

Chapter 3

A Strategy for Managing Quality in Ambulance Services

Mary Peters, Steve Barnard, Michael Dorrian and Kevin Mackway-Jones

Introduction and Background

While the practice of risk management and corporate governance relates to all aspects of an organisation's business and activities, the current focus within the English health service is primarily around improving quality by putting the patient first, providing an acceptable level of care, protecting patients from harm and developing a culture of transparency and openness (DH 2013a). The classification and management of risk is often considered under the headings of operational, financial and quality, and, while the management of operational and financial risks, within health-care provider organisations, are generally well established (although not always well managed), the identification, quantification and management of quality risks can be far more challenging and are of central concern to the government and public (DH 2013b).

Quality management in the context of patient care is certainly not new to the health service. Quality and, more specifically, patient safety began to emerge as a central concern from the mid-to the late 1990s, with the publication of *To Err is Human: Building a Safer Health System* (Kohn et al. 2000) in the USA. *An Organisation with a Memory* (DH 2000) was subsequently published in the UK. This resulted

K. Mackway-Jones (✉) · M. Peters · S. Barnard · M. Dorrian
North West Ambulance Service NHS Trust, Ladybridge Hall, Chorley New Road, Heaton,
BL1 5DD Bolton, UK
e-mail: kevin.Mackway-Jones@nwas.nhs.uk

M. Peters
e-mail: mary.peters@nwas.nhs.uk

S. Barnard
e-mail: steve.barnard@nwas.nhs.uk

M. Dorrian
e-mail: Michael.dorrian@nwas.nhs.uk

in clinical governance being developed as a framework to help drive improvements in the quality of care provided using the broad terms: efficiency, effectiveness, patient experience and clinical risk management.

Over the years, there have been many attempts to define quality in health. In 2008, Lord Darzi, as part of his review of the National Health Service (NHS) in England, created an enduring and widely accepted definition of high-quality care (DH 2008). This definition had three aspects—all of which had to be achieved:

- Care that is *clinically effective*—not just in the eyes of clinicians but in the eyes of patients themselves
- Care that is *safe*
- Care that provides as positive an *experience* for patients as possible (DH 2008)

While quality and patient safety have featured heavily in policy over subsequent years, the publication of the report into the Mid Staffordshire Trust (HMSO 2013) highlighted significant failures in quality issues and indicated that not only was there too great a tolerance of risk to patients but also that information about services was too biased towards reporting positive performance. The Berwick Report (DH 2013a) examined what changes were required within the NHS to improve patient safety, identifying that incorrect organisational priorities, systems, environmental factors and culture were contributory factors in failing to learn and in failing to protect patients from harm.

The complexity of healthcare provision and associated processes, as a risk factor, is also well documented (National Patient Safety Agency 2011). Furthermore, the uncontrolled and unpredictable environment, lack of supervision, limited information and extreme uncertainty are often suggested as factors contributing to increased patient safety risks within the pre-hospital setting (Price et al. 2013; Shaban et al. 2004; Brice et al. 2012). Stress is also considered to be a contributory factor in adverse incidents (National Patient Safety Agency 2011), with ambulance staff subjected to stressors including high workloads, shift patterns, time pressures and emotional responses to traumatic or serious incidents (Hegg-Deloye et al. 2014). Despite this, published literature on quality and patient safety within the pre-hospital setting remains limited (Price et al. 2013); with a tendency to focus more on the physical ambulance environment and the effectiveness of clinical decision making for non-conveyance decisions.

Management of Quality and Risk in Ambulance Services

The management of quality risks within ambulance services presents significant challenges due to the unique environment they operate within (Brice et al. 2012). Ambulance clinicians are often required to provide care for a diverse population in terms of demographics, levels of deprivation, medical problems and social problems. Emergency care has also been recognised as facing higher levels of risk than other areas of medicine, which is attributed to the “notion of risk and uncertainty” (Shaban et al. 2004).

