Measuring patient safety in a UK dental hospital: development of a dental clinical effectiveness dashboard

M. N. Pemberton,^{*1} M. P. Ashley,² A. Shaw,³ S. Dickson⁴ and A. Saksena⁵

IN BRIEF

- Identifies that measurement of patient safety is important in dentistry.
- Highlights particular areas of patient safety of relevance in a UK dental hospital.
- Explains the benefits of displaying patient safety information via a dashboard.

Patient safety is an important marker of quality for any healthcare organisation. In 2008, the British Government white paper entitled *High quality care for all*, resulting from a review led by Lord Darzi, identified patient safety as a key component of quality and discussed how it might be measured, analysed and acted upon. National and local clinically curated metrics were suggested, which could be displayed via a 'clinical dashboard'. This paper explains the development of a clinical effectiveness dashboard focused on patient safety in an English dental hospital and how it has helped us identify relevant patient safety issues in secondary dental care.

BACKGROUND

There are 16 dental hospitals or institutes in the United Kingdom, all associated with universities. All of these hospitals are involved in delivering secondary and tertiary specialist dental care together with postgraduate teaching and training. In addition, 14 of these hospitals host the main clinical facilities for undergraduate dental student teaching for their associated university dental schools. In contrast to medical students, undergraduate dental students must be able to perform a complex series of practical surgical tasks by the time they qualify and that experience has to be gained by treating patients during their training. For all these reasons, dental hospitals host a diverse group of clinicians undertaking dentistry, ranging from the inexperienced student to the visiting general practitioner, to the trainee, specialist and consultant. When working in the hospital these clinicians need to work within relevant policies and to have a clear understanding of their responsibilities to work as a member of a team. Frequently patients are treated by a series of clinicians, where communication is vital to ensure the correct procedure is undertaken as they progress through their

Table 1 Seven steps to building quality¹

Bring clarity to quality	This means being clear about what high quality care looks like in all specialties and reflecting this in a coherent approach to the setting of standards.
Measure quality	In order to work out how to improve we need to measure and understand exactly what we do. The NHS needs a quality measurement framework at every level.
Publish quality performance	Making data on how well we are doing widely available to staff, patients and the public will help us understand variation and best practice and focus on improvement.
Recognise and reward quality	The system should recognise and reward improvement in the quality of care and service. This means ensuring that the right incentives are in place to support quality improvement.
Raise standards	Quality is improved by empowered patients and empowered professionals. There must be a strong role for clinical leadership and management throughout the NHS.
Safeguard quality	Patients and the public need to be reassured that the NHS everywhere is providing high quality care. Regulation of professions and of services has a key role to play in ensuring this is the case.
Stay ahead	New treatments are constantly redefining what high quality care looks like. We must support innovation to foster a pioneering NHS.

treatment. For example, a patient referred by a general dental practitioner to a dental hospital for an extraction of a tooth will rely upon clear communication in the letter of referral, a clear initial hospital consultation and a clear understanding by the clinician subsequently undertaking the procedure of which tooth requires extraction. At each of these visits a different hospital clinician and nurse can be involved. (In contrast in general dental practice, a single practitioner and nurse will frequently perform all stages of this pathway.) There is thus no 'memory' other than that which is communicated on paper or electronically and with the addition of different nurses and inexperienced students into this pathway, it is possible to

envisage how communication could break down and consequently increase the risk of irreversible adverse events such as the wrong tooth being extracted. Extraction of the wrong tooth is clearly wrong and shows how identifying patient safety issues are as relevant to dental hospitals as to any other hospital.

In June 2008, the British government paper *High quality care for all – NHS next stage review final report* was published.¹ This was a review led by Lord Darzi into how the NHS could improve. Background work for this strategy found that the highest quality clinical teams used quality data routinely.² In one of the leading hospitals in the USA, the mechanism by which clinical engagement

¹Consultant in Oral Medicine, Clinical Head of Division,

²Consultant in Restorative Dentistry, Associate Clinical Head of Division, ³Clinical Effectiveness Manager, ⁴Divisional Director, ⁵Consultant in Oral Surgery, University Dental Hospital of Manchester, Higher Cambridge Street, Manchester, M15 6FH

*Correspondence to: Dr M. N. Pemberton
Email: michael.n.pemberton@manchester.ac.uk

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in quality had been achieved was by making data a credible endeavour rather than an activity reported by management.³ Creating a culture where interest in such data was routine was seen as a challenge.³

In the Darzi report, quality was identified as being at the heart of what the NHS should do and needed to be promoted. Quality was defined as needing to include the following three aspects of care; patient safety, patient experience and effectiveness of care. The principle behind patient safety was that we must do no harm to patients. The principle behind patient experience was to measure the 'quality of caring'. The principle of effectiveness of care means understanding the outcomes of different treatments for different conditions. To help achieve the objectives of continuous striving for high quality care, Darzi identified seven steps (Table 1). These three components of quality still remain relevant and form the key pillars of the stated mission of NHS England in 2014: high quality care for all – now and for future generations.⁴

