

CONVERSATIONS



The Need to Incorporate

# CONTINUOUS IMPROVEMENT

Into Healthcare Design Plans

An Interview on Process-Driven Design: Lean  
With Roger B. Call, AIA, ACHA, LEED AP, EDAC

## INSIDE YOU WILL LEARN ABOUT:

How incorporating continuous improvement in the design process  
can benefit healthcare organizations.

Which Lean elements can serve as a framework for designers to approach a project.

Why design should be adaptive over time to accommodate changing needs.

How the evidence-based design process and Lean elements can complement each other.

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**Roger B. Call, AIA, ACHA,  
LEED AP, EDAC**

Roger B. Call is a registered architect with over 30 years of experience at Herman Miller Healthcare. In his current role as Director, Kaizen Architecture, he is responsible for guiding the strategic application of continuous improvement and Lean initiatives within healthcare.

He is also a member of the American College of Healthcare Executives, the American Institute of Architects, the Clinical Laboratory Management Association, the American Society of Health-System Pharmacists, and the Academy of Architecture for Health, where he has served as both president and a member of the board of directors.

## The Need to Incorporate Continuous Improvement Into Healthcare Design Plans

### How did you become interested in continuous improvement and Lean, and what do those terms really mean?

I'm an architect who has always specialized in healthcare facilities. I was trained to define the problem I was designing for and to find the solution. But I often find that by the time I have the perfect solution, it's for yesterday's problem.

Then, close to 20 years ago, I was introduced to the Toyota Production System Support Center, which opened up my eyes to new ways to approach the design process. Herman Miller Healthcare has an exclusive relationship with Toyota's Support Center, and Toyota mentors us on the impact of operational improvements on the design of the physical space.

I define the concept of Lean—or continuous improvement—by what Toyota has taught us, which is that it's really about the process of removing waste. There is a lot of waste in the design process itself, as well as in healthcare facilities and how they operate. Designers can provide more value by taking a Lean approach in their own work, and by using Lean as a tool to help customers improve healthcare settings by reducing waste.

### Can you explain the elements of a Lean approach that designers need to understand?

When working on a client project, being “Lean” requires teaming up with major subcontractors early in the design process to eliminate redundancy, as well as thinking about how the choices you make will be adaptive (not adaptable), or intentionally designed to change. That is the design challenge. We need to be able to design a space that works for today, as well as for the future, some of which is predictable and some of which cannot be anticipated.

The Lean philosophy defines seven areas of waste that can serve as a framework for designers in any project. These include:

1. **Inventory:** You need some inventory, but it is a waste of money and space if you have more than you need.



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2. **Motion:** You need to look at the ergonomics of your space. Are staff members required to do too much reaching, bending, and twisting on the job?
3. **Overproduction:** Waiting is an example of overproduction, since it is not what a patient needs. Another example is requiring patients to show their insurance card multiple times.
4. **Conveyance:** A patient doesn't want to pay to be moved through a facility to access services, so in a Lean approach you might put imaging next to the Emergency Department (ED), since imaging is often needed by emergency patients. This minimizes the need for patients to move across the facility and is more efficient for staff.
5. **Process:** You need to identify any work processes that may be redundant or wasteful.
6. **Correction:** You need to focus on fixing what has gone wrong. This refers to quality and safety issues.
7. **Waiting:** No one wants to wait on anything, whether it's patients, families, or caregivers.

In addition to these seven elements, there are also eight healthcare flows that work in parallel. These include:

- Patients
- Staff
- Family and visitors
- Information
- Medication
- Supplies
- Equipment
- Flow of output

These two streams (the Lean and healthcare flows) fit together like hand and glove. When you examine a facility, you can track these flows and use Lean to determine where there is waste. This starts to define the baseline to address and determine your goals.



