

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

A. Niroshan Siriwardena MBBS, MMedSci, PhD  
Professor of Primary and Prehospital Health Care, University of Lincoln  
@nsiriwardena



NAEMSP: Annual Meeting | January 8-13, 2018 | Manchester Grand Hyatt | San Diego, CA

---

---

---

---

---

---

---

---

## Declarations and conflicts of interest



This presentation presents independent research funded by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Health Research (PGR) scheme (Grant Reference Number RP-PG-609-10195). The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.



NAEMSP: Annual Meeting | January 8-13, 2018 | Manchester Grand Hyatt | San Diego, CA

---

---

---

---

---

---

---

---

## Acknowledgements

- CaHRU, University of Lincoln: Viet-Hai Phung, Fiona Togher, Zahid Asghar
- East Midlands Ambulance Service NHS Trust: Anne Spaight, Debbie Shaw, Mohammad Iqbal
- Yorkshire Ambulance Service NHS Trust: Jane Shewan
- CURE, Sheffield: Janette Turner, Jo Coster, Prof John Nichol, Prof Alicia O’Cathain, Andrew Booth,
- Swansea University: Prof Helen Snooks, Prof Ronan O’Hara
- National Ambulance Research Steering Group
- National Ambulance Services Clinical Quality Group

---

---

---

---

---

---

---

---

### Overview

- Development of EMS quality measures in England
- Underpinning research
- Challenges
- Future

---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---

What is quality care?



"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

---

---

---

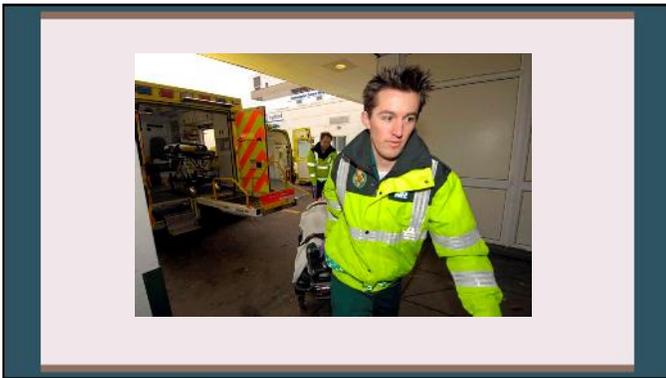
---

---

---

---

---



---

---

---

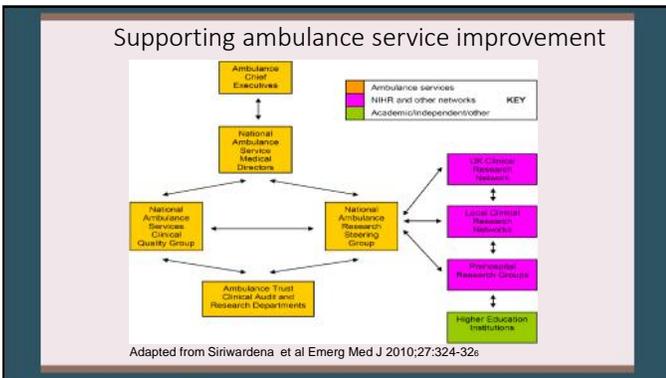
---

---

---

---

---



---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---

Research priorities

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

Snooks et al Emerg Med J 2009 26: 549-550

---

---

---

---

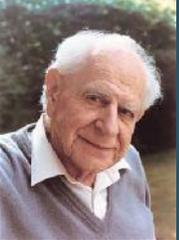
---

---

---

---

The importance of theory



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

Popper, K. The logic of scientific discovery. Routledge 2002.

---

---

---

---

---

---

---

---

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



---

---

---

---

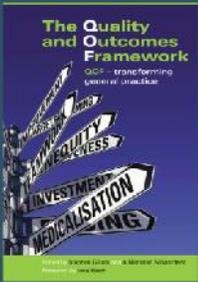
---

---

---

---

## 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

---

---

---

---

---

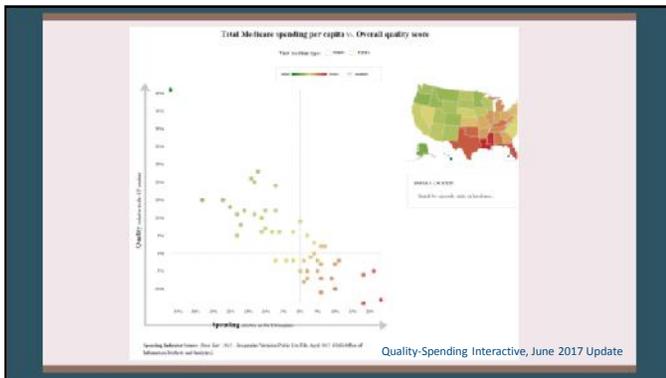
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

## Systems



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



Senge P. The fifth discipline: the art and practice of the learning organization. Random House 1999.



Gawande A. Reith lectures. The future of medicine. Lecture 2 The century of the system 2014.

---

---

---

---

---

---

---

---

---

---

### 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.

---

---

---

---

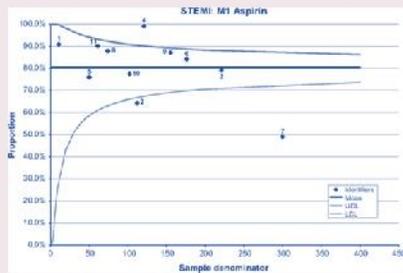
---

---

---

---

### Using funnel plots for benchmarking



Siriwardena et al. Emerg Med J 2010;27:327-331

---

---

---

---

---

---

---

---

### Care bundle for AMI

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

---

---

---

---

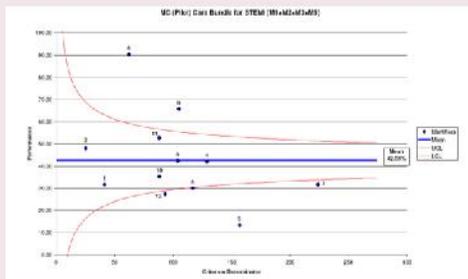
---

---

---

---

### 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

---

---

---

---

---

---

---

---



### 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%

Siriwardena et al. Implementation Science 2014; 9:17.