The measurement of quality within ambulance services has also been traditionally limited to operational activities. In June 2011, the National Audit Office report *Transforming NHS ambulance services* stated:

Traditionally, the ambulance service has been seen primarily as a call-handling and transportation service, encompassing some aspects of patient care. (National Audit Office 2011)

The report acknowledged that ambulance services were historically more operationally focussed with the management of response times being the priority. However, the report suggested that the development of national clinical quality indicators would help shift the balance to managing the quality of patient care.

This was quickly followed by publication of “Taking Healthcare to the Patient 2: A review of 6 years’ progress” (Association of Ambulance Chief Executives 2011). The report described the progress made by ambulance services since publication of *Taking Healthcare to the Patient* (Department of Health 2005) which described how ambulance services would modernise and transform to support a wider role within the health system, with care being provided closer to home. It highlighted improved response times, advances in clinical education, improved survival rates and improved patient and staff experience. The recommendations within the report included the development of high-quality clinical leadership to support the expanding clinical practice and replacement of one of the operational targets (category B calls) with a series of 11 ambulance clinical quality indicators (some of which measured clinical outcomes). The future of targets in ambulance services was to: “focus on improving patient outcomes, and balance measures of timeliness of care with measures that reflect whether the best possible clinical care has been delivered”.

How Is Clinical Quality Measured and Monitored?

Clinical Audit is the mechanism through which clinical quality is measured and monitored. It has been defined by the National Institute of Healthcare and Clinical Excellence (NICE) as “a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change. Aspects of the structure, processes and outcomes of care are selected and systematically evaluated against explicit criteria. Where indicated, changes are implemented at an individual, team, or service level and further monitoring is used to confirm improvement in healthcare delivery”. Some of the recent initiatives are discussed in the next section.

National Ambulance Service Audit Programmes

In April 2011, the Department of Health introduced a new series of ambulance quality indicators (AQIs) to help achieve a more balanced approach to measuring the quality of care provided. A total of 37 indicators were developed, consisting of 19 system indicators and 18 clinical indicators.

The AQIs are a specific set of indicators, audited on a whole patient cohort every month. These indicators are:

- Outcome from cardiac arrest—return of spontaneous circulation and survival to discharge
- Outcome from sinus tachycardia (ST) elevation myocardial infarction
- Outcome from stroke and *all* follow the principles of clinical performance indicator (CPI) care bundle performance measurement

Clinical Performance Indicator Care Bundles

In 2008, the National Ambulance Service Clinical Quality Group (NASCOG) developed a series of indicators on behalf of the English ambulance services. The performance information generated as a result of these audits is used by the Care Quality Commission as part of the ambulance trust Quality Risk Profile. CPI care bundle packages have been developed to cover a spectrum of pre-hospital care, such as management of asthma, hypoglycaemia, ST elevation myocardial infarction, febrile convulsions and stroke (Siriwardena et al. 2010).

Ambulance services across England use CPI care bundles to measure and monitor the quality of care given to patients. A CPI is designed to measure the elements of care that a patient may be expected to receive in the treatment of a specific clinical condition. The individual elements of a CPI may be grouped together as a “care bundle”. A bundle is a structured way of improving the processes of care and patient outcomes: a small, straightforward set of evidence-based practices — generally three to five — that, when performed collectively and reliably, have been proven to improve patient outcomes (Resar R et al 2005). Specifically, CPI bundle performance can be defined as measuring the number of patients who received all the metrics/elements as defined within each of the CPIs.

As a subset of clinical audit, CPIs measure small numbers frequently to provide an indication of performance at a set point in time. Ideally, CPIs are audited at local level by clinicians with feedback given without delay to celebrate good practice and support learning needs. CPI care bundle development process has several stages. One of the most challenging aspects (after determining what clinical condition is going to be audited) is to identify those cases. This poses a particular complication for ambulance services since emergency triage tools rely on the information given remotely by the caller, which can be different from the reality. Therefore, the ideal system of case identification is by the clinicians during face-to-face contact. Once the clinical condition of interest and a method of case identification have been agreed, the next step is to decide the aspects of care that are of interest. These are the metrics that combine to make up a CPI. Metrics should be evidence based and specific to the patient cohort condition. Evidence to support interventions may come from a number of sources. The condition-specific, evidence-based elements are grouped together to form a bundle. Each metric must be delivered in order for the patient to have received the full care bundle. Occasionally, it may not be able to deliver the full bundle, for example, a patient may refuse an intervention. In these

cases, provided the refusal is documented, an exception is generated which is still counted towards the patient receiving a full package of care as demonstrated in the next example (Table 3.1).

