Transforming our Hospitals: Clinician-driven Operations Management

Alain Mouttham
November 23rd, 2016
Commonwealth Fund National Scorecard

<table>
<thead>
<tr>
<th>COUNTRY RANKINGS</th>
<th>AUS</th>
<th>CAN</th>
<th>FRA</th>
<th>GER</th>
<th>NETH</th>
<th>NZ</th>
<th>NOR</th>
<th>SWE</th>
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<tr>
<td>Overall Ranking</td>
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<td>Healthy Lives</td>
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<td>Health Expenditures/Capita, 2011**</td>
<td>$3,800</td>
<td>$4,522</td>
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</table>

Notes: * Includes ties. ** Expenditures shown in SUS PPP (purchasing power parity); Australian $ data are from 2010.
The extensive empirical analysis underpinning this book shows that there has been relatively little fundamental change in Canadian health-care policy over the past four decades. This intransigence – the result of the interaction of ideas, interests, and institutions – has resulted in a paradigm freeze.

Without some sort of insurmountable disruptive force, either a major shift in medical science or technology, or a catastrophic economic or political crisis, fundamental health policy reform in Canada is unlikely.

As Pogo once reminded us, “We have met the enemy, and he is us”

Paradigm Freeze: Why it is so hard to reform health-care policy in Canada
Harvey Lazar, John N. Lavis, Pierre-Gerlier Forest, and John Church
McGill-Queen’s University Press, 2013
Healthcare Transformation

- Government
- Organization
- Individuals
Problem Statement

Value-Based Hospital:
- Patient-Centric
- End-to-End Management
- Value-Based Funding, focusing on outcomes (↑Quality and ↓Cost)

Volume-Based Hospital:
- Provider-Centric
- Silo Management
- Volume-Based Funding (Fee-for-Service)

Hospital Transformation is a clinical transformation, and not only an administrative or IT project
Clinical Operations Management (COM)

Value-Based Hospital:
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Value-Based Hospital

Hospital Transformation
Based on Operations Management

Volume-Based Hospital
Model-Based Clinical Operations Management

Value-Based Hospital

COM Models

People

Nursing

Physicians

Admin

Patients

Process

Information

Hospital Transformation
Based on Operations Management

Volume-Based Hospital
COM Models – Enterprise Architecture Diagram

Optimization, Simulation, Decision Analysis

Engineering

Operational Organization

Knowledge

Messages

Strategic

Tactical

Operational

Functions

Service Line Mgt

Demand Capacity Mgt

Supply Mgt

Performance Mgt

QoC, Safety & Risk Mgt

Accounting Mgt

Human Resources Mgt

Events, Alarms, Notifications

Processes

Hip & Knee Replacement

Congestive Heart Failure

COPD

…

Structure

ED

Medicine

OR

Surgery

Rehab

…
## COM Functions

<table>
<thead>
<tr>
<th>COMF</th>
<th>Service Line Management</th>
<th>Demand Capacity Management</th>
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<tbody>
<tr>
<td><strong>Strategic</strong>&lt;br&gt;(1-3 years)</td>
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<tr>
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<tr>
<td><strong>Operational offline</strong>&lt;br&gt;(1-4 weeks)</td>
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### Organization