---

---

---

---

---

---

---

---

### 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

---

---

---

---

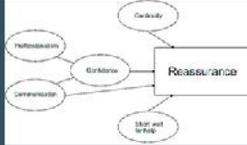
---

---

---

---

## What patients thought was important



Togher F.J, O’Cathain A, Phung V.H, Turner J, Siriwardena AN. interview study. Health Expectations 18 (6), 2951-2961.

Theme	Quotes
Not waiting too long for help	"...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"
Communication , professionalism	"Their bedside manner was excellent; they could certainly have been on the stage"
Continuity of care	"...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"
Confidence and reassurance	"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"

---

---

---

---

---

---

---

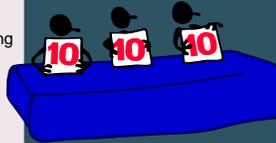
---

---

---

## 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



Coster J, Irving AD, Turner JK, Phung VH, Siriwardena AN Health Expectations 2018; 21:249–260

---

---

---

---

---

---

---

---

---

---

Rank	Measure	Essential	Desirable	In favour	Irrelevant
1	Accuracy of dispatch decisions	36 (86)	6 (14)	42 (100)	0
2	Complete/accurate patient records	35 (85)	5 (12)	40 (97)	1 (2)
3	Call taker identification of problem	33 (79)	7 (17)	40 (96)	2 (5)
4	Pain assessment/relief	33 (79)	7 (17)	40 (96)	2 (5)
5	Patient experience	31 (78)	9 (22)	40 (100)	0
6	Patient safety	32 (76)	9 (22)	41 (98)	1 (2)
7	Over/under-triage (priority) rate	31 (76)	9 (22)	40 (98)	1 (2)
8	Compliance with end of life care plans	31 (76)	7 (17)	38 (93)	3 (7)
9	Proportion of calls treated by most appropriate service	30 (75)	9 (23)	39 (98)	1 (2)
10	Compliance with protocols/guidelines	29 (69)	12 (29)	41 (98)	1 (2)

---

---

---

---

---

---

---

---

---

---

- ### 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

---

---

---

---

---

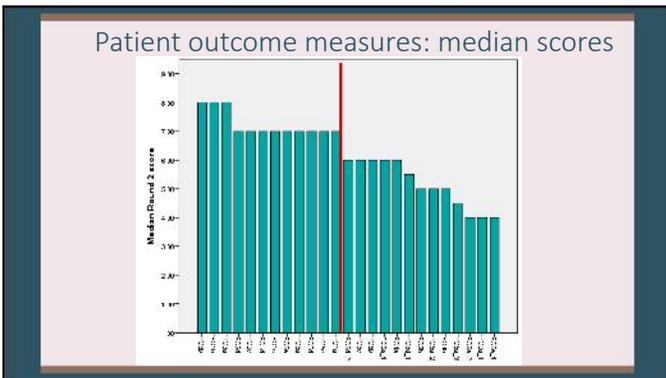
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

**Patient outcome priorities**

Rated highly	Rated least highly
Pain management	Intubation
Survival	Mortality
Recontact (EMS)	Recontacts (any service)
Patient experience	Wound infection

---

---

---

---

---

---

---

---

**Clinical management measure priorities**

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

---

---

---

---

---

---

---

---

**Whole service measure priorities**

Rated highly	Not rated highly
Time to definitive care	Other time measures
Mean response time	Over triage
Under triage	Other training e.g. advanced practitioner
Compliance with training requirements – ALS and BLS	Unit hour utilisation
Completion of patient clinical records	

---

---

---

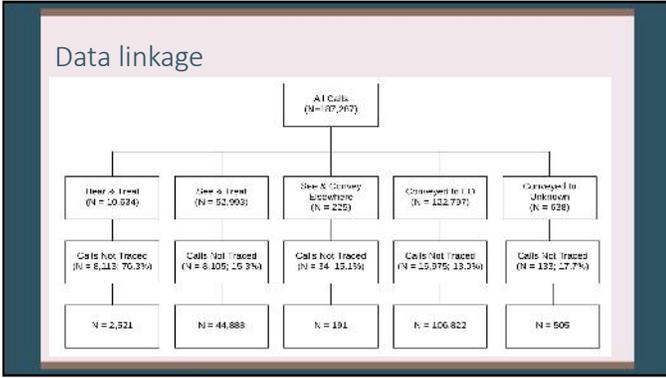
---

---

---

---

---




---

---

---

---

---

---

---

---

### Pain model specification

<b>Aim</b>	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
<b>Rationale</b>	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.
<b>Data sources</b>	CAD, ePRF.
<b>Data provider</b>	Ambulance service
<b>Other</b>	Populations, measurement, construction, case-mix adjustment, exclusion, inclusion etc.

---

---

---

---

---

---

---

---

### Case mix adjusted indicators

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

---

---

---

---

---

---

---

---

### 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=q2saLhBv9-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?

[nsiriwardena@lincoln.ac.uk](mailto:nsiriwardena@lincoln.ac.uk)  
[www.cahru.org.uk](http://www.cahru.org.uk)

---

---

---

---

---

---

---

---



---

---

---

---

---

---

---