Table 3.1 Example. Asthma management: National CPI 2014/15 criteria

<i>Short description</i>	Percentage of asthma patients with acute or severe asthma who receive high-flow oxygen and nebulised β_2 agonist bronchodilators
<i>Evidence base</i>	JRCALC 2013 British Guideline on the Management of Asthma 2013 Updated (Nice/Sign)
<i>Full indicator description</i>	100% of patients presenting with a pre-hospital clinical exacerbation of asthma should receive high-flow oxygen therapy (C) and nebulised β_2 agonist bronchodilator (A) within 5 min of assessment
<i>Inclusion criteria</i>	Patients with a pre-hospital clinical impression of exacerbation of asthma
<i>Measurement method and source</i>	Patient presenting with a pre-hospital clinical impression of exacerbation of asthma by Paramedic Emergency Service operational staff as documented on PRF
<i>Sample</i>	First 300 cases presenting or all if fewer
<i>Frequency</i>	Aligned to national CPI reporting timeline

A: directly based on category I evidence (systematic review of randomised controlled trials or at least one randomised controlled trial)

C: directly based on category III evidence (nonexperimental descriptive studies or extrapolated recommendations from category I or II evidence)

<i>Metric</i>		<i>Rationale</i>	<i>Exception</i>	<i>Data source</i>
A1	Respiratory rate assessed	Respiratory rates vary considerably depending on general health and activity levels. In order to establish the severity of an acute episode of asthma, it is good practice to undertake an assessment of respiratory rate	No exceptions	PRF
A2	PEFR recorded before treatment?	Using PERF assessments, attending clinicians can determine the severity of the asthma episode. PEFR can also be used as a benchmark to demonstrate patient improvement or deterioration	Patient refusal Patient unable Patient unconscious Patient does not understand Patient 5 years old	PRF

Table 3.1 (continued)

A3	SpO2 measured?	Oxygen saturation level assessments can be used by clinicians to determine the severity of the asthma episode	Patient refusal	PRF
A4	Nebulised β 2 agonist administered?	The most commonly used treatment for patients with asthma is Salbutamol. Salbutamol is a β 2 agonist which is administered nebulised with oxygen and has a relaxant effect in the medium and smaller airway which are in spasm in acute asthma attacks	Patient refusal Contraindicated	PRF
A5	Oxygen administered?	Administration of supplemental oxygen can relieve hypoxemia in moderate or severe exacerbations of asthma	Patient refusal SpO2 94–98% and β 2 agonist contra-indicated	PRF

Care bundle for asthma (A1 + A2 + A3 + A4)

PRF patient report form, CPI clinical performance indicator, PERF peak expiratory flow rate

Quality Improvement in the Pre-hospital Arena

A peripatetic responsive service that delivers pre-hospital emergency clinical care is a challenging context in which to deliver quality improvement. Teasdale (2008) states that “Improvement is desired by everyone but delivering this however is hindered by lack of clear, widely embraced perceptions of what is encompassed within quality and how improvement can be brought about”; which describes concisely the issues faced in the ambulance arena. As described earlier, we can now measure quality through bundle reporting. This can be done on an organisation-wide basis—but this is not meaningful for the individual clinician. If a clinician can see clinical performance at an ambulance station, team or individual level, then “what needs to be done to improve” becomes more obvious as the short case suggests.

Case Study: Varying performance

The high-level CPI report shows that in the management of a specific condition, an ambulance service delivers a full package of care (the care bundle) 93.7% of the time. A breakdown report is able to describe that for the same condition over the same time period, the care bundle performance for a small area of the ambulance service is 88.7%. An individual breakdown report for two clinicians (A and B) working in that area of the service may for the same condition and time period deliver care bundle performance of 95.5% for A and 64.9% for B, respectively.

