Reduced mortality with Hospital Pay for Performance in England

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Payment reform: Moving beyond Payment by Results
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Pay-for-Performance

- Health care commissioners can pay providers on the basis of:
  - an agreed service specification
  - population coverage (capitation)
  - volume
  - performance

- Internationally, more third-party payers are linking a proportion of provider revenue to achievement of quality indicators

- Examples in England: the *Quality and Outcomes Framework*, *Best Practice Tariffs*, and the *Commissioning for Quality and Innovation* framework
P4P and health outcomes

- Increased adoption of P4P is occurring despite a scant evidence base
  - by 2009, few schemes had been evaluated at all
  - evaluations show at best modest and temporary effects on quality
  - recent Cochrane review (Flodgren, 2011) found no evidence that financial incentives lead to improvements in health outcomes

- More inclusive review (van Herck, BMCHSR, 2010) highlighted that several aspects of P4P may be important:
  - the design of schemes
  - their mode of implementation
  - the context in which they are introduced
Advancing Quality

- First hospital P4P scheme to be introduced in the UK (October 2008)
- Based on Hospital Quality Incentive Demonstration (HQID) from the US
- Adopted by all 24 NHS Acute Trusts in the North West SHA
- Covered five patient groups: pneumonia, CABG, AMI, heart failure, hip/knee
- Performance on 28 quality indicators was reported by participating Trusts
  - collected and fed back quarterly and published annually
- Tournament scheme (for first 12 months)
  - top 6 Trusts received a 4% bonus on their tariff payments
  - next 6 Trusts received a 2% bonus on their tariff payments
- Bonuses allocated internally to clinical teams for investment in care
Our evaluation

• Independent evaluation funded by the NIHR Health Services & Delivery Research Programme

• Collaboration between Universities of Nottingham, Manchester, Cambridge and Birmingham

• Five-year study: April 2009 – March 2014

• Combination of qualitative and quantitative research
Estimation of effect on mortality

- Data from national Hospital Episode Statistics
- Deaths within 30 days of admission (in any hospital in England)
- For patients admitted for:
  - three incentivised conditions (AMI, heart failure and pneumonia)
  - six reference conditions
- Periods: 18 months before and first 18 months after introduction
- Comparison of 24 North West Trusts with 132 Trusts in rest of England
- Risk-adjustment using age and sex, primary diagnosis, 31 co-existing conditions, type of admission, residential location on admission
# Changes in unadjusted mortality rates

<table>
<thead>
<tr>
<th></th>
<th>North West</th>
<th></th>
<th></th>
<th>Rest of England</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
<td>Change</td>
<td>Before</td>
<td>After</td>
<td>Change</td>
</tr>
<tr>
<td>AMI</td>
<td>12.4</td>
<td>11.0</td>
<td>-1.4</td>
<td>11.0</td>
<td>10.7</td>
<td>-0.3</td>
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<tr>
<td>Heart failure</td>
<td>17.9</td>
<td>16.6</td>
<td>-1.3</td>
<td>16.6</td>
<td>16.1</td>
<td>-0.6</td>
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<tr>
<td>Pneumonia</td>
<td>28.0</td>
<td>25.9</td>
<td>-2.2</td>
<td>27.2</td>
<td>26.3</td>
<td>-0.9</td>
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<tr>
<td>Reference conditions</td>
<td>13.3</td>
<td>13.0</td>
<td>-0.3</td>
<td>11.7</td>
<td>11.0</td>
<td>-0.7</td>
</tr>
</tbody>
</table>

Mortality measured in percentage points.
Difference-in-differences analyses of adjusted mortality

<table>
<thead>
<tr>
<th>Health condition</th>
<th>Between-Region Difference in Differences</th>
<th>Triple Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference conditions</td>
<td>0.3 (-0.4 to 1.1)</td>
<td>-</td>
</tr>
<tr>
<td>Incentivised conditions</td>
<td>-0.9 (-1.4 to -0.4)</td>
<td>-1.3 (-2.1 to -0.4)</td>
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<tr>
<td>AMI</td>
<td>-0.3 (-1.0 to 0.4)</td>
<td>-0.6 (-1.7 to 0.4)</td>
</tr>
<tr>
<td>Heart failure</td>
<td>-0.3 (-1.2 to 0.6)</td>
<td>-0.6 (-1.8 to 0.6)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>-1.6 (-2.4 to -0.8)</td>
<td>-1.9 (-3.0 to -0.9)</td>
</tr>
</tbody>
</table>

Mortality measured in percentage points (95% CI).
Headline results

- There was a larger overall reduction in mortality of 1.3 percentage points in the North West when the P4P was introduced.

- Relative rate reduction of 6%.

- Over 18 months, equates to a reduction of 890 deaths (95% CI, 260 to 1500) amongst population of 70,644 patients with these conditions.
Further analyses

- No significant differences in proportions of patients discharged to institutions
- Trends in mortality were similar in the North West to the rest of England before introduction of the scheme
- Results unaffected by controlling for baseline mortality and changes in patient volumes
- Similar results when exclude the south of England
- Largest reductions in mortality achieved in small Trusts and Trusts rated “excellent” or “good” by CQC
- Cost-effectiveness
  - scheme cost £13M to set-up, administer and provide bonuses
  - estimated to have generated over 3,000 Quality-Adjusted Life Years
  - cost-per-QALY well below NICE threshold
How and why?

• Results differ from those found for HQID in the US
• Not feasible that the mortality reductions were only due to improvements on the incentivised process measures

• Providers adopted range of quality improvement strategies
• Identification and targeting of particular patient groups
• Principal differences from US scheme
  – Universal participation
  – Size of bonus
  – Probability of bonus
  – Regional collaboration
Implications

- NB. have only considered first 18 months of scheme

- Pay-for-Performance can be associated with substantial mortality reductions

- Financial incentive not as high-powered as QOF, BPTs, CQUIN

- AQ is a P4P programme:
  - regional initiative
  - new data collection and public reporting
  - bonuses to clinical teams
Concluding remarks

• NW SHA imported a P4P scheme from the US from October 2008
• Translated to NHS context – universal participation, regional collaboration
• Associated with a substantial reduction in mortality
• Cost-effective use of resources in first 18 months
• Not just direct result of improvements in the incentivised measures
• A quality improvement programme supported by financial incentives
• Differs in some potentially important ways from other P4P initiatives adopted in the NHS
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Incentivised process quality measures

• **Acute Myocardial Infarction**
  – Aspirin at arrival
  – Aspirin prescribed at discharge
  – ACEI or ARB for LVSD
  – Smoking cessation advice / counselling
  – Beta blocker prescribed at discharge
  – Fibrinolytic therapy within 30 minutes of arrival

• **Heart Failure**
  – Evaluation of LVS Function
  – ACEI or ARB for LVSD
  – Discharge instructions
  – Smoking cessation advice / counselling

• **Pneumonia**
  – Oxygenation assessment
  – Initial antibiotic selection in immunocompetent patients
  – Blood cultures performed prior to initial antibiotic selection
  – Initial antibiotic received within 6 hours of hospital arrival
  – Smoking cessation advice / counselling