Accelerating System Thinking in Health Systems via Collaboration with Academia

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2013 MIT Innovation in Health Care Conference
Health Challenge - Solution Approaches

• **Market Incentives Approach**
  (policy makers & public debate) =

  Payment schemes and risk allocation

• **Front-Line Approach**
  (‘HC Toyota system’) =

  Continuous improvement & total quality efforts
Health Challenge – Sloan Focus

Change healthcare cost-effectiveness equation

Rethink organizational capabilities of health systems (Design, workforce, analytics, IT & Technology)

What types of system innovation? With what infrastructures?
Three Lenses of Health Systems
(D. Ancona, T. Kochan, J. Van Maanen, E. Westney)

**Organizations are Machines**
Action comes through planning!

**Organizations are Contests**
Action comes through power!

**Organizations are Institutions**
Action comes through habit!

Strategic Design
Political
Cultural
Talk Goals

• Collaboration between health organizations and nonclinical academics to accelerate system innovation

• Field (applied) research and (action-based) teaching

• Collaboration formats and key success drivers and challenges
MGH-MIT Collaboration

Leaders:

Peter Dunn, MD
Executive Medical Director, MGH Perioperative Services

Bethany Daily
Senior Administrative Director, MGH Perioperative Services

Michael Jaff, MD
Chair, MGH Institute for Heart, Vascular and Stroke Care

Executive Sponsors:

Ann Prestipino
Senior VP for Surgical & Anesthesia Services and Clinical Business Development, MGH

David Torchiana, MD
MGHPO Chairman and CEO

Peter Slavin, MD
MGH President
MGH-MIT Collaboration History

• Began over 7 years ago (Ernie Berndt and Gabriel Bitran)

• 2008-10: Jointly funded postdoctoral fellow

• 2010-2013: MGH-wide project: “Surgical Patient Flow”
  (MGH funds 2 postdoctoral fellows and LGO students)
  Multiple large scale implementations!

• 2013-: Multiple projects throughout the hospital
  (Funded jointly by Hospital and MGHPO)
MGH- Perioperative System 2013

- 52-56 Operating Rooms, Main Campus

- Over 35,000 surgical procedures per year
  - 75% during prime time (0700-1700, M-F), 25% off-hours

- 16 Surgical Services

- 230 surgeons, 150 Anesthesiologists

- Nursing Staff: Total FTE’s-682
  - 407 Direct Care
  - 275 Support Staff
Example 1 – Smoothing Bed Census

Surgical floors bottleneck due to elective cases = System problem!

Objective: Smooth weekly floor census

Constraints:
OR resource constraints (e.g. room size) factored into model
One block per surgeon per day
Service blocks must be balanced across the week
Weekends are kept off-limits

Over 30% of surgeons changed day of surgery
Change Management

Model used to create schedule based on known constraints

Additional constraints added

Surgical services evaluate schedule for feasibility

Counterproposal

Model used to evaluate alternative schedule

Accept

Reject

Accept

Final schedule

“Challenging Operations: Medical Reform and Resistance in Surgery”, Kate Kellogg
Example 2 – Drug Management at MGH Internal Medicine Associates (IMA)

Size:

~31K patients, 50 MDs, 65 residents, 7 NPs, 86 support staff

180K annual drug prescriptions & 1M drug reconciliation

Current State: Complex Process!

Very high supervision ratio!

Exacerbated by initiation of new processes!
Drug Adherence

- Nationally 30-70% overall non-adherence, depending on drug class and diagnosis
- 20-30% of prescriptions never filled at all
- Duplicated and none-added value work
Future State: Centralized & Proactive

Centralized function that proactively manages all inflows and engage patients (guidance, monitoring)

Off-loading work from MDs
is pharmacy simplified. We fill, sort and deliver all your meds in personalized packets based on when you need to take them. Our service removes the complexity and hassle of managing multiple medications.

Taking medicine is painfully complicated, especially for those managing complex medication regimes. Faced with dozens of identical pill bottles, a complicated dosing schedule and illegible instructions, it’s no surprise that medical errors are common [1] and medication adherence hovers around 50% for most medications [1].