Blueprint to Quality Improvement

So what does this mean? It means that the need for improvement can be broken down to individual level. But how is that individual informed of their performance or lessons to be learned? A blueprint to quality improvement in the ambulance service is described below. This is broken down into clinical leadership education accountability and responsibility (CLEAR) and is further explained in some detail as follows:

Clinical: Leadership at Local Level

Key to the success of improving quality of care in an ambulance service is strong clinical leadership. Ideally, the clinical leaders are responsible for a team of clinicians in terms of clinical support and guidance. If mechanisms are set up to allow peer auditing by clinical leaders, the subliminal message that this is important is sent to staff. Clinicians actively performing the audit are tied in to the results and importantly the quality improvement process. It becomes meaningful to the individuals—something that they are part of rather than receiving passively the results of an audit performed on them.

Leadership: There Is Never Enough Feedback

Communication through feedback is the most essential tool in a quality improvement process. If you do not tell people what they are doing well, or what could be done differently, nothing changes. Personalised feedback which celebrates success and identifies learning points is effective in consolidating improved practice. Feedback can be given by colleagues, but it is useful if it is given by a team or clinical leader as this sets the context from a general discussion to that of a learning opportunity. Similarly, feedback of success has more resonance from a clinical leader than a colleague or non-clinician as the next case will highlight.

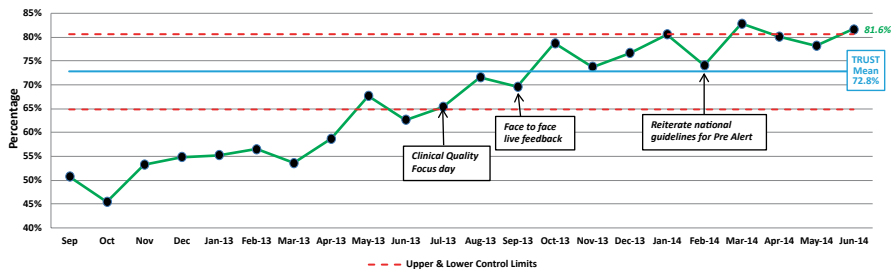
Case Study: Trauma Care Single Limb Fracture—Main Reason for Failing a Care Bundle—Distal Pulse

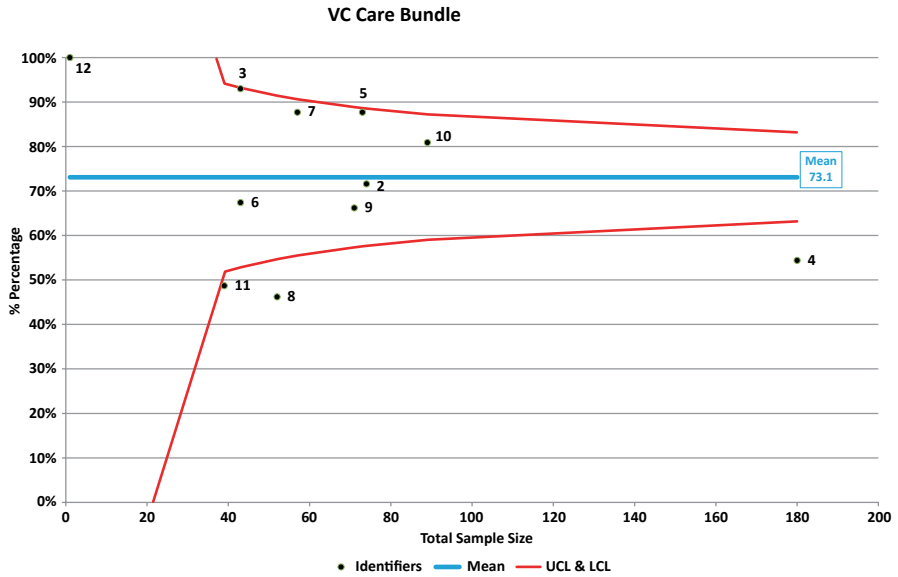
The results of the CPI audit identified that there was a trust-wide issue with performing a pulse check distal to the injury site. In one sector of the Trust, the approach to remedy the situation was through several devices.

