Gaining Control and Predictability of Complex Health Care Systems Through Patient Classification

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Motivation / Problem / Domain

- "Estimates suggest that as much as $700 billion a year in healthcare costs do not improve health outcomes." - Peter Orszag, director of the White House Office of Management and Budget, May 2009 interview with NPR [2].
- Annual provider inefficiency and error is estimated to cost $75-$100 Billion [2].
- Access to care is limited due to provider crowding particularly in Emergency Departments [3].
- There is a need for more engineering methods and thinking in healthcare [4].
- Much is known about how to increase quality and efficiency in manufacturing, some methods have carried to health care [5,6].
- A significant tool for reducing waste in manufacturing are takt times [7].

The Hypothesis:
Patient classification systems can leverage predictable treatment demands to control and improve high volume health treatment unit performance.

The Planned Research

- Research will focus on how to best create this classification system and understand larger engineering systems implications of its use.
- A partnership has been formed with the New England Veterans Health Administration.
- Research will begin with preliminary attempts to understand how accurately nurses can predict patient flow and assign classifications at the VA Boston Hospital Emergency Department.
- Based on the results, tools will be created to make this process more efficient and accurate.
- Then a case study at VA Boston will be performed to understand the affects of this system, including data analysis, interviews, and observation.
- Finally studies will be performed to see whether the system is replicable in other VA Hospitals and possibly non-VA Hospitals.

Expected Contribution

This research is expected to contribute to two fields:

Health Care Systems:
Health Professionals are beginning to understand how to leverage predictability. This research will provide an example that can be immediately applied to other Emergency Departments and also a process for creating similar tools in other units.

Lean Performance in Service Industries:
Lean and systems optimization tools often fail to deliver the performance benefits seen in classic manufacturing to service industries. This research can offer a new tool for optimization in more complex socio-technical systems.

Key Questions

- Can a patient classification system serve the same purpose as takt times? (act as a tool for control and monitoring of a system)
- What are the outcomes of implementing such a system?
- What factors (human, economic, etc.) help or hinder the use of such a system?
- How transferable can such a system be?

Methodology

This research will:

- Apply Complex Systems Design Methods to the Emergency Department to create a potential classification system at triage.
- Test the classification system through discrete event simulation.
- Use Interviews and data mining to create a functional classification system and tool for implementation.
- Use data and interviews to judge effectiveness of classification system.
- Use interviews and data to assess the properties of the classification system that can be transferred to other Emergency Departments.

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Literature Review

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