Improving the Quality and Efficiency of Inpatient Care

The Role for Hospitalists in Quality Improvement

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Statement of Disclosure

- Disclosure of Relevant Financial Relationships:

  The presenters have no financial or commercial conflicts of interests or relationships to disclose.
Presentation Outline

- Conceptual framework for understanding and evaluating performance in acute care settings
- Celebrate the growth and impact of hospitalist physicians in Ontario
- Using performance findings to drive quality improvement initiatives
- Panel Discussion - Comments/Questions
Learning Objectives

1) Describe a framework and key factors to consider when assessing quality and impact of hospital-based care/interventions

2) Synthesize the prevalence, growth and current performance of hospital-based physicians in Ontario

3) Identify opportunities for improvement in your clinical practice
Systematic Review

65 comparative evaluations of hospitalist performance

- **Hospitalists are efficient**
  - 69% reduction in average lengths of stay
  - 70% reduction in total hospital costs

- **No difference in clinical outcomes/patient satisfaction**

- **Need better models accounting for rare outcomes, confounding, patient severity**

Organizational structures of health care settings interact with the processes of care delivery to influence clinical and organizational outcomes.

**Structures**
- Professional, institutional and organizational resources associated with care provision

**Processes**
- Things done to and for the patient by providers during the health care encounter

**Outcomes**
- End states resulting from care
Conceptual Model - Understanding and Evaluating Quality in Acute Care Settings

- **Structures of Care**
  - Clinical Practice Structure
    - Clinical skill mix
    - Inpatient volume
    - Team size
    - Nursing staff and skill mix
    - Additional care providers
    - Discharge planner
    - Staffing/call model
    - Compensation model
    - Opportunities for continuing education
    - Physician support, reward and retention strategies
  - Institutional Characteristics
    - Hospital type/size/location
    - Administrative support
    - Technological resources
    - Organizational culture

- **Processes of Care**
  - Clinical Processes
    - Range of services offered
    - Frequency and timing of diagnostic tests, treatments and procedures
    - Use of evidence-based practice guidelines
    - Use of specialty care units
    - Facility transfers
    - Teaching/clinical responsibilities
    - Continuity-of-care
    - Information transfer
    - Utilization of electronic health records, safety protocols and audit mechanisms
  - Interpersonal Processes
    - Subspecialty consultations
    - Frequency of patient/family/outpatient physician contact
    - Knowledge and use of institution and community services/resources
    - Quality improvement teams
    - Physician audit and feedback

- **Outcomes of Care**
  - Operating Efficiency
    - Length of stay
    - Operating costs
    - Patient throughput
  - Clinical Outcomes of Treatment
    - Mortality
    - Failure to rescue
    - Adverse events/complications
    - Readmissions/return to ED
    - Clinical and functional status
    - Pain/anxiety
    - Discharge disposition
    - Outpatient MD follow-up
    - Patient/family satisfaction
    - Self-reported health status
    - Quality of life

- **Physician Characteristics**
  - Age, sex, years in practice
  - Medical specialization
  - Location of training

- **Patient Need & Demographics**
  - Age, sex, marital status, ethnicity
  - Insurance status
  - Income/education attainment
  - Geography of residence
  - Primary/secondary diagnoses
  - Medical comorbidities/case-mix
  - Lifestyle-related characteristics
  - Access to a primary care physician
Do Hospitalist Models Add Value to the Canadian Health Care System?

- Despite 15 years of practice, little evidence on prevalence, growth, safety or value of Canadian hospitalists.
- Do findings from the USA ‘fit’ in Canadian Health Care?
- What’s driving performance?
  - Volume
  - Clinical Experience
  - Medical Training
  - Core Competencies
- Which structural care models optimize patient outcomes?
1) Describe the prevalence and growth of hospital-based physicians working in Ontario over time

- Can we identify hospitalists using administrative data, based on patterns of inpatient services billed to OHIP?

2) Examine impact of physicians practicing general hospital medicine on select patient outcomes

- Does higher physician volume predict improved patient outcomes?
Growth and Prevalence of Ontario Hospitalists

- All active physicians in Ontario between 1996-2011, submitting fees to OHIP

- Physician demographics for each year:
  - Age
  - Sex
  - Years in Practice
  - Functional Specialty
  - City size of Practice
  - Primary Hospital Type
  - Primary Hospital Size
  - Urban/Rural Geography

- Physicians linked to their yearly OHIP service billings
Physician’s Annual Inpatient Volume

- Annual volume of patient evaluation-and-management (E&M) claims billed to OHIP by location of service delivery

  “A clinical visit, consultation, assessment, reassessment, death pronouncement, case conference, counseling, or psychotherapy session”

- Three measures of annual inpatient volume/physician*:
  - # E&M claims billed for hospital care
  - % of total OHIP claims generated from inpatient E&M
  - # calendar days worked in hospital

*Excludes procedural volume, including obstetrical delivery*
Statistical Modeling

- Descriptive characteristics of physicians by year
- Autoregressive [AR(1)] temporal models*

*Physician's inpatient volume in one year is related to the volume they practiced the previous year

