Using Lean Thinking to Cross the Quality Chasm

One Academic Medical Center’s Approach

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Michigan Quality System:
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Michigan Quality System:
• Quality
• Safety
• Efficiency
• Appropriateness
• Service
UMHS in a Slide

Integrated academic health system, within major public research university:

• UM Hospitals and Health Centers
  – 1100 beds
  – 1.8 million outpatient visits/year

• UM Medical School
  – 1600 faculty physicians
  – 1000 resident physicians
  – 700 medical students

• Total 20,000 employees & trainees, $3.5B/y
Lean Thinking at UM Health System

Summary A3

J Billi  Oct 2011

• **Background**
  – University of Michigan has problems:
    Quality – 13% readmits on a med service
    Safety – wrong site surgery, sponge counts
    Efficiency – missing instruments in OR
    Appropriateness – MRI for back pain
    Service – 90 min. wait in a clinic
  – Problems harm patients, raise costs, frustrate workers

• **Current state**
  – >20,000 faculty, staff, trainees
  – >100,000 processes – all have problems
  – Great workers trying to do a good job

• **Goals**
  – Ideal Patient Care Experience
  – Ideal Clinician/Staff Experience
  – Ideal Trainee/Research Experience
  – Safest health system in US
  – Financial stability

• **Analysis**
  – Workers/managers: little std work
  – Few trained in problem solving
  – Problems complex, cross units
  – Work often invisible
  – Unclear responsibility for problems
  – Unclear priorities
  – Time, cost pressures: stress
  – Great scientists & clinicians: in silos

• **Strategies**
  – Spread a consistent improvement model across UM Health System
  – Michigan Quality System – MQS
  – UMHS workers build it
  – Build on our CQI base
  – Adapt lessons from Lean Thinking
  – Balance people development and process improvement
  – 20,000 problem solvers
Burning Platform for Change?
Gaps at UMHS

“No problem” is problem…

• **Quality:** Not all coronary patients get statin, aspirin, flu shot
• **Safety:**
  • Medication errors (10x infusion pump dose)
  • Labs labeled with wrong patient name
  • Results sent to wrong clinician
  • Retained surgical objects
• **Efficiency:**
  • Nurse, doctor searching for equipment, forms, pts…
  • Weeks waiting for appointment to the right physician
  • Higher LOS: fewer admissions, less $$, lay-offs
• **Appropriateness:**
  • Antibiotics for resp. infection; MRI for low back pain
• **Service:** Patients lost, staff look too busy to help
Ideal Patient Care Experience

The care we want for our family, our friends, ourselves

1. Patient Centered Medical Home
2. Patient/Family Centered Care
3. Clinical Quality
4. Safety as a System Property
5. Environment of Service Excellence
6. Care Coordinated Around Patient Needs
7. Facilities and Amenities that Promote a Healing Environment
The Ideal Patient Care Experience

- The Institute of Medicine 2001 “Chasm” Report gives us a vision of where to go
- Lean Thinking gives us the holistic approach and business system to get there
The Ideal Patient Care Experience

• The Institute of Medicine 2001 “Chasm” Report gives us a vision of where to go

• Lean Thinking gives us the holistic approach and business system to get there
What is Lean Thinking?
Several perspectives…

“The endless transformation of waste into value from the customer’s perspective”.

---Womack and Jones, *Lean Thinking*
“20,000 Problem Solvers”

Every worker
applying the scientific method
to every part of daily work.

If this is just the scientific method,
then who is the scientist? - John Shook

Turn all daily work into an experiment
and every worker into an investigator. - Steven Spear
Lean Thinking:
Grass-roots scientific problem solving

How can we fit these together?
We need a plan!

Adapted from J Womack, J Liker
Lean Quotes Guide to Michigan:

1. Plans...

- *Half the plans you make are wrong. You just don’t know which half.*
- “I haven't failed, I've found 10,000 ways that don't work.” Thomas Edison
- “A plan is an experiment you run to see what you don’t understand about the work”. Stephen Spear
- “If you want to make God laugh, tell him your plans”. Woody Allen
- “If there’s one thing I never see in a modern company, it’s a plan”. John Shook
Origins

We knew we were supposed to do 2 things, we just didn’t know how.