PillPack simplifies and personalizes the pharmacy experience. We deliver each patient’s combination of pills in multi-medication, time-specific packets. PillPack transforms daily medication management into a personalized system that fits a person’s daily routine, so they can easily and confidently take the right combination of pills at the right times.

The medical system calls it drug adherence (but we prefer to think of it as just a way to feel better). Interventions like ours have been shown to rapidly improve the number of patients taking the prescribed dosage of their medication from a baseline adherence of 61% to 96%, resulting in better health outcomes.

PillPack, Inc. operates a licensed pharmacy in Manchester, NH and is licensed to dispense prescriptions in thirteen other states, including Massachusetts, Rhode Island and Maine. PillPack is an in-network pharmacy with most forms of insurance, including Medicare Part D.

PillPack’s pharmacy team has over 50 years of combined experience (CVS, Target, MGH, OmniCare and Northeast Pharmacy). Our design, engineering and technology team is based in Cambridge, MA and is currently working in collaboration with IDEO, an international design firm.


www.pillpack.com
BIDMC-MIT Collaboration

Leaders:

Ken Sands, MD
Senior Vice President for Health Care Quality, BIDMC

Brett Simon, MD
Chair, Department of Anesthesia, Critical Care and Pain Medicine, BIDMC

Elliot Chaikof, MD
Chair, Department of Surgery, BIDMC

Danny Talmor, MD
Vice Chair for Critical Care, Department of Anesthesia, BIDMC

Executive Sponsor:

Kevin Tabb, MD,
President and CEO, BIDMC
BIDMC-MIT Collaboration History

- Began 3 years ago
- BIDMC member of the LGO program at MIT
- Focused on perioperative environment and network optimization
- Joint effort to redesign safety and prevent harm in the ICU environment (funded by the Moore Foundation)
Example 3 – Resource Allocation in HC Networks

M. Braum, F. Bravo, V. Farias, and R. Levi and D. Price from MIT and C. Lynch, D. Rogers, J. Tumolo and R. Whyte from BIDMC

Network’s Goals:
Profit, Cost, Throughput, Utilization, Access, Social Welfare

Cannot think about each patient separately!

★ Hospitals in the network
△ In-network PCPs
▲ PCPs /other hospitals

Network demand
Loss demand
Recaptured/Reallocated demand
Marginal Cost of an Extra Case

Example:

Cost of procedure = Variable Cost + Allocated Fixed Cost (Overhead)

<table>
<thead>
<tr>
<th></th>
<th>Procedure 1</th>
<th>Procedure 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab</td>
<td>4.0%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Nutrition</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Overhead + Labor</td>
<td>66.8%</td>
<td>43.8%</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>3.5%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Supplies</td>
<td>25.7%</td>
<td>51.4%</td>
</tr>
</tbody>
</table>

Average cost Procedure 1 = 59%

Average cost Procedure 2

It reduces to 59.1% when Overhead & Labor is not included

Procedure 1 consumes more network resources that are shared by other activities!
Example 4 – Risk Drivers Instead of Risk Events

A. Hu and R. Levi and D. Price from MIT and P. Folcare, K. Sands and D. Talmor from BIDMC

Risk:

Uncertain event likely to lead to outcomes, which have negative (positive) impact (consequences) on the desired goals of the system
Success Drivers and Challenges

- System level innovation is essential for creating required organizational capabilities

- 3-lens approach and skills are key! (analytics, organizational change management, behaviors)

- New formats of collaboration needed (learn the respective 3-lenses of the organization)

- **System innovation**: Models to predict impact? Infrastructures to test ideas? Methodologies to measure post implementation effectiveness?
Example 2 – Waitlist Cases

Centralized Open Blocks

Wait List Cases Exceeding Max Wait Time

Max Wait Time Definition

Non Urgent    24 hours
Urgent        4 hours
Emergent      45 minutes

Centralized Open Blocks

Over 30% of patients not operated within time window!