### Groups

### Individuals

### Individuals
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<td>Service mix planning; Case mix planning; Capacity dimensioning; Workforce planning</td>
<td>Performance Management policies</td>
<td>QoC Policies; Culture of Safety; Accreditation</td>
<td>Supply Chain design; Materials Planning</td>
<td>Investment plan; Annual Budget</td>
<td>Organization structure; Workforce planning; Roles &amp; responsibilities</td>
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<tr>
<td><strong>Operational - offline (1-4 weeks)</strong></td>
<td>Care Plan for individual patient; Activity plan update</td>
<td>Appointment scheduling; Booking; Staffing; Admission Control</td>
<td>Operational Performance Forecasting (operational BI)</td>
<td>Infection Control; High-risk medication management</td>
<td>Stock purchasing; Non-stock ordering</td>
<td>Billing; Cash-flow analysis; Financial Control</td>
<td>Staffing; Workforce Mgt; Continuous improvements</td>
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<td>Care Plan update in real-time; Activity management; Process Monitoring &amp; Control</td>
<td>Capacity monitoring &amp; control; Full-Capacity protocol; Staffing - to - Census; Real-Time Patient Flow Mgt; Housekeeping &amp; Portering</td>
<td>Performance Monitoring &amp; Control; Escalation management; Adverse Event monitoring &amp; control; Escalation management</td>
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<td>Planning of care processes implementing customized Care Pathways and QBP for patient groups</td>
<td>Master Surgery Scheduling; Shift Scheduling; Scoping Ancillary Services</td>
<td>Performance Management planning; Historical Performance Analysis</td>
<td>QoC Reviews; Risk Management; Falls prevention; Infection Control policies</td>
<td>Supplier selection; Tenders; Procedure Card mgt</td>
<td>Budget tracking; Activity Based Costing; analysis</td>
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Some COM Functions for Emergency Department

• Strategic
  – Regional coverage
  – Ambulance districting
  – Capacity dimensioning: wait rooms, treatment rooms, emergency wards, staffing

• Tactical
  – ED layout
  – Patient routing: Triage, Fast-Track, CDU, High-Acuity wards
  – Admission control/smoothing
  – Physician scheduling
  – Nursing scheduling

• Off-line Operational
  – Nursing staffing

• On-line Operational
  – Ambulance dispatching & routing
  – Treatment planning & prioritization; medical directives
  – Patient tracking
  – Staff re-scheduling
  – Real-Time Demand Capacity
  – Surge protocol
Some COM Functions for Peri-Op/Surgery

• Strategic
  – Service mix: e.g. General Surgery, Orthopaedic, Urology, Ob/Gyn, Plastics, ENT
  – Case mix
  – Capacity dimensioning: e.g. open 1 more OR in the Fall/Winter; create 4 additional beds in Surgery

• Tactical
  – Master Surgery Schedule for the Fall; Assignment of surgeons to OR blocks
  – OR and Surgery Nursing schedules for the Fall
  – Elective Surgery booking rules (admission control) for the Fall; Wait list management rules

• Off-line Operational
  – Elective Surgery case booking
  – Nursing staffing

• On-line Operational
  – Emergency surgery case booking
  – Elective surgery case re-booking
  – Staffing changes
  – Nurse-to-Patient assignment in Surgery
  – Bed allocation to Patient in Surgery
  – Transfer scheduling
  – Discharge Planning; Discharge roll-out
  – Real-Time Demand Capacity
  – Surge protocol
Some COM Functions for Medicine

• Strategic
  – Service mix
  – Case mix
  – Ward partitioning: med/surg
  – Capacity dimensioning: beds, Physicians, Nurses, equipment
  – Ward layout, isolation rooms

• Tactical
  – Temporary bed capacity change for seasonality
  – Admission control: static bed reservation, dynamic bed reservation, off-servicing rules from one ward to another
  – Hospitalist scheduling
  – Nursing scheduling

• Off-line Operational
  – Elective admission booking
  – Nursing staffing

• On-line Operational
  – Emergency admission handling
  – Elective admission re-booking
  – Staffing changes
  – Nurse-to-Patient assignment
  – Bed allocation to Patient
  – Transfer scheduling
  – Discharge Planning; Discharge roll-out
  – Real-Time Demand Capacity
  – Surge protocol
COM Models driven by Clinicians

Value-Based Hospital

COM Models

Clinicians

COMP Tools

People

Process

Information

Hospital Transformation Based on Operations Management

Volume-Based Hospital

Nursing, Physicians, Admin
At this stage, COM Models can be used for...

