Lean Process Improvement in Healthcare: Barriers and Opportunities

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Introductions

Edward G. Anderson Jr., Ph.D.:

• Wright Centennial Professor for the Management of Innovative Technology, University of Texas McCombs School of Business
• Director of Healthcare@McCombs
• Co-author of two books:
  • The Innovation Butterfly: Managing Emergent Opportunities and Disruptions Under Distributed Innovation
  • Operations Management for Dummies
• Ph.D. in Management Science, Massachusetts Institute of Technology
• Former operations engineer at Ford Motor Company
• Holds six U.S. and international patents.

Neal Wendt, M.S, M.A.:

• Fellow of the Lean Healthcare Institute
• Lean Six Sigma Expert, Black Belt certified, Lean Instructor certified; US Air Force & General Electric
• Former Air Force Officer; awarded the Bronze Star Medal for exceptionally meritorious service while serving with the Combined Forces Special Operations Component Command-Afghanistan
• M.S. in Technology Commercialization from the University of Texas McCombs School of Business
• M.A. in Organizational Leadership from Gonzaga University
• B.S. in Management from the United States Air Force Academy
Agenda

- Agenda
- Introductions
- Goals
- Focus on Outpatient care
- What is lean?
- Patient Is Not A Widget
- Why You Care

- Value Add In Outpatient Care
- How To Start Lean
- Elements Of Lean Organization
- Review
- Contact Information
- Why outpatient clinics are a worthy target for process improvement
- Definition of what Lean is.
- Understand the barriers to implementing process improvement in Healthcare
  ◦ Focus is on outpatient care, but also generally true for Hospitals
  ◦ Patients are not widgets, physicians are not robots
  ◦ Processes harder to see or dissect (EMR’s make this worse)
  ◦ Incentive compatibility (hinders surfacing of problems)
- Some ways forward (i.e. it’s not hopeless)
  ◦ “Mind the gaps”
  ◦ Perfect patient (bring in IS)
  ◦ Single patient flow
  ◦ Blue sky: IS for evidenced-based care

Note: Focus is on outpatient care, but generally applicable to Hospitals as well.
Primary & Specialist Clinics (Outpatient)

Most PI focused on hospitals

Half of physicians in practices have low morale and/or are burnt-out

- Average 99 patient visits and 50 work hours per week
- Large scale consolidation has had mixed results

Patient issues

- 4 patient visits annually in U.S. vs 6.5 in rest of OECD
- 44 minutes waiting or filling out forms per visit; 20 with physician
- Dropped calls, failure to return calls or messages, etc.

Outpatient practices vs. Hospitals

- Spending is similar
- 33% more medication errors and adverse events resulting in injuries

Inadequate communication between: primary care, secondary care, and hospitals

- 20%-40% of specialists don’t send reports to referring primaries. 50% hospitals don’t send discharge reports to primary care.

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1 Howard Janet, 2 Physicians’ Foundation, 3 Medical Economics, 4 Gaynor & Pauly-JPE, 5 Squires & Anderson-Commonwealth Fund, 6 Ray et al. Amer. J. Managed Care (there is also 37 minutes of driving time in $43 opportunity cost), 7 CMS, 8 IOM, 9 AO'Malley & Reschovsky-Arch. Internal Med.
Lean is the generic term for the Toyota Production System (TPS) as coined by MIT International Motor Vehicle Program*

*TPS’s first goal is to develop a management culture that surfaces and solves problems. Then...

- Strive for PERFECTION
- PULL the product
- Establish smooth, continuous FLOW
- Identify the VALUE STREAM
- Define VALUE from the customer’s perspective

The central problem is that Lean was developed in a manufacturing context. Healthcare is a complex, artisanal service with its own unique issues

*Figure is adapted from the “Lean Thinking” by J. Womack, except for culture quote which comes from Toyota Consulting Services, & Six Sigma from M. George (Lean 6 Sigma)
Patient Is Not A Widget

Lean is built on foundations of mass production in which every part is interchangeable, i.e. a widget

Patients are not interchangeable. They have heterogeneous:

- Needs (such as co-morbidities) that evolve over time
- Expectations
- Life experiences
Provider is Not a Robot

Lean is built on foundations of mass production in which knowledge is embedded in assembly lines, i.e. automated robots & unskilled 60-second jobs

Providers are artisanal.
- All work is customized.
- Skills are in providers’ heads, and cannot be automated.
- Delivery of services cannot be separated from “production.”
- **Process view difficult** (Duty to current patient, No reflection time, Training & Incentives)
- EMRs hinder process change
CAROL, SCHEDULE A STAFF MEETING.

WHAT’S THE TOPIC?

I PLAN TO FUSE SIX SIGMA WITH LEAN METHODS TO ELIMINATE THE GAP BETWEEN OUR STRATEGY AND OUR OBJECTIVES.

