SYNOPSIS

KEY POINT SUMMARY

OBJECTIVES

To quantify the value of applying a Lean-based systems engineering approach to the reorganization of patient flow through the Fast Track area of an emergency department.

Using Lean-based systems engineering to increase capacity in the emergency department

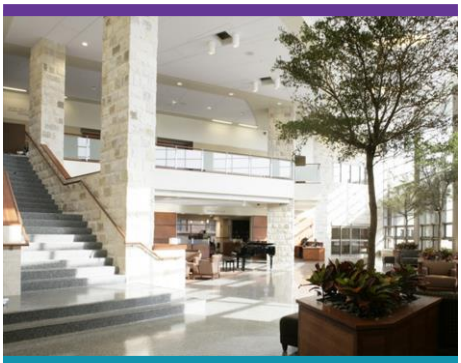
White, B. A., Chang, Y., Grabowski, B. G., & Brown, D. F. 2014 | *Western Journal of Emergency Medicine* Volume 15, Issue 7, Pages 770-776

Key Concepts/Context

Emergency department (ED) crowding is a widespread issue that causes a multitude of negative effects on patient care quality, safety, and efficiency. Lean-based systems engineering, which is often used for industrial manufacturing, is a method for eliminating all forms of waste (including wasted time and other resources) to optimize productivity. Recent studies have begun to demonstrate the use of systems engineering and improvement science on streamlining processes and improving throughput in different medical capacities, but an opportunity remains to refine the application of these tools within EDs in particular.

Methods

- Before-and-after analyses of Fast Track (FT) process improvements were conducted over two six-month periods in a large, urban ED with six care units. Patients with the lowest acuity (relatively minor injuries) were triaged to the FT area, while medium-acuity patients are sent to a Supplemental Triage and Rapid Treatment (START) area. Adult patients from these two areas were included in all analyses.
- A rudimentary model was created based on estimated exam and procedure cycle times and resource requirements in each treatment space, and seven goals were formed based on Lean methodologies and other engineering theories. These included: 1) Simplify whenever possible 2) Reduce waste, especially of limited resources 3) Maintain forward progress at all times 4) Support and plan for inherent behaviors of both staff and patients 5) Plan capacity and meet demand, and exceed if possible 6) Draw on success and test new ideas, with an aim to the future state 7) Develop a culture of continuous quality improvement.
- Three of the seven available treatment rooms were remade into “exam-only” rooms, while the other four were remade into “procedure rooms.” “Procedure



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

carts" were placed in each room to minimize instances of staff leaving rooms to gather supplies, and paperwork was simplified to further expedite flow.

Findings

The Lean-based reorganization of patient flow ultimately decreased patient length of stay by 15 minutes and time spent in exam rooms by 34 minutes while using very few resources and no additional expenses. The multidisciplinary, team-oriented nature of this approach also decreased the likelihood of unintended workflow imbalances and bottlenecks.

Design Implications

Apart from workflow changes among personnel, the addition of quickly accessible resources in each exam and procedure room, along with the planned repurposing of certain spaces, played equally key roles in making the Lean-based approach effective. Supply closets or other stockpiles of resources could be kept in quickly accessible areas if fully-stocked carts aren't available for each room. As rooms are repurposed and workflows adjusted, the width and clutter of certain hallways should be considered for optimum personnel flow.

Limitations

The authors state that since this was a before-after study, the outcomes measured might prove association but do not ensure causality, meaning that other factors aside from the Lean-based approach may have contributed to improvements. The study was conducted at a single institution with a Fast Track area, which is not a feature available in all EDs. Participants were not blinded to the intervention, which may have altered their actions during the study. The Lean-based system for reorganization is technically a series of smaller systems improvements and none of these single processes.

The Knowledge Repository is provided with the funding support of:

AIA Academy of Architecture for Health of the American Institute of Architects

ASHE American Society for Healthcare Engineering, A personal membership group of the American Hospital Association

AAHF Academy of Architecture for Health Foundation

FGI

Additional key point summaries provided by:

NIHD Nursing Institute for Healthcare Design — Leadership · Education · Advocacy

Research Design Connections