### **What do architects and designers need to learn, understand, and be prepared to do to effectively implement Lean and continuous improvement in the design of healthcare environments?**

Designers need to know that the better we can understand what the consumer wants, the better we can design spaces that meet those needs. We also have to create designs that can continually address changing needs. There are some changes that are predictable. From an architectural perspective, we can think about this in terms of concrete design choices. For instance, I can put in shell space that can expand in the future, or I can create a master plan with areas for growth in the ED and imaging down the road. While we can't anticipate all changes, these are things we can plan for now.

With any design plans, designers should also rely on first-hand observations of a situation (rather than simply using a 40-page report to acclimate themselves). Such observation is a key part of defining the problem, defining the baseline, and coming up with a plan. Spending time in the facilities you are designing for, and with the people who will use them, will help you get a better feel for what users need and want.

### **Can you explain in more detail the actual process designers would use to approach a Lean project?**

The process usually starts by gathering an interdisciplinary team, along with stakeholders, so designers can get their perspective and understand their needs. Then it's important to do research. Designers should gather information and data to understand the current issues and problems. They should also observe. They can use a variety of tools, including a P3 and A3 to track their observations and create a hypothesis.

In addition, designers should always look to the research—not just about the state of the facility they are working on, but also about the state of the problem on a broader level. This can include studies and literature to inform their thinking.

This is where evidence-based design and Lean really work together. Designers can use the primary and secondary research to help understand the current state of the issue both in the facility and in the field. They need to be able to say, "Here is the current state, here is the research, here is the hypothesis, here is



the goal, here is the plan.” For instance, we know if we leave a person alone in an exam room for a period of time, satisfaction goes down. There is factual information on the impact of different scenarios on patients. So this is not just a consensus, but information based on experiments designers have conducted or read about. We would use the observation and research to come up with a plan to reduce waiting, and from a design standpoint, we would create a smaller waiting room with fewer chairs. To check our plan, we might create cardboard or foamcore mockups and have users try out the space. Toyota and Herman Miller both use the PDCA framework: Plan, Do, Check, Act.

### **Can you provide an example of how incorporating evidence-based design into a Lean process works in a healthcare environment?**

One example is Geisinger Health System in Pennsylvania. The CEO, Dr. David Feinberg, said his goal is to get rid of waiting rooms. They are there for the convenience of the provider, but the customer does not want to wait. Using the Lean framework, waiting is considered waste by the patients. So the challenge is to design a way to create a flow without waiting.

Using Lean to address this challenge, we would observe the initial state (such as how many patients wait and for how long) to determine a baseline. Then we would incorporate the research that has been done on waiting room usage to determine how many chairs are needed, and to learn what’s been done in other facilities.

Once we have established the baseline and understand the research, we would come up with a plan. For instance, we may not be able to get rid of waiting entirely at first, but maybe we can work toward that goal in stages. On day one, we may need a waiting room for 20 people. On day two, we may be able to reduce it to 15 people. We also need to think ahead to determine what to do with the space once we eliminate all waiting.

### **Is there any value in using the Lean approach with healthcare organizations that don’t yet have a Lean culture or have not yet embraced the philosophies?**

I can design a facility that can help an organization to be Lean, but I can’t design one that will *make* them Lean. Unless there is a business model and a culture of



continuous improvement in place, the facility design will have little impact on ongoing improvement.

In my experience, it is also much harder to get buy-in from leadership to make the changes if they haven't adopted a Lean culture yet and aren't making this a priority throughout the organization.

For example, let's say a facility's goal is to create a culture change to get the staff to take more of a team approach. But for physicians, having a private office is a perk of the position. The problem is that when the physician is in the private office and not co-located with the rest of the staff, it weakens the team culture and weakens communication. Therefore, the culture change would have to begin with the physician's understanding of the benefits of relocating to a common space. Often this change in culture comes from the top. The leadership team needs to lead by example. Otherwise, organizations can spend a lot of money using Lean processes, but their changes won't be sustained.

That being said, there is a growing trend in healthcare to design a facility that can accommodate future changes with minimal construction, capital costs, and downtime. This will be of growing importance to every healthcare system. Right now, between 60 and 70 percent of healthcare systems would say that they have some kind of process improvement, continuous improvement, or Lean effort under way.