- *No matter where you start, it’s the wrong place.*
- “Forget grand strategy for the moment, just get started”. Womack and Jones
- “When you’re not sure what to do next, that’s a good time to try something”. John Long, MD
- “Every new program looks good as you start. I call this Uninformed Optimism”. Dave LaHote
Uninformed optimism…
-Dave LaHote

• **Process Improvement**
  – “Let’s fix everything…”
  – Lots of *learning* projects led by coaches

• **People Development**
  – “Let’s train everybody…”
  – “Then they can fix everything!”
Initial “Learning” Projects

- Facilitators from GM
- Help from John Long
- Reflections, teaching and questions from John Shook
- Projects scattered like popcorn
  - Door to balloon for heart attack
  - Pre-Op – From “decision to incision” in surgery
  - HR – From “decision to incision” for new doctor
  - Misdirected lab results
  - Appointments in a Sports Medicine clinic
  - Radiation for patients with brain metastases
- We expected them to succeed, sustain.
  Most did, but few spread
Initial Results from the Michigan Quality System

Door to Balloon Time for MI
• From 75% within 90 minutes
• To 93% in 90 minutes (mean time now 56 minutes)

Patients Referred for Brain Metastases
• From 3 visits over 5 days (consult, simulation, treatment)
• To 95% of patients have all 3 parts within 24 hours

Getting Lab Results to the Right Physician
• From 13% with no ordering physician
• To < 2% (over 4 years)

Scheduling to MedSport Clinic
• From 23 days (27 minutes of work)
• To 2 ½ minutes - first phonecall for 90% of patients

PICC Line Placement for Inpatients
• From 35% placed in 12 hours
• To 71%; 46% fewer needed Interventional Radiology
Vascular Access Supply Cart 5S
Drawer: Post- 5S
Saved each nurse an hour a day!
Engaged team: front line workers and managers
Initial Approach to Training

• Anyone can pull training
• Singly or in groups
• 1 hour, 4 hours, 4 days…
• Hope you use it when you get back…
• Created “islands of lean in a sea of waste”
  – “Not sure what to do”
  – “No one around me knows what I’m doing”
  – Efforts often lost steam
Reflections on Initial Approach

• Process Improvement
  – “Let’s fix everything…”
  – Lots of *learning* projects led by coaches
  – What did we learn???
    Little spread
  – What did *they* learn???
  – “Lean done in projects by coaches”

• People Development
  – “Let’s train everybody so they can fix everything”
  – Training ahead of need is… *Inventory!*
  – How can we train Just-In-Time?
Evolving Strategy

We began in the basement of two buildings

People Development  Process Improvement

- Individual learning
- Point improvements
How do we get to 20,000 problem solvers?

We all must learn to:

• Do our work every day in a standard way that we created
  – Not just the way the work evolved!
• Be alert to things going wrong
  – They always do!
• Fix the problem now
  – For this patient or co-worker
• Find and fix the root causes of the problem
  – So it never happens again!

Modified after Spear; Billi
Lean Quotes Guide to Michigan: 3. The team, the team, the team…

- *The goal is 20,000 problem solvers*
- “Opportunity is missed by most people because it is dressed in overalls and looks like work.” Thomas Edison
- “Toyota has average people, brilliant processes, and produce superb results. You have brilliant people, broken processes and produce mediocre results.” Fujio Cho to Jim Womack
- *We squander workers’ brilliance passing patients across the gaps in our processes.*
Value Stream Mapping: 
Learning to See…Together

• “Ah ha” moments:
  – I never knew this is how it worked!
  – I can’t believe what a mess this process is!
  – No wonder we’re frustrated!
  – It’s a miracle a patient (investigator, trainee, grant, bill…) ever gets through it!

-All heard from physicians, nurses, staff, managers
Psychiatry Referral Process
The Broken Office Visit
Lean Quotes Guide to Michigan:

4. Who owns the problem??

- “A nurse, a pharmacist, and a resident physician walk into a patient room…”
- “If we don’t know who owns the problem, it won’t get solved.” John Shook
University of Michigan Health System

Is this any match…

Michigan Health Corporation

Hospital and Health Centers

Medical School / Faculty Group Practice
Older patients experience complex care

For this??????

Hospital
Disease Mgmt
Pharmacy
Family Caregiver
Home Care
Physicians
Nursing Home
Preventing Readmissions

Multiple Clinical Interventions

Do all these people have to work for the same boss???
Common Patient Transitions

- Emergency Department
- Hospital
- Sub-acute nursing home
- Hospital

Who will build these bridges???
Patient Journeys

Who owns the problem??

Acute Medical (unscheduled)

Ambulatory

Primary Care

Medical Clinics

Surgical Clinics

ED

MOU

Medical Inpatient

Home or ECF

Surgical (scheduled)

ORs

Surgical Inpatient

Home or ECF
What kind of organizations can do this?