1. During one-to-one feedback sessions, senior paramedics were repeatedly told by clinicians that the intervention was performed but not written down. There was no specific space of the patient report form (PRF) to document this intervention.
2. Senior paramedics consulted with colleagues throughout the Trust, and they gained support for the recommendation that the PRF be amended to include a space for distal pulse documentation. The PRF was updated accordingly.
3. At the local level, senior paramedics continued to remind clinicians to document the intervention, and, when the new PRF became available, actively advertised that the PRF now has a specific place in which to record a distal pulse.

Output: Through one-to-one feedback, the clinician in the front line was able to receive and give feedback which changed the Trust PRF. As a result, the recording of the distal pulse has improved.

It is important that the feedback is tailored to the audience—a clinician needs individualised feedback. A senior manager will need a more strategic view. The impact of interventions in the form of annotated charts showing the outcome of changes implemented over time is a persuasive tool as is the use of statistical process control funnel plots.





The funnel Chart as seen in the example above can be used to benchmark how ambulance services perform in comparison to each other.

Education: Plan to Improve

The clinical leader should be able to use a number of quality improvement methods to support and identify the issues causing the barrier to improving care. Through the use of collaborative quality improvement discussions, focus groups and process mapping, a series of interventions may be agreed. This may include short education packages or references to articles which are pertinent to the points of concern; all of which should be captured in a plan.

Accountability and Responsibility: At Individual Level

A quality improvement action plan serves several purposes. It provides a clear record of what the clinical teams will do to change practice, while providing a record of evidence for managers, commissioners and other stakeholders, so they know what is being done in response to the audit results. The action plan is necessary so that the implementation of actions can be monitored, and there are clear lines of accountability. Moreover, the individual has been part of the decision-making process and is responsible for ensuring that they keep to the actions they have agreed to.

Accountability and responsibility occur at service level too. The ambulance service senior leaders must show a commitment for quality improvement, and fur-

therefore hold the responsibility for improvement. Through the receipt of regular clinical performance information, ambulance services are able to demonstrate their commitment to improving the quality of care received by patients.

Conclusion: Quality Improvement—The Next Phase

The lessons learned in developing quality improvement mechanisms across the English ambulance services are best described from the results of the Health Foundation-funded project that was run through NASCQG in 2010 (Siriwardena et al. 2014). The Ambulance Services Cardiovascular Quality Improvement Initiative (ASCQI) had two aims. The first was to improve the quality of care through the use of CPI measurement on patients with cardiovascular disease. The second was to introduce and embed the use of quality improvement techniques in the participating ambulance services. ASCQI was successful. A number of trusts showed significant improvement in the care delivered to patients; importantly, ambulance services learned and retained the quality improvement techniques which have been reinvested in other areas of work.

The introduction of CPIs across all English ambulance trusts has been successful as demonstrated through the national CPI programme. New and more sophisticated CPIs are being developed by NASCQG to supplement the current programme.

References

- Association of Ambulance Chief Ambulance Officers. (2011). *Taking healthcare to the patient 2: A review of 6 years progress and recommendations for the future*. London: AACE.
- Brice, J. H., Studnek, J. R., Bigham, B. L., et al. (2012). EMS provider and patient safety during response and transport: Proceedings of an ambulance safety conference. *Prehospital Emergency Care*, 16, 3–19.
- Department of Health (DH) (2000). *An organisation with a Memory*. London: The Stationery Office.
- Department of Health (DH). (2005). *Taking healthcare to the patient. Transforming NHS Ambulance Services*. London: The Stationery Office.
- Department of Health (DH) (2008). *High quality care for all*. London: The Stationery Office.
- Department of Health (DH) (2013a). *A promise to learn—a commitment to act: Improving the safety of patients in England*. London: Department of Health.
- Department of Health (DH) (2013b). *Review into the quality of care and treatment provided by 14 hospital trusts in England: Overview report*. Leeds: NHS England.
- HMSO (2013). *Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry*. London: The Stationery Office.
- Hegg-Deloye, S., Brassard, P., Jauvin, N., Prairie, J., Larouche, D., Poirier, P., Tremblay, A., & Philippe, C. (2014). Current state of knowledge of post-traumatic stress, sleeping problems, obesity and cardiovascular disease in paramedics. *Emergency Medicine Journal*, 31, 242–247.