I’LL JUST SAY “WASTE OF TIME.”
Elements Of Lean Organization

- Process focus
- PI led by line workers
- Reflection time for PI
- PDSA Cycle
- PI tools

- Continuous Flow
- Pull Systems
- Takt Time
- Quick Changeover
- Integrated Logistics
- Leveling
- Sequencing

**TPS**

**JUST IN TIME**
“Right Part at Right Time in the Right Amount”

**JIDOKA**
“Make problems visible”

**Heijunka**
Leveled Production

**Standardization**
Standard Work, Standard Environment, Standard Information

**Culture**
Management creates culture that surfaces & solves problems

- Automatic Stops
- Andon/Visual Control
- Automation
- Mistake Proofing
- Quality at the Source

- Suppliers are Important
- Work Instructions
- 5S
- Visual Control

*Figure is adapted from the “Toyota Way” by J. Liker, except for culture block which comes from Toyota Consulting Services*
How To Start Lean

1. Commitment to Change
2. Understand Voice of Customer
3. Gemba Walk: 5S
4. Value Stream Map
5. Implement Pull System
6. Right-Sizing and SMED

Source: QuoteAddicts
First: Patient as customer

Understanding that Outpatient care is a retail operation is important to the overall public health. Making it more inviting to handle critical issues at the lowest, and therefore least expensive entry point of healthcare, reduces costs for the entirety of healthcare and ultimately leads to patient-centered care.

There are three factors that are changing the forced customer stickiness within healthcare:

1. Democratization of Healthcare
2. Interoperability of Electronic Health Records
3. Consumerism
Tools: Some carry directly over from Mfg.

Some tools carry directly over from lean:

1. Process value mapping
2. Ishikawa Root-Cause Diagram
3. Pareto charts for prioritizing root causes
4. Plan-Do-Study/Check-Act Cycle
Tools: Single Patient Flow

Single Patient Flow

- Move the Patient down the value stream
- Continuous... any stop or reverse is waste
- Flow reduces cycle time and good things happen
- Flow enables anyone at any time to see the status of the Single Patient Flow
- Quality is better throughout the process
- Minimized changeover time

“Right Part, at Right Time, in the Right Amount”
Lean comparison, any time a product is touched it opens another opportunity for a defect to be made.

Miscommunication due to handoffs are responsible for 2 out of 3 sentinel events, an event in a healthcare setting resulting in death or serious physical or psychological injury to a patient or patients, not related to the natural course of the patient's illness.

86% of mistakes made in healthcare industry are administrative.
Tools: Perfect Patient

- **Perfect Patient** is one that has all of the information necessary to make a diagnosis as they are being delivered to the provider.

- Moves as many diagnostic and lab tests as legally possible in front of the appointment.

- Critical to the implementation of Single Patient Flow, with it an organization can streamline the patient experience and eliminate multiple visits related to the same pre-diagnosis condition.

- **Minimum Required Diagnostic Information (MRDI)** is broken down for each chief complaint and Single Patient Flow is structured to input the information in advanced of the patient seeing the provider.

- Drastically decreases the “visit to solution” metric of each patient. This visit-to-solution metric measures how many patient visits a clinic needed to diagnosis the chief complaint of a patient.
Majority of consultations do not involve a physical exam, those that do rarely need a patient to lay on a table.

Providers can be in position of consultation, not focused on a laptop or having the patient talk to the back of their head.

Eliminating the movement time from room to room a clinic can see an increase in physician availability, there are reductions in repeated mistakes of patient identification, paperwork, patient readiness status, and even physician location that lead to lost time and elevated staff stress.

Patient confidentiality stays in the exam room.
Harness EHRs to assist rather than hinder process improvement.

Develop information systems strategy that includes harnessing EHR platforms

Implement portals, wearables, and other apps

Use personalized, predictive data and evidence-based medicine to inform diagnostic decision trees and courses of treatment.
Next Steps

- Learn from implementation at local clinics.
- Develop information systems strategy that includes harnessing EHR platforms and portals.
- Develop and incorporate back office strategies.
- Implement in integrated practice units
Review

- What is lean
- Barriers to implementation in healthcare
- Ways Ahead (i.e. it’s not hopeless)
Institute for Lean Healthcare
LeanHealthInst.org

A community committed to improving outpatient care in the U.S. Healthcare System

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- Neal Wendt, M.S., M.A., Principal Consultant, The Hill Growth Fund
- Nitin Joglekar, M.S., Ph.D., Associate Professor of Business, Boston University
- Jim Nelson, M.S., Managing Director, Knosys Investments
- Douglas Morrice, M.S., Ph.D., Sublett Centennial Professor, University of Texas
- Geoffrey G. Parker, M.S., Ph.D., Professor of Engineering, Dartmouth College
- Mary Ann Anderson, M.S., Director, U. of Texas Supply Chain Center
- Holly Lanham, Ph.D, Asst Professor U. of Texas Health Sciences Center, San Antonio
- Keith Leitner, M.S., Founding Faculty, Lean for Hospital Healthcare, U. of Tennessee
Thank You!

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