Inpatient Volumes: Family Physicians

Annual Inpatient Volume

* Indicates a significant increase over time
+ indicates a significant decrease over time
Inpatient Volumes: Internists

Annual Inpatient Volume

* Indicates a significant increase over time
+ indicates a significant decrease over time
Inpatient Volumes: Specialists

Annual Inpatient Volume

* Indicates a significant increase over time
+ indicates a significant decrease over time
High-volume generalists are increasingly present, and deliver a large volume of inpatient care for Ontario.
Inpatient Practice Types: Family Medicine

- Community-Based
- Mixed-Practice
- Full and Part-Time Hospitalists
- False Positives
Assess the system-level relationship between annual inpatient volume and clinical outcomes of care in select cohorts of hospitalized patients managed by family physicians and general internists working in Ontario.
Research Question

- Do patients managed by generalists (family physicians and general internists) with higher inpatient volumes have improved outcomes?
  - Lower Mortality?
  - Fewer Readmissions?
  - Shorter Lengths of Stay?
Study Population

- **Ontario residents aged 18+ hospitalized:**
  - April 1, 2009 to March 31, 2011
  - Main Diagnosis of:
    - Congestive Heart Failure
    - COPD
    - Pneumonia
    - Delirium
  - Incident Admission (1 year look-back)
  - Managed by a family physician or general internist
- Excluded hospitals with < 10 medical beds

55,484 patients, managed by 3,546 generalists, in 151 hospitals
Measures

Exposure

- Physician’s annual inpatient volume in fiscal year of admission

Outcomes

- Mortality within 30-days of admission
- Mortality OR readmission within 30-days of admission
- Acute Length of Stay
Covariates

**Patient-Level**
- Age
- Sex
- Income Quintile
- Disease Cohort
- Baseline Severity Score
- Disease-specific Comorbidities
- Charlson Comorbidities
- Year of Admission

**Physician-Level**
- Age
- Sex
- Medical Specialty
- Years in Practice

**Hospital Level**
- Size (Medical Beds)
- Teaching Status
- Urban/Rural Geography
- Annual Case Volume
Methods

- Patients assigned to MRP based on most claims billed
- Baseline severity estimated for each patient
- 3-level hierarchical models adjusting for patient, physician and hospital characteristics
- Each disease cohort analyzed separately, by outcome
- Results pooled across cohorts to estimate overall effect
Baseline Patient Severity

Predicted 30-day Mortality %

Cohort
- CHF
- PNEU
- COPD
- DELIR

Annual Volume of Managing Generalist

Low Volume  |  Mid Volume  |  High Volume

0  |  2  |  4

0  |  6  |  8

10  |  12  |  14

16  |
Results: Mortality and Readmissions

- Prevalence of hypertension based on self-report
- Urban neighbourhoods
- Cross-sectional

Outcomes
- Red: Mortality or Readmission within 30 Days
- Blue: Mortality within 30 Days
Results: Acute Length of Stay
In Summary

- Concentrating inpatient care among high-volume generalists lowers mortality and decreases readmissions for hospitalized Ontarians at a trade off to length of stay.

- Outcomes worst when managed by physicians with low hospital volume.

- Results not driven by patient severity, differences in medical training, or confounding by hospital volume/geography.

- Lots of mathematic techniques we can use to adjust for differences in populations and differences in practice.
How Do We Engage Hospital Physicians in Quality Improvement?
How does your “Mess” Fit in the Conceptual Model?

Inpatient Care Model

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Defining Health Quality

- The degree to which health care services provided to individuals and populations increase the likelihood of desired health outcomes
  (World Health Organization)

- The right person providing the right care, at the right time, in the right place
  (Ontario Health Quality Council)

Safe  Effective  Patient-Centered
Timely  Efficient  Equitable

6 attributes of a high-performing health care system
(Health Quality Ontario)
What is Quality Improvement?

“the combined and unceasing efforts of everyone --- to make the changes that will lead to better patient outcomes (health), better system performance (care) and better professional development (learning)”

Adapted from Batalden and Davidoff, 2007
# Measurement for QI is Different

<table>
<thead>
<tr>
<th></th>
<th>Measurement for Quality and Process Improvement</th>
<th>Measurement for Research</th>
<th>Measurement for Accountability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>To bring new knowledge into daily practice</td>
<td>To discover or report new knowledge</td>
<td>To compare, choose, or spur system-level change</td>
</tr>
<tr>
<td><strong>Tests</strong></td>
<td>Many small, sequential, observable, short tests of change</td>
<td>One large test</td>
<td>No tests – live performance</td>
</tr>
<tr>
<td><strong>Biases</strong></td>
<td>Stabilize biases from test to test (accept and work within consistent biases)</td>
<td>Control for as many biases as possible (in the design or methods)</td>
<td>Measure and adjust to reduce biases.</td>
</tr>
<tr>
<td><strong>Data</strong></td>
<td>Gather ‘just enough’ data to learn and test the next step (sequential samples)</td>
<td>Gather as much data as possible on a defined group of interest</td>
<td>Obtain 100% of available, relevant data</td>
</tr>
<tr>
<td><strong>Determining if change is an improvement</strong></td>
<td>Run Charts, Control Charts</td>
<td>Hypothesis tests (t-tests, chi-squared, p-values)</td>
<td>Results compared against a target, average, baseline</td>
</tr>
</tbody>
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Quality Improvement Is Not

- Quality Assurance (fixing all errors)
- Quality Control (eliminating all problems)
- Research (controlled)

Perfect!