- Kohn, L. T., Corrigan, J. M., & Donaldson, M. S. (2000). *To err is human: Building a safer health system*. Washington, DC: National Academy Press.
- National Audit Office. (2011). *Transforming NHS Ambulance Services*. London: The Stationery Office.
- National Patient Safety Agency. (2011). *Patient Safety First: 2008 to 2010, the campaign review*. London: National Patient Safety Agency.
- Price, R., Bendall, J. C., Patterson, J. A., & Middleton, P. M. (2013). What causes adverse events in prehospital care? A human-factors approach. *Emergency Medicine Journal*, 30, 583–588.
- Resar, R., Pronovost, P., Haraden, C., Simmonds, T., et al. (2005). Using a bundle approach to improve ventilator care processes and reduce ventilator-associated pneumonia. *Joint Commission Journal on Quality and Patient Safety*, 31(5):243–248.
- Shaban, R., Wyatt-Smith, C. M., & Cumming, J. J. (2004). Uncertainty, error and risk in human clinical judgment: Introductory theoretical frameworks in paramedic practice. *Journal of Emergency Primary Health Care*, 2, 1–11.
- Siriwardena, A. N., Shaw, D., Donohoe, R., Black, S., & Stephenson, J. (2010). Development and pilot of clinical performance indicators for English ambulance services. *Emergency Medicine Journal*, 27, 327–331.
- Siriwardena, A. N., Shaw, D., Essam, N., Togher, F. J., Davy, Z., Spaight, A., & Dewey, M. (2014). The effect of a national quality improvement collaborative on prehospital care for acute myocardial infarction and stroke in England. *Implementation Science*, 9, 17.
- Teasdale, G. M. (2008). Quality in healthcare and the quest for improvement. *Scottish Medicine Journal*, 53, 3–6.

Mary Peters is the senior clinical quality manager for the North West Ambulance Service NHS Trust. A paramedic with 20 years of experience in the NHS; Mary holds an MSc in leadership in Health and Social Care. Her specialist areas of interest include continuous quality improvement, change management and clinical leadership in health and social care. Mary is a key member of the NWAS team who received the “Closing the Gap: Ambulance Service Cardiovascular Quality Initiative” award from the Health Foundation.

Steve Barnard has worked as the head of clinical quality for the North West Ambulance Service NHS Trust since its inception in 2006. Steve was instrumental in developing ambulance clinical quality reporting and improvement systems that delivered substantive improvements in care and informed the development of national ambulance quality measures. He also leads on an annual, national ambulance audit that examines recontact rates for patients who were not transported following a 999 call. Steve also leads on End of Life Care for the ambulance sector in England and has coauthored a number of publications relating to this. Working in the NHS for 23 years, Steve is a paramedic and holds an MBA in managing in Health and Social Care.

Michael Dorrian is the risk manager for North West Ambulance Service NHS Trust. He is a member of the Institute of Risk Management and a chartered member of the Institute of Occupational Safety and Health. His previous roles include health and safety officer in a top tier COMAH site and health and safety manager for a large charity based in the North West. His specialist areas of interest include implementation of risk management frameworks and the installation risk management information systems.

Prof. Kevin Mackway-Jones was appointed as a consultant at the Manchester Royal Infirmary in 1993 and became a professor in the year 2001. He has published widely on the practice and theory of Emergency Medicine, both books (*Advanced Paediatric Life Support*, *Major Incident Medical Management and Support*, *Emergency Triage* amongst others) and academic papers. His main research interests are diagnostic strategies, psychosocial care and major incident management. Apart

from consulting at the Manchester Royal Infirmary and the Royal Manchester Children's Hospital, he is also an executive medical director at the North West Ambulance Service, civilian consultant advisor to the British Army and head of the North Western School of Emergency Medicine. He is the webmaster for www.bestbets.org and the St Emlyn's Virtual Hospital through which he runs an MSc in Emergency Medicine. He was an editor in chief of the Emergency Medicine Journal from 2005–2013.