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## Design Case Study: How Lean Design Can Improve Healthcare Outcomes

By Marc Margulies, AIA LEED AP, and John Duggan



Lean is a process management philosophy originally developed by auto-manufacturer Toyota as a way of maximizing customer value while minimizing waste and using fewer resources. It is not a cost reduction program but rather a way of thinking and acting for an entire organization.

Combining lean design with two emerging healthcare delivery models—the Medical Home or Patient-Centered Medical Home (PCMH) and the Urgent Care Center (UCC), Fallon Clinic in Massachusetts—are changing the way healthcare is provided to its patients. Over the course of a week-long meeting, and accomplishing six weeks of work in only five days, Fallon and Margulies

Perruzzi Architects worked together to understand what patients experience on a typical visit to an Emergency Department and/or medical office and how an improved layout and design could improve the process, efficiencies, and experience of staff and patients alike.

By including Margulies Perruzzi Architects in the careful study of the needs, costs, location, services, and configuration that would best serve the demographic of its patients, Fallon used lean process management to influence the lean design of two new facilities and healthcare models. Their experience serves as a blueprint for improving the customer experience and operational efficiencies to provide better care to a greater population with existing medical facilities.

### Emerging Healthcare Delivery Models

Providing lower cost (estimated at one-sixth to one-third of the Emergency Department cost) and more readily accessible care by qualified but less specialized medical personnel, there is a nationwide effort to build new Urgent Care Centers (UCC's). Fallon Clinic built its first 5,000-sq.-ft. facility, "ReadyMed," to bring in new patients while decreasing costs and patients' expenses.

Unlike a more traditional family practice, UCC's are intended to be open at least 12 hours per day, seven days per week; patients do not expect to see any particular practitioner. Just as the patients must be flexible as to which practitioner they see, the care-givers at UCC's should be willing to abandon the traditional "doctor with

an office” paradigm in favor of a workplace that is more dynamic and less individualized. Patients are whisked directly into exam rooms with little or no time spent in a waiting room. All consultation happens in exam rooms, which also means that exam rooms need to be large enough for a practitioner, a patient, and one or two family members (often a parent and another child).

The Medical Home, or Patient-Centered Medical Home (PCMH), is a team-based model of care led by a personal physician who provides continuous and coordinated care throughout a patient's lifetime to maximize health outcomes. The PCMH approach emphasizes pro-active outreach by practitioners, group education, and electronic access to healthcare staff from patients' homes.



## Using Lean to Improve Healthcare Outcomes

At the outset of the design process for two new facilities, Fallon Clinic approached lean in a truly holistic fashion, involving expert facilitators as well as professional staff to redesign the entire patient experience. “Value-stream maps” were created to understand the entire process that patients go through on a typical visit, including all points that Fallon staff might interact with patients and how, and at what points there is a potential for increased efficiency or patient satisfaction.

A “future state” value stream map was then created to incorporate all of the ways to improve the process. The maps were created in a collaborative process involving volunteer patients, clinical staff, real estate and financial leadership, as well as the executive team and the architect.

Based on these findings, the lean design team then established a set of weighted criteria against which to measure a variety of schemes, and selected the floor plan that responded best to these requirements. Layout improvements included:

- 1) improved visual management,
- 2) better flow (of patients, staff, practitioners, and electronics),
- 3) ability to expand, and
- 4) sensitivity to cost.

The future stream map process for the Patient-Centered Medical Home, coupled with an improved layout, promises an increased efficiency of 29 percent by reducing wasteful waiting time, lost effort, and uncertainty.

## Layout

The “AIA Guidelines for the Design and Construction of Health Care Facilities”, section 3.5, sets the standard for freestanding Urgent Care facilities. Sizes of rooms, adjacencies, heating, ventilating, and air conditioning stan-



dards, dimensions of components, and acoustic and visual privacy requirements are all specified. Given this highly prescriptive and regulated format, the opportunities for thinking outside the box comes mostly from the improvement of patient and practitioner flow within the space. Cutting down on wasted motion saves time, which leads both to greater patient satisfaction and greater profitability. Better visual management of rooms, i.e., knowing which doctors are where and what patients require, likewise increases efficiency.

For example, “visual control” is one of the key tenets of lean operations, and the openness of the space at Medical Home Center makes operations

much more efficient. The lean process concluded that a hub-and-spoke concept is far preferable to a more linear layout with exam rooms arrayed along a series of closed claustrophobic corridors with physicians’ offices on the exterior of the space. The new hub-and-spoke model involves an open, glass-walled environment that moves doctors’ offices into the interior of the space, making their visibility and accessibility to the exam rooms and staff much greater. As a result of this comprehensive lean design process, Fallon will realize an increase in patient volume and profitability within the same facility footprint.

Part of the lean design philosophy employed during the design included collaborative sessions with members of the staff, facilities, and executive leadership. The interactive 3-D visualization technology permitted development of a wide variety of layouts, which were critiqued and modified as the session progressed. When the final layout had been resolved, all members of the team were sufficiently involved in the design that the natural progression to discussing extremely minute levels of detail (standardized locations of supplies, medication, printers, sinks and counters, lighting, etc.) was very easy. The discussions about relative value of various clinical components were easy to weigh against image and aesthetics, since both the cost and 3-D images readily were accessible.

## Conclusion

Approaching a healthcare project using lean design is far more than just another way of programming a space: it is a different way of thinking about healthcare delivery. In a world where healthcare costs and outcomes are under ever-increasing pressure, architects of clinical spaces can play an important role in improving patient care if they are engaged in the lean process right from the start.

*Marc Margulies, AIA, LEED AP is a principal with Margulies Perruzzi Architects in Boston. John Duggan is Director of Real Estate Operations and Retail Subsidiaries for the Fallon Clinic, a multi-specialty group practice in Worcester, Massachusetts.*