Quality improvement is aiming for GOOD ENOUGH
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Conceptual Framework for Evaluating Hospital-Based Interventions and Impact

# Quality Improvement Training Opportunities, Resources and Organizations

*Please note: this list is not exhaustive. Information is current as of September 2017.*

<table>
<thead>
<tr>
<th>Geography</th>
<th>Name of Program</th>
<th>Web Link</th>
<th>Description (as taken from each Program’s Website)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>IDEAS (Improving and Driving Excellence Across Sectors)</td>
<td><a href="https://www.idealiseontario.ca/">https://www.idealiseontario.ca/</a></td>
<td>IDEAs is a comprehensive, evidence based quality improvement training program for Ontario's health professionals. Participants become versed in a common language and approach to quality improvement with the explicit aim to improve patient care, experience and outcomes.</td>
</tr>
<tr>
<td><strong>Central Canada</strong></td>
<td>Health Quality Ontario</td>
<td><a href="http://www.hqontario.ca/Quality-Improvement">http://www.hqontario.ca/Quality-Improvement</a></td>
<td>We host and support a variety of conferences and events on health quality topics that address the challenges facing health care.</td>
</tr>
<tr>
<td></td>
<td>Quality Rounds Ontario</td>
<td><a href="http://www.hqontario.ca/Quality-Improvement/E-Learning-and-Events/quality-rounds-ontario">http://www.hqontario.ca/Quality-Improvement/E-Learning-and-Events/quality-rounds-ontario</a></td>
<td>Quality Rounds Ontario are monthly Health Quality Ontario educational sessions that offer participants from across the province opportunities for knowledge exchange and idea sharing on topics relevant to anyone interested in improving the quality of health care.</td>
</tr>
<tr>
<td><strong>Western Canada</strong></td>
<td>BC Quality Academy</td>
<td><a href="https://bcpsqc.ca/learning/quality-academy/aim-and-curriculum/">https://bcpsqc.ca/learning/quality-academy/aim-and-curriculum/</a></td>
<td>The aim of the Quality Academy is to provide participants with the capability to effectively lead quality and safety initiatives, including teaching and advising others in the process of improving health care quality.</td>
</tr>
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<td>Canada-Wide</td>
<td>Canadian Patient Safety Officer Course</td>
<td><a href="http://www.patientsafetyinstitute.ca/en/education/psoc/Pages/default.aspx">http://www.patientsafetyinstitute.ca/en/education/psoc/Pages/default.aspx</a></td>
<td>This four-day course designed for healthcare professionals and leaders responsible for patient safety programs in their organizations, offers information, tools, and techniques to advance leading patient safety practices and build a strong patient safety culture in your organization.</td>
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<td>Patient Safety Education Program</td>
<td><a href="http://www.patientsafetyinstitute.ca/en/education/PatientSafetyEducationProgram/Pages/default.aspx">http://www.patientsafetyinstitute.ca/en/education/PatientSafetyEducationProgram/Pages/default.aspx</a></td>
<td>Built on a train-the-trainer model, PSEP-Canada is one response to the challenges that remain in integrating fundamental patient safety practices into the routine delivery of healthcare.</td>
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<td></td>
<td>LEAN Healthcare Certification</td>
<td><a href="https://www.chalearning.ca/programs-and-courses/lean-healthcare-belts/">https://www.chalearning.ca/programs-and-courses/lean-healthcare-belts/</a></td>
<td>Participants of this program will be able to lead Lean projects, facilitate a team, and mentor colleagues to sustainable improvements.</td>
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<tr>
<td>United States of America</td>
<td>National Association for Healthcare Quality</td>
<td><a href="http://nahq.org/">http://nahq.org/</a></td>
<td>National Association for Healthcare Quality (NAHQ) is the only organization dedicated to healthcare quality professionals, defining the standard of excellence for the profession, and equipping professionals and organizations across the continuum of healthcare to meet these standards.</td>
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<td></td>
<td>Agency for Health Care Research and Quality</td>
<td><a href="https://www.ahrq.gov/">https://www.ahrq.gov/</a></td>
<td>Provides a list of resources and certifications related to Quality and Patient Safety</td>
</tr>
<tr>
<td>Worldwide</td>
<td>Institute for Health Care Improvement (IHI) Open School</td>
<td><a href="http://www.ihi.org/education/ihiopenschool/Pages/default.aspx">http://www.ihi.org/education/ihiopenschool/Pages/default.aspx</a></td>
<td>The Open School offers more than 30 online courses in quality, safety, leadership, the Triple Aim, and patient-centered care. Through narrative, video, and interactive discussion, the courses create a dynamic learning environment to inspire health professionals of all levels.</td>
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