Developing Ambulance Quality & Performance Measures that Make a Difference to Patients

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- National Ambulance Services Clinical Quality Group

Acknowledgements
Overview

- Development of EMS quality measures in England
- Underpinning research
- Challenges
- Future
"The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge."

Crossing the Quality Chasm: A New Health System for the 21st Century. IOM 2001
Research priorities

“Development of EMS performance measures other than response times for use in performance management, audit and research”


The importance of theory

- Check whether theory is logical
- Compare competing theories
- Compare with similar theories
- Check against empirical observations


Four “theories” of improvement

1. Just set targets
2. Create better markets
3. Add resources to the current system
4. Redesign systems for better performance

Don Berwick International Forum for Quality and Safety in Healthcare 2008
Response time targets

- 8 minute urgent (75%) response
- 19 minute non-urgent (75%) response
- 60 seconds to decide on dispatch

“What do “targets” accomplish? Nothing. Wrong: their accomplishment is negative.’

‘Management by numerical goal is an attempt to manage without knowledge of what to do’.  

W Edwards Deming 1900-1993

Sick patients left stranded...

- ...a queue of a DOZEN ambulances pictured outside Cardiff hospital just hours before New Year
- Paramedics warn of ‘fighting a losing battle’ as huge line of emergency vehicles seen waiting outside A&E at University Hospital of Wales
The internal market and financial incentives

“That any sane nation, having observed that you could provide for the supply of bread by giving bakers a pecuniary interest in baking for you, should go on to give a surgeon a pecuniary interest in cutting off your leg, is enough to make one despair…”

George Bernard Shaw

Quality Spending Interactive, June 2017 Update


Plsek P. The challenge of complexity in healthcare BMJ 2001;323:625

Moving from response time targets

- Focus on improvement
- Initially 20 indicators, 5 clinical domains
- Pilot indicators
- Benchmark using funnel plots
- Identify areas for improvement
- Linking measurement to improvement

Measurement and data sanity

Balestracci D. Data sanity: a quantum leap to unprecedented results. MGMA 2009.

Using funnel plots for benchmarking

Care bundle for AMI

- M1 Aspirin
- M2 GTN
- M3 Two pain scores
- M4 Analgesia (morphine or Entonox) given
- Care bundle = M1+M2+M3+M4

AMI bundle performance

Care bundle for stroke

- S1 FAST assessment recorded
- S2 Blood glucose recorded
- S3 Blood pressure (SBP+DBP) recorded
- Care bundle = S1+S2+S3
Ambulance Services Cardiovascular Quality Initiative (ASCQI)

- To improve delivery of AMI care bundle from baseline (43%) to at least 70% within 2 years
- To improve care delivery of stroke care bundle from baseline (83%) to > 90% within 2 years
- To increase diffusion of quality improvement (QI) methods to front line ambulance staff

How we made improvements?

- Focus groups & interviews (practitioners and patients)
- Process mapping & critical-to-quality (CTQ) steps in each service
- Plan-Do-Study-Act (PDSA) cycles
- Statistical process control (SPC)

Small tests of change
Overall

- 10 (of 12) for AMI care bundle and 8 (of 12) for stroke care bundle improved significantly
- 11 of 12 significant improvement in either AMI or stroke care bundle.
- 6 of 12 significant improvements for AMI and stroke bundle
- AMI bundle: 43% at baseline to 79%
- Stroke bundle: 83% at baseline to 96%


Prehospital Outcomes for Evidence Based Evaluation (PhoEBE)

- 5-year NIHR research programme
- To develop better ways of measuring the performance, quality and impact of ambulance service care
- Whole ambulance population
- Methods: systematic reviews, qualitative, consensus, data linkage, case mix adjusted measures

Measures currently in use or advocated

- Systematic review of current measures: 495 measures/151 papers – 60% time and survival vs. 13% patient outcomes such as quality of life, experience, pain
- Policy review: favoured patient outcomes; balanced scorecard; suite of measures rather than single measures
- Barriers: lack of a range of perspectives, data on patient outcomes
### What patients thought was important

<table>
<thead>
<tr>
<th>Theme</th>
<th>Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not waiting too long for help</td>
<td>&quot;...It wasn't life or death. I wasn't dying. So I thought I wasn't going to be top priority anyway. So I thought ten, fifteen minutes was alright&quot;</td>
</tr>
<tr>
<td>Communication, professionalism</td>
<td>&quot;Their bedside manner was excellent; they could certainly have been on the stage&quot;</td>
</tr>
<tr>
<td>Continuity of care</td>
<td>&quot;...As soon as they get you to the hospital the ambulance leaves. As I say it was about half an hour before I was seen. And I had to stay in hospital&quot;</td>
</tr>
<tr>
<td>Confidence and reassurance</td>
<td>&quot;First time I've called 999, I was a little bit nervous really, you don't really know what, or what the reactions are to people, but yeah very good&quot;</td>
</tr>
</tbody>
</table>


### Consensus studies

- Consensus event – small group discussion and live voting on measures
- 23 different time measures – prioritised using an online form
- Delphi survey

### Multistakeholder consensus event

- Aim: to prioritise potential measures for measuring ambulance service quality and performance
- 1 day event, 42 participants
- Ambulance service, patient and public, commissioners, policy makers, academic research
- Round table small group discussions, live voting

