Can report cards improve cardiovascular care? Lessons from Ontario

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Objectives

1) To discuss our experiences in developing public report cards for improving cardiac care in Ontario, Canada (cardiac surgery, heart attack and heart failure care).

2) To discuss where we have had an impact and lessons we have learned that may assist future report card initiatives.
Health care report cards

• Designed to evaluate performance of the health care system

• May be at a national, provincial, regional, institution or provider level

• Report on quality or performance indicators

• Cardiac diseases have been at the forefront of this issue
  – Common diseases
  – Measurable outcomes (death), available data
  – Funding issues
  – Public/media interest
Donabedian quality of care framework

- **Structure**: the attributes of settings where care is delivered
- **Process**: whether or not good medical/healthcare practices are followed
- **Outcome**: impact of the care on health status

http://www.ahrq.gov/research/findings/final-reports/medteam/figure2.html
CABG surgery report cards in Ontario

- Modeled after New York State’s Cardiac Surgery Reporting System (first US cardiac report card)
- Produced by ICES in collaboration with CCN (Cardiac Care Network of Ontario) biannually since 1993
  - Utilize CCN clinical database linked to ICES administrative database
  - Risk-adjustment methods extensively tested and published in the medical literature
- Results shared with hospital CEOs, Chiefs of Cardiac surgery and surgeons at each institution
- Hospital results first publicly released in 1999
Risk-adjusted 30-day CABG mortality rates by cardiac surgeon in Ontario
Risk adjustment (to take into account case-mix differences)

- Observed rate = \( \frac{\text{Count of discharges of interest}}{\text{Count of discharges in the population at risk}} \)

- Expected rate = \( \frac{\text{Sum of the predicted rate for each discharge}}{\text{Count of discharges in the population at risk}} \)

- Use logistic regression to calculate the predicted rate

- Risk-adjusted mortality rate = \( \frac{(\text{Observed Rate} / \text{Expected Rate}) \times \text{Reference population average rate}}{\text{Reference population average rate}} \)
Impact of more risk factors included in a Risk – Adjustment Model

Tu JV et al. JACC; 30:1317, 1997

Variables added in this order:
1. Age 65-74, >75
2. Female gender
3. Emergency surgery
4. Previous CABG
5. Grade 3 & 4 LVF
6. Left main disease
7. Recent MI
8. CCS Class 4 angina
9. PVD
10. CVD
11. Diabetes
12. COPD
Examples of responses from hospitals/surgeons

- High-outlier surgeons lost surgical privileges/retired
- Triaging of high-risk cases to more experienced surgeons
- Systematic efforts to improve risk factor coding
- Mandatory audits of all surgical deaths
- A 2003 survey of Ontario cardiac surgeons revealed
  - 50% opposed public release of hospital-specific data
  - 80% opposed release of surgeon-specific data
  - Most agreed outcomes report cards were an important indicator of quality of care
  - Concerned about
    a) being labelled an outlier
    b) ‘upcoding’ of data at other institutions

Guru V et al. CJC 2009
Correlation between risk-adjusted hospital mortality rates and proportion of preventable deaths after CABG surgery

*Spearman Correlation Coefficient: -0.42 (p-value=0.26)

Preventable Death Proportion

Risk-adjusted mortality*

*Risk-adjusted all cause mortality rate is calculated using the observed all cause mortality divided by the predicted mortality rate for a particular hospital multiplied by the average crude provincial mortality rate for isolated CABG surgery.

Lessons learned

- CABG report cards have been an effective tool for quality assurance in Ontario
- Risk-adjustment requires a few key variables
- No evidence of systematic ‘up-coding’ or ‘skimming’ i.e., avoidance of high-risk patients
- Collaboration between clinical researchers and surgeons has helped ‘buy-in’
- Approximately 1/3 of deaths may have been potentially ‘preventable’
- Reporting has since expanded to include other types of cardiac procedures (e.g. aortic valve surgery, PCI/angioplasty)
Effectiveness of Public Report Cards for Improving the Quality of Cardiac Care
The EFFECT Study: A Randomized Trial

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Julie T. Wang, MSc
Peter C. Austin, PhD
David A. Alter, MD, PhD
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Public release of hospital performance data is increasingly being mandated by policy makers with the goal of improving the quality of care.1,2 Advocates of report cards believe that publicly releasing performance data on hospitals will stimulate hospitals and clinicians to engage in quality improvement activities and increase the accountability and transparency of the health care system.3-5 Critics argue that publicly released report cards may contain data that are misleading or inaccurate and may unfairly harm the reputations of hospitals and clinicians.6-8 They also are concerned that report card initiatives may divert resources away from other important needs. Although there has been considerable debate, few empirical data exist to determine whether publicly released report cards on hospital performance improve the overall quality of care provided.