- Structure is not the answer…
  Power or control is not the answer…
  Size is not the answer…

- Do we have agreement?
  - On the vision?
  - On the problems? On their owners?
  - On their root causes?
  - On which experiments to try first?
**Title:** Return to work placements are less than ideal

**Recommended:**
- Collect data
- Determine potential root causes
- Brainstorm counter measures
- Random selection & view
  - Rapid Return
  - Slow Return

**Current Situation:**
- Supervisors were willing to accommodate work restrictions
- Unaddressed Performance Issues
- Open positions

**Goal:** 100% placed

**Analysis:**
- EE doesn't feel appreciated
- EE applies for another
- EE needs more stability

**PIP:**

<table>
<thead>
<tr>
<th>Who</th>
<th>Task</th>
<th>How</th>
<th>When</th>
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<tbody>
<tr>
<td>HRC</td>
<td>Collect data</td>
<td>Questionnaires &amp; Interviews</td>
<td>Within 60 days</td>
</tr>
<tr>
<td>Supervisor</td>
<td>Provide support</td>
<td>Questionnaires &amp; Interviews</td>
<td>Within 60 days</td>
</tr>
<tr>
<td>WC</td>
<td>Provide data analysis &amp; feedback</td>
<td>Questionnaires</td>
<td>Within 60 days</td>
</tr>
<tr>
<td>Employer</td>
<td>Provide data analysis &amp; feedback</td>
<td>Questionnaires</td>
<td>Within 60 days</td>
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**Follow up:**
- Develop Action Plan based on outcomes of the data

**Sign off:** J. Mulcrone
Current Strategy: one building
Balance & Align Efforts

People Development ↔ Process Improvement

- Learning organization
- Area transformation (Ambulatory Care)
- Work group learning (Children’s Operating Rooms, Lean Implementation Teams)
- Individual learning

- System level
- Flow improvements (Value Streams)
- Point improvements

2 sides of the same coin...
Agreed on Common Adult Patient Journeys

Acute Medical (unscheduled)

Ambulatory

Primary Care

Medical Clinics

Surgical Clinics

ED

Obs Unit

Medical Inpatient

Home or ECF

Surgical (scheduled)

ORs

Major Procedure Rooms

Surgical Inpatient

Home or ECF
Clinical: Major Patient Journeys
(Value streams across areas/units)

Clinical Stream
Chief Engineer

Ambulatory Care

Medical Stream - Adult

Surgical Stream - Adult

Unscheduled Inpt - Child

Scheduled Inpt - Child

Department Leaders: ED Med/Peds Surg Anes Nursing

Modified from John Shook
Major Patient Journey
Value Streams

Better Discharge Planning (med ward)
• Appointment in hand
• Decreased readmissions by 33%; 72h ER returns by 81%

CT scheduling and throughput for inpatients
• Standard request process eliminated daily workaround
• Like drycleaners: *In by 9AM, out by 6 PM* for inpatients

Neurosurgery nurses round with interns 5PM and 11PM
• Fewer phonecalls, problems discovered earlier
• Nurses and interns empowered, families love involvement
• 1 day decrease LOS for inpatients

Cardiac Surgery Length of Stay – vent wean protocol
• Standard work handoffs: 2 day decrease in LOS
Neurosurgery Length of Stay

Goal: Create capacity to grow Neurosurgery activity

Results:
- Adding evening rounds with house officer and floor nurse + weekend discharges reduced LOS by 1 day
- Patients’ families liked being able to interact with care team in the evening
Goal: for uncomplicated pts, reverse 2 day increase (due to new building)  

Results:  
- Used standardized clinical pathway, handoff tool, no-interrupt zone  
- OR team completes SBAR triggers the pathway, identifies rapid wean ventilator patients  
- LOS reduced 2 days
Current Strategy: one building
Balance & Align Efforts

People Development ↔ Process Improvement

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2 sides of the same coin...
Lean Implementation Teams (LIT)

• Committed leader, staff engaged
• Track Value Metric continuously
• Standard work: workers and manager
• Manager rounds daily, worker shows problems
• Workers create Everyday Lean Ideas (A4)
Urology Visual Value Metric

Goal: 780% of nursing calls completed within 720 min initiation to completion

- Daily Problems
  - Provider orders by 4pm
  - Pay attention to FFU waiting results on CWN
  - Letter of medical necessity
  - Time-consuming & multiple in the box
  - Empty box before count
  - Multiple users identified ways to identify UT
  - DDPU = waiting for 11/16

- Value metric
  - 83% 2
  - 65% 3
  - 75% 4
  - 69% 5

- Daily
  - Value metric
  - 9
  - 10
  - 11

We standardized care for UAC from #24
Ambulatory Care Transformation Plan

• 80 Ambulatory Care Leader Teams
  – Medical director and clinic manager train together, 2 day workshop
  – Work on common problem
    • Satisfaction, access, wait in clinic, margin
  – Pull central coaching help as needed
  – Report progress to peers at regular meetings
  – Integrated into standard management meetings
IHI Open School – student organized QI learning – MD, RN, Pharm, Soc Work, Engineer, MPH, MBA
A3 workshop: multidisciplinary problem solving
Practice in A3 problem-solving, presenting, critiquing
5. Improvement v. daily work

