Implementing Lean Operations in Healthcare: A Cautionary Tale

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Healthcare Delivery Challenges

• Healthcare involves highly customized work, process, and outcomes.

• The economics of healthcare are poorly understood, relative to industries such as manufacturing.

• What does it mean to say that healthcare is “working”?  
  – Different stakeholders have different interests  
  – Every patient’s goals are different (and those change over time).

• Strategies of many healthcare providers are in flux.

• Other challenges???
“Lean” in healthcare

• There is a toolkit to improve outcomes in manufacturing that is reasonably well-understood, much of it is based on “Lean.”

• But, the context of manufacturing differs from the context of healthcare

• Hypothesis: Implementations of lean in healthcare, while having some success, are limited and difficult to scale because the change in context is not fully considered.
Goals of this talk

• Describe exactly what lean manufacturing is in its original manufacturing context, so that you can make your own judgments as to what might work (easily) and what won’t work (or will only work with considerable difficulty) in healthcare.

• Explain what I see as some of the problems of importing the lean toolkit/methodology wholesale into healthcare

• Illuminate some higher-level “lean principles” that could make sense in a healthcare context.

• Leverage your knowledge as to what other aspects of lean might work well in a healthcare context.
What is “Lean”

• Developed by MIT researchers in early 1990s

• Genericized the Toyota Production System (and—to some extent—Honda), which is the dominant paradigm in manufacturing
  – It includes a quality component

• To understand Lean, it helps to have an understanding of mass and craft production.
Craft (Artisanal) Manufacturing

• Craft production existed before Henry Ford

• Key aspects
  – Total customization as requested by the customer
  – No standardized units of production, and no truly interchangeable parts.
  – No assembly lines, assembly was done by master skilled trades, who read and interpreted schematics
Mass Manufacturing

• Job specialization at the 60-second level
  – Exploits economies of scale
  – Knowledge embedded in an engineered line because most workers illiterate in English and innumerate

• Identical products (at first)
  – “You can have it any color, as long as it’s black”
  – This was relaxed later, which contributed to quality issues

• Truly interchangeable parts
  – Standardized gages

• Vertical integration of suppliers (down to rubber plantations!)
  – No good suppliers originally.
  – Otherwise, spot contracts

• Expert-driven quality
Lean Production

- Limited menu of products

- Eliminate waste in the process thru continuous improvement (Kaizen)
  - 5 S’s (Sort, Streamline, Systematic Clean, Standardization, Sustain)
  - Sustained reduction of inventory (Kanban, Just-In-Time)

- Leverage line worker knowledge to improve process
  - With respect to “defects,” separate process from people
  - Mistake-proofing, visual management
  - Scientific method to PI (Plan-Do-Study-Act Cycle, Ishikawa/TQM tools) led by line workers

- Production leveling (Heijunka)
  - Rapid change-overs between models

- Long-term “Marriage” relationships with suppliers (Keiretsu)
  - Small number of large, empowered, first-tier suppliers
Food for thought

• Taiichi Ohno (co-inventor of TPS) thought that Lean was just a natural evolution of Mass production.

• Is the healthcare environment more like mass production or more like craft (artisinal production)?
Challenges to Lean in Healthcare

• **Limited menu of products**
  – **Patients are unique** with ever-changing objectives based in part on interaction with healthcare providers.
  – **Metrics are not clear-cut** even at system or population level.
  – **Who is the customer**, hospitals are more akin to iPhones than auto firms?

• **Eliminate waste in the process thru continuous improvement (Kaizen)**
  – Flow is more **difficult to standardize** than in manufacturing, outside of public health
  – **Fear of litigation, wishes of patients**, lead to “over-production” in testing & procedures
Challenges to Lean in Healthcare (cont.)

• Leverage line worker knowledge to improve process
  – Everyone clinician is trying to do a good job for each *individual* patient
  – **Fragmented specialties** on many levels
  – Fear of *litigation* sometimes leads to hiding of adverse events, rather than “treasuring” them

• **Production leveling (Heijunka)**
  – In many cases (such as ED), patients **need help when they need help**

• **Long-term marriage-like relationships with suppliers (Keiretsu)**
  – **Little influence** over too-many (relative to Lean ideal) “suppliers”

• Other Issues???
What can we take from Lean?

- Create constancy of purpose for improvements of product and service…improvement in all areas of business should be expected (Deming’s 14 points)
  - Must convince people it’s everyone’s job in a meaningful way.
  - Everyone in the system must be more observant (including the patient!)

- Pay attention to the “supplier” interrelationships
  - Be mindful of interrelationships in process that lead to communication/coordination gaps, between personnel in different
    - Departments, Specialties, Professions
  - And, of course, the patient!

- Pay attention to fundamental issues in process
  - Be mindful of process gaps (e.g. between depts. or at discharge)
    - Minimize handoffs
  - Smoothing flow and reducing time in process is useful where practical
    - Physical design of facilities (this has already had some success)
  - Consider eliminating unnecessary/redundant process steps where feasible. “Don’t do something, just stand there!”
What can we take from Lean (cont.)?

• **Co-opt clinicians** so that they want to make PI part of their job, not so that they can help you do it, but rather because they are the only people who understand how to do it.
  
  – Can we **standardize** (and other 5S’s), where standardization is feasible?
    • Standardization, etc., only works when done at grass-roots level
  
  – Can we **separate process from people** and learn from our mistakes?
    • Employ mistake proofing and visual management as much as possible
  
  – Can we leverage statistically varying **time-series data** to improve the process?
    • Needed for using scientific method on processes.

• Other takeaways from Lean?
Takeaways

• There are some aspects of healthcare that resemble lean/mass production and others that resemble artisanal production. We need to understand which is which.

• While a direct arbitrage of lean to most areas of healthcare is problematic, some principles can be applied.

• Filling out the remainder of the operational principles and toolkit for healthcare is a vital task, and I’d love your help.
Thank You!

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