While several uncontrolled studies have suggested that certain report card initiatives have had a beneficial effect, no large randomized trials, to our knowledge, have been conducted to evaluate the effectiveness of public report cards on hospital performance. To evaluate whether the public release of data on cardiac quality indicators effectively stimulates hospitals to undertake quality improvement activities that improve health care processes and patient outcomes, a population-based cluster randomized trial (Enhanced Feedback for Effective Cardiac Treatment [EFFECT]) of 86 hospital corporations in Ontario, Canada, with patients admitted for acute myocardial infarction (AMI) or congestive heart failure (CHF)

Intervention Participating hospital corporations were randomized to early (January 2004) or delayed (September 2005) feedback of a public report card on their baseline performance (between April 1999 and March 2001) on a set of 12 process-of-care indicators for AMI and CHF. Follow-up performance data (between April 2004 and March 2005) also were collected.

Main Outcome Measures The primary outcomes were composite AMI and CHF indicators based on 12 AMI and 6 CHF process-of-care indicators. Secondary outcomes were the individual process-of-care indicators, a hospital report card impact survey, and all-cause AMI and CHF mortality.

Results The publication of the early feedback hospital report card did not result in a significant systemwide improvement in the early feedback group in either the composite AMI process-of-care indicator (absolute change, 1.5%; 95% confidence interval [CI], −2.2% to 5.1%; P = .43) or the composite CHF process-of-care indicator (absolute change, 0.6%; 95% CI, −4.5% to 5.7%; P = .81). During the follow-up period, the mean 30-day AMI mortality rates were 2.5% lower (95% CI, 0.1% to 4.9%; P = .045) in the early feedback group compared with the delayed feedback group. The hospital mortality rates for CHF were not significantly different.

Conclusion Public release of hospital-specific quality indicators did not significantly improve composite process-of-care indicators for AMI or CHF.

Tu JV, et al. JAMA 2009; 302 (21)
Can public report cards improve quality of care?

Pros
- Stimulate quality improvement (QI) activities by hospitals and clinicians
- Enhance transparency and accountability

Cons
- Concerns about data quality and ‘risk-adjustment’
- Impact on hospital’s reputation
- No clinical trials demonstrating effectiveness

http://www.ccort.ca/EFFECTStudy.aspx
Enhanced Feedback for Effective Cardiac Treatment (EFFECT) study

• Hypothesis – Public release of hospital report cards would improve the quality of cardiac care provided
  – Heart attack (AMI), heart failure (CHF)

• Design – Cluster randomized trial of 86 hospital corporations in Ontario, Canada

• Intervention
  – Hospitals randomized to Early (Jan 2004) or Delayed (Sept 2005) feedback of a public report card on baseline performance (April 1999 to March 2001) on national AMI / CHF process-of-care quality indicators
  – Estimated audience: > 12 million Canadians exposed to the early feedback results via the media
  – Follow up data (April 2004 to March 2005) collected to assess for changes in quality indicators and outcomes

http://www.ccort.ca/EFFECTStudy.aspx
Main outcome measures

- Co-primary outcome measures
  1) Composite AMI indicator – all 12 AMI process-of-care quality indicators
  2) Composite CHF indicator – all 6 CHF process-of-care quality indicators

- Secondary outcome measures
  1) Individual process-of-care quality indicators
  2) Hospital report card impact survey
  3) AMI and CHF all-cause mortality rates

- Statistical power
  - The study had 84% power to detect a 5% absolute difference in the composite quality indicators between the two study arms

AMI = heart attack
CHF = heart failure

http://www.ccort.ca/EFFECTStudy.aspx
130 Hospital Corporations Assessed for Eligibility

- 86 Hospital Corporations Randomized
  - Baseline—44 Hospital corporations randomized to early feedback report card (April, 1999 - March, 2001)
    - Early feedback report card January 2004
    - Hospital Report Card Impact Survey June 2004
  - Follow up—2 Hospital corporations unable to participate in follow up (April, 2004 – March, 2005)
  - Analysis—42 Hospital corporations 2 Hospital corporations excluded

- 44 Hospital Corporations Excluded (42 low volume, 2 no longer acute care)

- Baseline—42 Hospital corporations randomized to delayed feedback report card (April, 1999 - March, 2001)
  - 1 Hospital corporation withdrew
  - Hospital Report Card Impact Survey June 2004
  - Delayed feedback report card September 2005
  - Follow up—2 Hospital corporations unable to participate in follow up (April, 2004 – March, 2005)
  - Analysis—39 Hospital corporations 2 Hospital corporations excluded
### Hospital report card impact survey