- Documenting the processes, the organization, and the information model, at the business level
- Ensuring that all business functions have been covered systematically, thoroughly, and are integrated
- Communicating the “Future” map, across the hospital

But, the COM Models can also be refined and transformed further by Health Informatics Analysts ...
COM Models refined and transformed by Analysts

Value-Based Hospital

Volume-Based Hospital

Hospital Transformation Based on Operations Management

People

Process

Information

Nursing
Physicians
Admin

Clinicians

Analysts

COM Models

COMP Tools
Mapping from COM Models to SOAML Participants
SOA Services between SOAML Participants
Model Weaving
Generation of a Clinical Operations Support System (COSS)

COSS is technology enabler for COM

Clinicians

COMP Tools

Analysts

IT team

COM Models

COSBench

Value-Based Hospital

Hospital Transformation Based on Operations Management

Volume-Based Hospital

uOttawa

uOttawa
COSS Positioning

- EHR/EMR
- Clinical Information Systems
- CDSS

- Admin/Mgt Information Systems

Clinical Operations Support Systems

uOttawa
COSS Architecture

Hospital Map

Demand Mgt DSS
Capacity Mgt DSS
Real-Time Demand Capacity Mgt
Unified Communications
Infection Control
QoC, Risk, Safety Mgt
Adverse Event Mgt
Process Repository

Full-Capacity Protocol DSS
Master Schedule
Operational Business Intelligence DSS
Service Mgt
Unit Mgt
Ancillary Service Mgt
Patient Cohort Mgt

Hospital Map

Infection Control
Case Costing
Staffing Mgt
Inventory Mgt
Real-Time Patient Flow Mgt DSS

Hospital Map

Real-Time Patient Flow Mgt DSS

Hospital Map

Process Mgt
Process Engine
Event Mgt
Event Engine

Clinical Operations Object Model (COOM)

HL7 Adapters to EMR
Real-Time Location System
Data Collection Adapters

Clinical Operations Object Model (COOM)

HL7 Adapters to EMR
Real-Time Location System
Data Collection Adapters

Clinical Operations Object Model (COOM)

HL7 Adapters to EMR
Real-Time Location System
Data Collection Adapters
Vision of Clinical Operations Management Center

- Example of Thomas Jefferson Hospital in Philadelphia
- Patient Flow Management Center equipped with Patient Flow Management System (supporting redesigned care processes and re-organization of Patient Flow Transformation)
- Real-time Clinical Operations Management
Idea for a THTex
Hospital Transformation EcoSystem

• Hospitals, willing to participate in pilot projects
  • Creation or Reorganization of hospital units into Service Lines or Centers of Clinical Excellence
• Universities, willing to do research and teaching in COM
  • Teaching of COM to Business, Medicine, Health Sciences students
  • Research in Advanced COM
• Non-Profit StartUps, willing to develop Open Source software
  • New business model for StartUps, for which there is a critical need in universal, public healthcare systems
• Provincial, Federal agencies, willing to fund Ecosystem
  • Crowd-funding
  • Ontario Chief Health Innovation Office, OCE, Champlain LHIN
  • CIHR, DND
  • US AHRQ, NIH
Key Success Factors for Ecosystem

• Physician Engagement
  • “Unless Physicians see ourselves as part of the system, we will always wait for someone else to fix it”. UofT Faculty of Medicine magazine: http://uoftmedmagazine.utoronto.ca/2017/winter/
• Agile approach to bring innovations to patient bedside
  • Pragmatic Clinical Trial
  • Intrapreneuring
• …
Recap...

- Hospital Transformation is primarily a Clinical Transformation
- One way to achieve it is with Clinical Operations Management (People, Information, Process)
- Clinical Operations Management can be based on COM Models
- COM Models could be driven by Clinicians (with support from Health Informatics Analysts)
- COM Models lead to the generation of a Clinical Operations Support System, customized for the specific needs of the hospital in terms of processes, organization, and information
- COSS supports a real-time integrated management of the hospital operations. COSS complements and communicates with the hospital Electronic Health Record system; it does not replace it.
- An Ecosystem could be the incubator for such Hospital Transformation
Thank you!
Email: AlainMouttham@Montfort.on.ca

Now Q&A and Panel