THE IMPACT OF QUALITY ON THE FINANCIAL PERFORMANCE OF ACUTE CARE HOSPITALS

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Can quality be used as a strategy to improve a hospital’s bottom line?
CURRENT STATE OF HEALTHCARE

- Non-profit status
- Escalating costs
- Transition from retrospective to prospective payment system
  - DRGs

- Financial Performance
  - Decreasing operating margins
  - Declining reimbursements

- Quality
  - Variation in care
  - Slow adoption of quality measures
  - Process measures versus outcomes
NEW JERSEY

- Hospital closures
  - 27 hospitals closed or changed to long term care between 1987 to 2009

- Financial situation
  - Average operating margins below national averages
    - New Jersey 1.6% operating margin
    - National average 3.7%
  - 40% of the hospitals operating with a financial deficit (2005)
NEW JERSEY

- Quality measures
  - Below national averages
    - AMI, CHF, PNU below national average in both 2004 and 2005
  - Variations in use of evidence based medicine
    - More likely to receive high cost intervention with marginal benefit that evidence based care
New Jersey Hospitals
  - N=72
  - Acute Care facilities

Administrative data set
  - New Jersey Cost Report
  - Medicare Cost Report
  - New Jersey Hospital Operational Performance
VARIABLES

- **Dependent**
  - Patient Care Operating Margins (PCO)
  - Net Patient Revenues (NPR)

- **Independent**
  - Acute Myocardial Infarction (AMI)
  - Pneumonia (PNU)
  - Congestive Heart Failure (CHF)
  - Surgical Care Improvement Project (SCIP)
  - Nurse Staffing Levels (HPPD)
## VARIABLES

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definition</th>
<th>Source</th>
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<tr>
<td><strong>Profitability</strong></td>
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<tr>
<td>Patient Care Operating Margins (PCO)</td>
<td>Operating revenues from patient care activities (NPR) – Operating expenses from patient care activities/ NPR</td>
<td>New Jersey Cost Report</td>
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<tr>
<td>Net Patient Care Revenues (NPR)</td>
<td>Revenues recognized from patient care activities</td>
<td>New Jersey Cost Report</td>
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<td><strong>Quality</strong></td>
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<tr>
<td>AMI Composite score (AMI)</td>
<td>Score reported to CMS for care and treatment of patients with AMI. Implemented in 2003</td>
<td>New Jersey Hospital Quality Report</td>
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<tr>
<td>Pneumonia Composite Score (PNU)</td>
<td>Score reported to CMS for care and treatment of patients with PNU. Implemented in 2003</td>
<td>New Jersey Hospital Quality Report</td>
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<tr>
<td>CHF Composite Score (CHF)</td>
<td>Score reported to CMS for care and treatment of patients with CHF. Implemented in 2005</td>
<td>New Jersey Hospital Quality Report</td>
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<tr>
<td>SCIP Composite Score (SCIP)</td>
<td>Score reported to CMS for care and treatment of patients undergoing surgery. Implemented in 2007.</td>
<td>New Jersey Hospital Quality Report</td>
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<tr>
<td>Nursing Staffing Levels (HPPD)</td>
<td>The number of hours a Registered Nurse provides care to a patient</td>
<td>New Jersey Cost Report</td>
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<tr>
<td></td>
<td>(Annual RN hours worked)</td>
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<tr>
<td></td>
<td>Number of admissions</td>
<td></td>
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<tr>
<td>Hospital Characteristics</td>
<td>Description</td>
<td>Report</td>
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<tr>
<td>Length of Stay (LOS)</td>
<td>The average number of days a patient stays in the hospital</td>
<td>New Jersey Cost Report</td>
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<tr>
<td></td>
<td>(annual patient days number of admissions)</td>
<td></td>
</tr>
<tr>
<td>Teaching Status (Tstat)</td>
<td>At least one resident is present in the facility engaged in education</td>
<td>Medicare Cost Report</td>
</tr>
<tr>
<td>MCadmit</td>
<td>An average percentage for Medicare and Medicaid. (Sum of Medicare and Medicaid (patients/total admissions)</td>
<td>New Jersey Cost Report</td>
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<tr>
<td>Size (Staffbed)</td>
<td>Number of staffed beds</td>
<td>New Jersey Cost Report</td>
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ANALYTICAL APPROACH

- Longitudinal Study
  - 2003 to 2009
  - Changes in outcomes over time

- Administrative data set

- Mixed Linear Modeling (MLM)

- Generalized Estimating Equations (GEE)
FINDINGS

MLM - PCO

- **2006 – 2009**
  - Significant main effect for **SCIP** \( F_{1, 87} = 8.08, p<0.01 \) in predicting **PCO**
  - Higher **SCIP** scores were associated with increased **PCO**

- **2003 – 2009**
  - **CHF** and **SCIP** were excluded
  - a significant main effect was found for **AMI**, \( F_{1, 216} = 12.20, p<0.01 \)
FINDINGS

- GEE - PCO
- 2006-2009
  - significant main effect for SCIP ($\chi^2 = 8.53, p<0.01$)

- 2003-2009
  - significant main effects was found for AMI, $\chi^2 = 9.13, p<0.01$
DISCUSSION

- Higher quality scores was associated with higher PCO

- Quality had a positive relationship with PCO
  - In particular higher AMI scores is associated with higher PCO while the reverse is true – lower AMI is associated with lower PCO
  - This is repeated when SCIP is added to the equation – higher SCIP higher PCO
DISCUSSION

- **HPPD**
  - Showed no relationship to PCO or NPR
  - No erosion of PCO with higher staffing levels
LIMITATIONS

- Administrative data set
  - Measurement errors
  - Quality of the data
  - Missing information
  - Variations in the data
- Quality measures
  - Process versus outcomes
  - Technical aspect
  - Data not risk adjusted
LIMITATIONS

- HPPD variations
  - Hospital variations – effect of critical care versus general beds
- Financial complexity may make revenues an unreliable measure
- Generalizability of the study
IMPLICATIONS

- Improvements in quality associated with improvement in PCO
- Financially distressed hospitals should focus on AMI and SCIP
- Avoid decreasing nurse staffing levels to improve PCO
- Use of evidence based medicine will decrease utilization
Implications for health policy
  - Value based purchasing
    - Improvements in quality affect PCO not revenues
    - Implications for financial incentives for improving quality

- Patient Protection and Affordability Act
  - Quality component – are these the right measures
  - Future quality initiatives
The relationship between HPPD and the quality measures should be examined.

Will the relationship change as the value based purchasing proposition develops?
  - Will there be a relationship with NPR under this model?

What effect will changing the quality indicators have on these findings?