



A "KIT-OF-PARTS" FOR PATIENT-CENTERED CARE: UMASS MEMORIAL HEALTH CARE'S CAMPUS REVITALIZATION



"In planning the Leanest, lowest impact approach for the renovation of UMass Memorial Health Care's 250 patient rooms, we customized the Lean material delivery concept of 'Just-in-Time-Delivery,' expanding it to 'Just-in-Time Construction,' by identifying a way to renovate the patient rooms through a construction 'kit of parts' approach."

LEAN FOCUSED, PATIENT CENTERED

"Our Lean processes help us focus in on what's most important. Our use of Target Value Design, Choosing by Advantages and our "kit-of-parts" material strategy are ultimately focused on improving patient care, too. We are doing all we can to ensure our role is contributing to that goal, as well," explains Consigli's Project Manager Rick Gala.

THE PROJECT CHALLENGE

Worcester-based UMass Memorial Health Care, the clinical partner of the University of Massachusetts Medical School and the largest health care system in Central and Western Massachusetts, saw the need to align and upgrade patient and staff experiences at the network's Memorial Campus and University Campus, home to the UMass Memorial Medical Center. To provide patients and staff with the same contemporary healthcare facility environment, UMMHC is updating Medical/Surgical and Intensive Care Unit patient rooms, as well as a number of staff and public areas, at both campuses.

The challenge for Consigli? Renovate these 250 patient rooms and the public areas, with as few as four rooms out-of-service at a time, and with as little disruption to each campus' daily operations as possible.

In developing their Lean approach, the questions for the team became:

- Can we limit what needs to be done on-site?
- Can we limit the disruption of delivering materials through the hospital campus?
- Can we reduce the construction packaging brought on site?
- Can we increase pre-fabrication opportunities through Target Value Design?

A "KIT-OF-PARTS" APPROACH TO PATIENT ROOM RENOVATIONS

Consigli's "Yes, we can!" answer to all these questions was one inspired by a Lean manufacturing approach, helped by the repetitive nature of the patient room renovations. While the dimensions vary for some of these rooms, the bathroom components, millwork, interior finishes and equipment for them are the same. The team realized that almost all of the materials needed for each room could be prepared for installation at Consigli's Milford-based Pre-Fab Lab, where the materials are organized by construction sequence,

LEAN APPROACHES IMPLEMENTED

- ▶ Target Value Design
- ▶ Choosing By Advantages
- ▶ Pre-Fabricated Construction Materials: A "Kit-of-Parts"
- ▶ Just-In-Time-Deliveries
- ▶ Pull Planning
- ▶ Daily Stand-Up Meetings
- ▶ "Nothing Hits the Ground"

SPECIFICATIONS

LOCATION:
Worcester, Mass.

SIZE/TYPE:
345,000 sq. ft./Renovation

DELIVERY METHOD:
CM at Risk

DURATION:
50 months

OWNER:
UMass Memorial Health Care

ARCHITECT:
The S/L/A/M Collaborative

KIT-OF-PARTS PRE-FABRICATION



pre-packaged into four "Construction Kit" categories, and delivered "just-in-time" for their installation. Organized into a Bathroom Kit, Finish Kits One and Two, and a Millwork Kit, together these prepared kits account for 80% of the materials needed for each room's renovation.

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When each set of four rooms is ready for renovation, the corresponding kits are delivered to the campus in just two or three weekly deliveries. Once there, the kits are brought in on Consigli's wheeled "Smart Carts"—the company's rolling implementation of Lean's "Nothing Hits the Ground" policy. The remaining materials—wiring supplies, insulation and the like—are stored and moved room-to-room as needed on wheeled storage units, limiting the materials on-site to what is needed for each week's room renovations.

The kitting system also allows for customizing within each kit, when needed. For example, some of UMMHC's patient rooms have different dimensions, which will affect the size to which flooring materials or wall protection need to be pre-cut. With the team confirming room dimensions before each individual room renovation is scheduled, Consigli's Pre-Fab Lab team can customize individual materials within this larger production process.

TRACKING SKILLS: LEADING-EDGE PREFABRICATION SOFTWARE

New prefabrication planning software, ManufactOn—the beta-phase result of an on-going collaboration between Consigli and A/E/C industry technology specialist Raghi Iyengar—is providing a customized solution to track and fine-tune these moving parts. It is allowing Consigli's team to track the kits each step of the way, from planning or updating their contents, to tracking the production schedule of each kit's items, to scheduling and confirming delivery on site—or identifying a hiccup in the process, with enough time to adapt.

THE "CHOOSING BY ADVANTAGES" ADVANTAGE

"Choosing by Advantages" is another Lean process that's a perfect fit for the UMMHC project. Through Choosing by Advantages (CBA)—a structured decision-making process—clients review construction material choices through the lens of their advantages from the end-users' perspectives. This process facilitates decision-making while also helping avoid a later need to replace or rework an aspect of a project when a less thoughtfully chosen component is found to be a problem.

CBA is also another way that Consigli and the project's architects, S/L/A/M, are keeping the experience of patient and healthcare staff at the center. This comprehensive review considers patient and health care staff ease-of-experience, and the physical impact of construction materials. The client will consider the advantages of which patient room flooring to use? A more expensive

KIT-OF-PARTS BENEFITS

- ▶ Minimizes deliveries and traffic to the campuses
- ▶ Limits material storage and handling on-site
- ▶ Ensures materials are ready when each room is scheduled for renovation
- ▶ Anticipates and allows for customization
- ▶ Simplifies subcontractor scheduling
- ▶ Reduces construction packaging brought on site
- ▶ Reduces cost

choice that's most comfortable underfoot for staff, or a less expensive option that makes for a louder footfall? What is the best lighting choice from the perspective of the patient lying on a gurney in a hallway, en route to surgery? Which bed-curtain track allows staff to open and close curtains quietly and quickly, supporting patient privacy and calm?

DECISION MAKING TOOL: PROTOTYPICAL PATIENT ROOMS

To facilitate the CBA review, the UMass Memorial team is building a prototypical patient room on each campus, showcasing the construction material options and patient room equipment. These full-scale room mock-ups allow the client team to experience the options as a patient or staff might, as they weigh each alternative's advantages. Another win? Once, the CBA process is completed, these two prototype rooms will also become new, fully functional patient exam rooms. ■