<table>
<thead>
<tr>
<th>Question</th>
<th>Early Feedback Hospitals</th>
<th>Delayed Feedback Hospitals</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q. Who at your hospital read / discussed the Early Feedback report card?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chief of Medicine/Cardiology</td>
<td>34 (82.9%)</td>
<td>18 (60.0%)</td>
<td>0.031</td>
</tr>
<tr>
<td>Other Medical Staff</td>
<td>33 (80.5%)</td>
<td>15 (50.0%)</td>
<td>0.007</td>
</tr>
<tr>
<td>Q. Made changes to <strong>AMI</strong> care in response to the Early Feedback report card?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>30 (73.2%)</td>
<td>14 (46.7%)</td>
<td>0.003</td>
</tr>
<tr>
<td>Q. Made changes to <strong>CHF</strong> care in response to the Early Feedback report card?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>25 (61.0%)</td>
<td>15 (50.0%)</td>
<td>0.038</td>
</tr>
</tbody>
</table>

AMI = heart attack  
CHF = heart failure
### Hospital report card impact survey (cont’d)

<table>
<thead>
<tr>
<th>Question</th>
<th>Early Feedback Hospitals</th>
<th>Delayed Feedback Hospitals</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>41/44 surveys (93.2%)</td>
<td></td>
<td>30/41 surveys (73.2%)</td>
<td></td>
</tr>
<tr>
<td><strong>Q. Changes made to AMI care in response to the Early Feedback report card</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduced new / revised standard adm orders/care paths</td>
<td>22 (53.7%)</td>
<td>13 (43.3%)</td>
<td>0.39</td>
</tr>
<tr>
<td>Conducted an initiative to improve Door-to-Needle times</td>
<td>16 (39.0%)</td>
<td>5 (16.7%)</td>
<td>0.042</td>
</tr>
<tr>
<td>Changed policies to enable ED physicians to decide re: lytics</td>
<td>10 (24.4%)</td>
<td>2 (6.7%)</td>
<td>0.049</td>
</tr>
<tr>
<td><strong>Q. Changes made to CHF care in response to the Early Feedback report card</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduced new / revised standard adm orders/care paths</td>
<td>18 (43.9%)</td>
<td>9 (30.0%)</td>
<td>0.23</td>
</tr>
<tr>
<td>Initiated a CHF clinic</td>
<td>5 (12.2%)</td>
<td>4 (13.3%)</td>
<td>0.88</td>
</tr>
</tbody>
</table>

AMI = heart attack     CHF = heart failure
### EFFECT Study

Mean change in hospital-specific mortality rates after publication of report cards for Early Feedback arm

<table>
<thead>
<tr>
<th>All-Cause Mortality</th>
<th>Early Feedback Hospitals (N=42)</th>
<th>Delayed Feedback Hospitals (N=39)</th>
<th>Absolute Difference* Early vs Delayed % (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Follow up</td>
<td>Baseline</td>
<td>Follow up</td>
</tr>
<tr>
<td><strong>AMI patients</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 day</td>
<td>11.7%</td>
<td>9.8%</td>
<td>12.2%</td>
<td>12.2%</td>
</tr>
<tr>
<td>1 year</td>
<td>19.2%</td>
<td>19.4%</td>
<td>20.2%</td>
<td>22.5%</td>
</tr>
<tr>
<td><strong>CHF patients</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 day</td>
<td>11.3%</td>
<td>9.6%</td>
<td>10.4%</td>
<td>10.6%</td>
</tr>
<tr>
<td>1 year</td>
<td>32.6%</td>
<td>30.3%</td>
<td>33.2%</td>
<td>32.9%</td>
</tr>
</tbody>
</table>

**AMI** = heart attack  **CHF** = heart failure

*Absolute difference represents the mean relative improvement in each mortality indicator in the early feedback hospitals as compared with the delayed feedback hospitals in the follow up patient cohort after adjusting for performance in the baseline patient cohort and type of hospital. Negative values indicate better performance in the early feedback hospitals.
Lessons learned from EFFECT

• Report cards based on clinical data are more credible and useful to hospitals
• Public report cards are more likely to stimulate QI activities than confidential reporting
• “Hawthorne Effect” with public reporting
• High level of heterogeneity in terms of how hospitals/physicians respond to data
• Should try to reduce number of indicators to a few key indicators
• Possible to rigorously evaluate effectiveness of report cards
Conclusions

• Cardiac report cards in Ontario have been an effective instrument for stimulating a variety of quality improvement initiatives aimed at improving the quality of cardiac care.

• Report cards that include clinical data and process of care indicators are important complements to those derived solely from outcome indicators and administrative data.

• Clinical/stakeholder involvement is important in developing effective report cards.

• Need to develop mechanisms for efficient and timely clinical data collection.

• Need to develop better capacity (e.g. QI teams) in the health care system to act on report card information.
Acknowledgments

• Our thanks to
  – The Canadian Institutes of Health Research, the Heart and Stroke Foundation of Ontario, and the Ontario MOHLTC for financially supporting this work
  – All the hospitals, clinicians, and administrators across Ontario/Canada who have participated in these report card initiatives