<table>
<thead>
<tr>
<th>Rank</th>
<th>Measure</th>
<th>Essential</th>
<th>Desirable</th>
<th>In favour</th>
<th>Irrelevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Accuracy of dispatch decisions</td>
<td>36 (86)</td>
<td>9 (14)</td>
<td>42 (100)</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Complete/accurate patient records</td>
<td>35 (85)</td>
<td>5 (12)</td>
<td>40 (97)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>3</td>
<td>Call taker identification of problem</td>
<td>33 (79)</td>
<td>7 (17)</td>
<td>40 (96)</td>
<td>2 (5)</td>
</tr>
<tr>
<td>4</td>
<td>Pain assessment/relief</td>
<td>33 (79)</td>
<td>7 (17)</td>
<td>40 (96)</td>
<td>2 (5)</td>
</tr>
<tr>
<td>5</td>
<td>Patient experience</td>
<td>31 (76)</td>
<td>9 (22)</td>
<td>40 (100)</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>Patient safety</td>
<td>32 (78)</td>
<td>9 (22)</td>
<td>41 (98)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>7</td>
<td>Over/under triage (priority) rate</td>
<td>31 (76)</td>
<td>9 (22)</td>
<td>40 (98)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>8</td>
<td>Compliance with end of life care plans</td>
<td>31 (76)</td>
<td>7 (17)</td>
<td>38 (93)</td>
<td>3 (7)</td>
</tr>
<tr>
<td>9</td>
<td>Proportion of calls treated by most</td>
<td>30 (75)</td>
<td>9 (22)</td>
<td>39 (98)</td>
<td>1 (2)</td>
</tr>
<tr>
<td></td>
<td>appropriate service</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Compliance with protocols/guidelines</td>
<td>29 (68)</td>
<td>12 (29)</td>
<td>41 (98)</td>
<td>1 (2)</td>
</tr>
</tbody>
</table>

**Delphi study**

- 42 invited from the following groups:
  - Emergency Medicine
  - Ambulance Clinical Operations
  - Ambulance Research and Audit
  - Policy/Commissioning
  - Other
- 29/42 agreed to take part
- 23/29 Round 1 responses (79%)
- 18/23 Round 2 (78%)
- Little score change between the rounds

**Patient outcome measures: median scores**
### Patient outcome priorities

<table>
<thead>
<tr>
<th>Rated highly</th>
<th>Rated least highly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain management</td>
<td>Intubation</td>
</tr>
<tr>
<td>Survival</td>
<td>Mortality</td>
</tr>
<tr>
<td>Recontact (EMS)</td>
<td>Recontacts (any service)</td>
</tr>
<tr>
<td>Patient experience</td>
<td>Wound infection</td>
</tr>
</tbody>
</table>

### Clinical management measure priorities

<table>
<thead>
<tr>
<th>Rated highly</th>
<th>Rated least highly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct categorisation of urgency</td>
<td>Correct identification of condition during call taking</td>
</tr>
<tr>
<td>Patient safety: never events, drug errors</td>
<td>Treat and leave at home by advanced paramedic practitioners</td>
</tr>
<tr>
<td>Treatment according to protocols/guidelines</td>
<td></td>
</tr>
</tbody>
</table>

### Whole service measure priorities

<table>
<thead>
<tr>
<th>Rated highly</th>
<th>Not rated highly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to definitive care</td>
<td>Other time measures</td>
</tr>
<tr>
<td>Mean response time</td>
<td>Over triage</td>
</tr>
<tr>
<td>Under triage</td>
<td>Other training e.g. advanced practitioner</td>
</tr>
<tr>
<td>Compliance with training requirements – ALS and BLS</td>
<td>Unit hour utilisation</td>
</tr>
<tr>
<td>Completion of patient clinical records</td>
<td></td>
</tr>
</tbody>
</table>
Data linkage

Aim
To calculate the mean change in pain score for patients who were sent an ambulance response and had more than one pain score recorded, using a predictive model.

Rationale
The focus of this measure is on the management and relief of pain. Measuring a change in subsequent pain scores is a direct way of measuring the effect of care provided by the ambulance service.

Data sources
CAD, ePRF.

Data provider
Ambulance service

Other
Populations, measurement, construction, case-mix adjustment, exclusion, inclusion etc.

Pain model specification

To calculate the mean change in pain score for patients who were sent an ambulance response and had more than one pain score recorded, using a predictive model.

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Case mix adjusted indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Factors in risk adjustment model</th>
<th>Importance of risk adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean change in pain score</td>
<td>First pain score, age, gender, total pre-hospital time</td>
<td>Not important</td>
</tr>
<tr>
<td>Mean response time mean and 90th centile</td>
<td>None</td>
<td>N/A</td>
</tr>
<tr>
<td>Proportion of serious emergency conditions correctly identified</td>
<td>Age, gender, condition, Index of Multiple Deprivation (IMD)</td>
<td>Limited importance</td>
</tr>
<tr>
<td>Proportion of decisions to leave a patient at scene which were potentially inappropriate</td>
<td>Age, gender, reason for the call, IMD</td>
<td>Limited importance</td>
</tr>
<tr>
<td>Proportion of patients transported to ED by 999 emergency ambulance, but who were discharged without treatment or investigation(s)</td>
<td>Age, hospital, deprivation, gender, call type</td>
<td>Important</td>
</tr>
<tr>
<td>Proportion of ambulance patients with a serious emergency condition who survive to admission, and to 7 days post-admission</td>
<td>Age, condition, IMD, hospital</td>
<td>Important</td>
</tr>
</tbody>
</table>
What impact has PhOEBE had so far?

- Ambulance Response Programme time measures
- Measures to be used this year for QI starting with pain management
- Patient experience measure developed and piloted
- Public engagement: https://www.youtube.com/watch?v=g2saLH8v9-U&feature=youtu.be

EMS take home points

- The right measures used in the right way can help support improvement
- A mix of clinical, operational and patient outcomes can provide a balanced set of measures
- Linked data can help build risk adjusted measures linked to important outcomes
- MEASUREMENT ALONE IS NOT ENOUGH: measures are being used to support quality improvement in the NHS

Questions?

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Thank you for listening!