- Daily work beats out improvement work every time.
- Everyone loves the firefighter, no one loves the fire marshal.
- “If your house is on fire, by all means put it out…” — Jim Womack
Fire Marshall:
Halls must be “Clear as Built”
Clear as Built ???
Clear as Built ???
Front line workers still fixing problems…

Early ICU Mobility Project

• Collaboration between nursing & PT

**Goal:** ICU patients on their feet, walking

**Results:**
• Reduced Medical ICU LOS for vent patients from 8.4 to 6.4 days
• Reduced Hospital LOS from 22 to 16 days

**Spread:**
• Collaborating with Neurosurgery and Surgery ICUs
Early Mobilization of ICU Ventilator Patients
Lean Quotes Guide to Michigan:

6. Leadership...

- “A critical role for the leader is to reduce overburden” John Shook
- I got to this exalted position by being a good firefighter, I now realize I am the arsonist.
- “UMHS may have the highest complexity per worker of any place I have seen.” John Shook
- “How can I get my people to do this?” “You must do this” John Shook
- Sometimes UMHS feels like a place where mandatory programs are optional...
Where are we now?

• Slow steady progress
  – Lots of workers and managers running experiments
  – Experimenting with courses:
    • Intact work-teams on real problems
    • Managing to Learn: Problem Solving. 3d over 8 wks

• Multiple top priorities, overburden:
• Workers have variable knowledge, skill
• Leaders have variable knowledge, skill
P-D-C-A - Adjust…
Where do we need to go?

• Continue to learn from major experiments
  – Major Patient Journey Value Streams
  – Lean in Daily Work (Lean Implementation Teams)
  – Area Transformation Plans

• Leaders learning by doing
  – Go see, ask why, respect people
  – Strategy deployment – alignment through:
    gemba, catchball, prioritization, tiered A3s, visual
    management (Visual Room for clinical mission)
  – Explore the many chief engineer roles within
    UMHS
Problem and PDCA Tools for different levels

Key to success: The Mid-management and First Line Supervisory Level

HK – hoshin kanri
  – policy alignment
  – policy deployment

Muri – overburden
Mura – uneven workload
Muda – waste

Shook
### Shift Mental Models

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<tr>
<th>Old Mindset</th>
<th>New Mindset</th>
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<tr>
<td>Autonomy <em>(my way)</em> valued</td>
<td>Standard work <em>(our way)</em> valued as basis for improvement &amp; creativity</td>
</tr>
<tr>
<td>Command &amp; control</td>
<td>Engaged employees 20,000 problem solvers</td>
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<tr>
<td>Specialists mainly do improvement, using complex methods</td>
<td>Everyone’s job (workers &amp; managers) is improvement, using simple methods whenever possible</td>
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<tr>
<td>Cutting budgets = efficiency</td>
<td>Creating capacity by increasing throughput through existing resources</td>
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People development-
A little help from our friends…

• GM
  – Early coaches, intro to John Long and John Shook

• Lean Enterprise Institute
  – Courses, workshops, webinars
  – LEI Partners:
    • Coca Cola, Textron, Cardinal Health, Medtronic, UMHS
    • Workshops, gemba visits, experienced mentors

• Lean Thinkers series – site visits to UMHS
  • Womack, Shook, Liker, Jones, Toussaint, Bennett, Gruner…

• Gemba visits to ThedaCare, Virginia Mason…
• Healthcare Value Network (gemba, shared learning)
Michigan Quality System
Quality – Safety – Efficiency – Appropriateness – Service

Just-in-Time
- Pacing by Demand
- Continuous Flow
- Pull Systems

Built-in Quality
- Error Proof
- Surface Problems
- Stop and Respond to Abnormalities
- Solve Problems at Root Cause

Leveled Workload
Continuous Improvement (P–D–C–A) and Learning
Standardized Work

Make Value Flow by Eliminating Errors and Waste

MQS House – Master version (All Missions) Sources: J. Shook, J. Billi, J. Liker, S. Hoeft, J. Womack, Park–Nicollet /jmk 06.23.07
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- Michigan Quality System at UMHS: med.umich.edu/mqs
- Lean Enterprise Institute: www.lean.org webinars, books, meetings…
- Lean Healthcare Value Network www.healthcarevalueleaders.org
- Ideal Patient Care Experience sitemaker.umich.edu/jbilli/ideal_patient_care_experience_-_quality_chasm