Time		Takt Time	
LOS/T.T.		LOS/T.T.	
Cath Labs #		EP Labs #	

Cath Hold Beds		Cardiac Observation Unit	
Total Cath Holds	#	Total C.O.U Patients	#
Available Time		Available Time	
Time per Cath Hold		Time per Case	
Total Cath Hold Time Needed		Total C.O.U Time Needed	
Cath Hold Total Time / Avail Time		C.O.U Hold Total Time / Avail Time	
Takt Time		Takt Time	
LOS/T.T.		LOS / T.T.	

Total Number of Cath Holds + C.O.U #

Value Stream Mapping and deep data analysis come together to optimize designs with accurate numbers of suites, hold beds, and observation bays needed today and in the future



Point-to-point or "spaghetti" diagrams trace workflows in current and new design layouts, providing one means of evaluating designs

Adult Hospital Looking to Benefit from Lean Design in Catheterization Lab and Endoscopy

With the staff enthusiasm and impressive savings from the Children's Hospital, leadership decided to expand the Lean Design review to the new construction of the Catheterization Lab and Endoscopy suites at the adjacent adult hospital, Health Park Medical Center. By applying Lean analysis and new workflow concepts, the Cath Lab design team was able to eliminate the construction of an entire Cath lab.

The savings on the 1 Cath Lab resulted in \$1.5 million construction cost avoidance and saved an additional \$2 million in equipment costs. Endoscopy Lean design work resulted in 1,750 square feet of savings and in \$262,000 of construction cost avoidance. The space saved allows for potential additional inpatient bed space.

It's the Team's Design

The incredible collective efforts from each department and all supporting functions made for a thorough and encompassing process. All functions that worked in a particular area had some input into the design.

Mr. Anderson, recollects, "It was surprising to see every group act exactly the same. They would come in apprehensive and nervous." The team members were pleasantly surprised to find a hands-on process that brought out their knowledge and experience while bringing to light possibilities and questions that had not been addressed. "We went from departments that were not really happy with their layouts but accepting them, to departments that were eager to come in and talk about their spaces. They wish they had it now."

One of the most important pieces was when it came time to present the final layouts. The department leaders, not the consultant, presented the design and the revisions. They were able to use what they learned to confidently support and answer questions. They had real ownership because it was their design.

Exciting Results

The Lean design efforts have resulted in immense savings in space and in construction cost avoidance. The process has created space savings of almost 13,000 square feet, while also freeing up space to allow for placement of other important functions. "Even for the internal space that I can't avoid building, it allows me to put something else in there," says Mr. Anderson. "After the process, I have another 3,000 square foot of Interior space that I can use. There are always things that come up during the design that need more space."

However more importantly, the design process has sparked Lean thinking and initiatives across the organization. Team members who went through the Lean design review have gone back to their teams and spread the word. "I was on the elevator one day and we were talking about how we could do things more efficiently and all of a sudden the words 'standard work' were coming out of my mouth," laughs Ms. Bridge-Liles.

The final stage of this work was the sign-off phase with the architects. Originally sign-off meetings had been scheduled for 2 hours, but many only took 15-30 minutes, because the teams owned their layout and knew exactly what they wanted. "It went much more smoothly because the departments had 100% buy-in going into those meetings. We did some tweaks here or there because of code, but we weren't going back to the drawing board," says Ms. Bridge-Liles.

Looking back, Mr. Anderson notes "It is a scary process starting, but it is very well worth it. You don't see the value at the beginning. At first we're thinking 'how much is this going to cost? I don't have that in my budget', but looking back we would not be where we are today, looking at 16,000 square feet of savings, if we hadn't gone through this process." He also adds a helpful tip, wishing they had the opportunity "to do this sooner, before the architect comes onboard so you don't end up introducing someone else after there is already a design."

Savings from Application of Lean Principles

Department	Space Savings	Cost Avoidance
Emergency Department	3,000 ft ²	\$450,000
Hematology / Oncology	1,000 ft ²	\$150,000
Pharmacy	1,000 ft ²	\$150,000
Cath Lab	1,000 ft ²	\$2,000,000
Endoscopy	1,750 ft ²	\$263,000
Total	7,750 ft²	\$3,000,000

*Additional NICU space savings of 8,300 square feet and \$3.3 million in construction avoidance from floor consolidation was enabled by Lean design, which made effective work flows possible with the reduced space.

"It is a scary process starting, but it is very well worth it...looking back we would not be where we are at today, looking at 16,000 square feet of savings, if we had not gone through this process"

Moving Forward: Still More Work to Do

With the schematic design phase completed, it is more important than ever to continue with Lean and build it into today's current processes and environment. "Somebody has to be here to get us through the design process. And then after that, getting into elements like 5S, Kanban, standard work...the best design in the world can't solve everything", notes Ms. Bridge-Liles. "We're not finished. We are only going to be successful if we start changing the way we work now."