### **What are the current conditions in healthcare that are leading more organizations to adopt a Lean approach, or at least to move in that direction?**

There has been a tremendous amount of change fueled by healthcare reform that has really impacted the way things operate today. Many health insurance plans are going to higher co-pays, and patients have more financial responsibility for services. This has led patients to expect more transparency, putting the focus on quality and cost. In addition, mergers and consolidations in the field are driving some different behaviors that require tighter control and more standardization of the physical space. Moving forward, we have to figure out how we design for continuous improvement to address the issues of cost, quality, and experience.



When organizations have been on a Lean journey, we see the quality go up and the costs go down in terms of both design and operations.

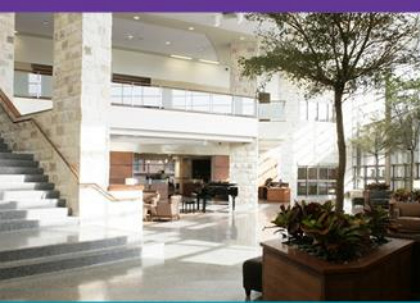
When organizations are on a Lean journey, we see the quality go up and the costs go down in terms of both design and operations. We're currently working with one large healthcare system that has saved more than 20 percent in initial fit out costs and reduced construction times by 50 percent for freestanding EDs using Lean strategies. Lean design solutions can also reduce every aspect of waste in operations, such as excess walking, supply management and access, waiting times (both for patients and for staff to access information), poor ergonomic work environments, and the time and cost of fixing what goes wrong. The Lean Construction Institute is focused on the design and construction process and has a lot of data about how Lean has saved both time and initial construction costs.

With a Lean journey, employee engagement also improves. The fact is that to hire and retain the right people, you have to offer them opportunities to have an impact. In other words, going Lean pays off in the improvements that are implemented over time that help an organization operate efficiently and effectively.

### **What is needed from healthcare organizations to successfully incorporate Lean design? What steps lead to an improvement in performance, and how can this be communicated to clients?**

To create more lasting change, the first question for an architect to ask an owner is "Do you have some type of continuous improvement program, whether it is called Lean or something else?" If so, then the group that runs it should be involved in the design process. This does not always happen and is a missed opportunity. If such a group does exist, getting them involved in your efforts is a good starting point. It's also important to educate clients about the fact that Toyota's continuous improvement is not just a program; it's actually changing the way you approach things system-wide.

Keep in mind that Lean is a fragile state, and there is not much we can do if an organization regresses due to leadership change at the top (the leading cause of Lean failure). What designers can do is design facilities that can change with grace. By that I mean change on a daily basis, not just adapt to major changes that require renovation or expansion.



### The Center for Health Design: Moving Healthcare Forward

The Center for Health Design advances best practices and empowers healthcare leaders with quality research that demonstrates the value of design to improve health outcomes, patient experience of care, and provider/staff satisfaction and performance.

Learn more at  
[www.healthdesign.org](http://www.healthdesign.org)

Continuous improvement results in continuous change, which requires a facility that *can* change. One of the biggest mistakes designers make is to think they've designed "the perfect building" that will never need to adapt to future changes.

### What other advice do you have for those who are interested in learning more about how to integrate Lean and continuous improvement into their practice?

For individuals and organizations that want to learn more, there are a ton of books, resources, and consultants out there who can serve as mentors. My advice is to find a mentor and just do it. While we do some Internet training sessions with our staff, it's really experiential learning, not classroom learning. Neither Toyota nor Herman Miller subscribes to the "belt" certification. Knowing something and doing it are two different things. It's better to do it and, in so doing, learn how to improve. Like life, it's a journey.

Other good resources include [Catalysis](#), which has a network of more than 70 healthcare systems (both big and small) that are on Lean, or continuous improvement, journeys. They share findings with one another.

There is also the [Lean Enterprise Institute](#) (LEI), which provides information, education, and advice about Lean journeys. Finally, you can visit the [Toyota Production Service Support Center](#), Toyota's consulting business arm, for more information.