One of the challenges that the Darzi report produced was how to measure quality. Information was needed to show clinical teams where they most need to improve and which would then enable them to track the effect of the changes they implement. National metrics of quality were to be identified, however, in the report it was acknowledged that it was critical that local NHS organisations should sign up to the concept of quality metrics and feel motivated to augment the national indicators with their own local measures of quality. The aim was for NHS organisations to freely develop the mechanisms that would best help them to review the quality of the services they offer. The mechanism offered by Darzi, by which these metrics could be displayed and monitored over time, was the 'clinical dashboard'. This would present metrics in a simple graphical format as a tool to inform the decisions that drive quality improvement. As well as providing information for quality assurance and exception reporting, the visual representation of data could act as an early warning system, with each individual metric used to identify sub-optimal performance that might otherwise remain undetected.

In 2008, the Royal College of Obstetricians and Gynaecologists recommended that all maternity units used dashboards to improve maternal care.⁵ Clinical dashboards are now widely used in maternity units across the UK to provide a local quality assurance system.⁶ In the last few years, clinical dashboards have also been described in other medical settings, including otolaryngology, and accident and emergency.^{7,8}

Table 2 The initial dental division patient safety dashboard contents, December 2009

Measures of harm (or potential harm)	Number of patient falls (by month)
	Number of medication errors (by month)
	Number of high level (level 5) investigations in division (by month)
	Number of incidents of wrong tooth extraction (by month)
	Incidence of the use of Flumazenil (appropriate or inappropriate usage decided after assessment) (by month)
Measures of the reliability of critical safety processes	Hand hygiene compliance rates (summation of spot check audits) (by month)
	Number of staff with documented completion of medical device training (six monthly audit)
	Number of staff with documented completion of corporate mandatory training (by month)
	Number of staff with documented completion of clinical mandatory training (by month)
	Compliance with correct site surgery policy for tooth extraction (monthly audit)
	Correct completion of patient identification bracelets (yearly audit)
	Numbers of new dental trainee starters correctly completing induction (6 monthly audit)
	Compliance with quality of completion of consent forms (yearly audit)
	Compliance with quality of case note entries according to trust policy (yearly audit)
	Number of eligible staff trained in adult life support in last year (by month)
	Number of eligible staff trained in paediatric life support in last year (by month)
Clinical effectiveness	Compliance with NICE guidelines for wisdom tooth extraction (yearly audit)

INITIAL DEVELOPMENT OF A TRUST-WIDE CLINICAL EFFECTIVENESS DASHBOARD

Following the Darzi report, Central Manchester University Hospitals NHS Foundation Trust developed a clinical effectiveness dashboard focusing on patient safety issues. Initially, this dashboard concentrated on Trust-wide hospital clinical effectiveness issues. The initial dashboard featured a mixture of metrics of important patient safety indicators (for example Hospital standardised mortality ratio's (HSMR), incidence of multi-resistant *Staphylococcus aureus* bacteraemia etc and metrics of measures taken to reduce the likelihood of incidents occurring (for example corporate and clinical mandatory staff training rates, resuscitation training rates etc). Clearly some of the metrics analysed were highly relevant for some areas of the hospitals in the Trust, but irrelevant for others. The 'red, amber, green' (RAG) traffic light system was used to highlight data in relation to performance thresholds. A red rating was used when an agreed threshold was breached, amber to alert staff that action may be required to avoid a red rating and green for satisfactory performance. The thresholds for red, amber and green were specific for different metrics and derived from information contained in national guidance, and by local consensus.

DEVELOPING A DENTAL PATIENT-SAFETY FOCUSED, CLINICAL EFFECTIVENESS DASHBOARD

In line with other divisions, in 2009, the dental division was challenged by the Trust executive team to develop a divisionally focused clinical effectiveness dashboard with an emphasis on patient safety.

The dental division had a clinical governance structure where this issue was initially discussed. The dental division clinical effectiveness board met, and continues to meet, on a monthly basis, chaired by the Clinical Head of Division (the most senior management clinician in the hospital). The board comprised of a senior dental (consultant level) representative from each of the major dental specialties, the dental nurse matron, the head of the university undergraduate dental programme, dental divisional management representatives, divisional safeguarding lead, divisional infection control lead and a representative from the Trust Clinical Effectiveness Team attached to the Medical Director's Office. Each month the board considered an agenda of items including an incident report summary, any root cause analysis reports of significant incidents for discussion and sign off, a summary of audit activity and audit plans, a legal case summary report, the divisional risk register,

a summary of safeguarding issues, together with reports from the divisional health and safety committee and infection control.

Following discussion, divisional metrics where relevant, such as rates of completion of mandatory training and resuscitation training, were retained on the dental division dashboard, but we realised that more patient safety issues relevant to dentistry needed to be identified. In 2009, the initial dental patient safety issues identified by the board and the mechanism by which they could be measured were:

- Incidence of wrong tooth extraction (an incident report had previously identified this possibility and clinicians were encouraged to incident report any unintended tooth extractions including when the wrongly extracted tooth had decay and a guarded prognosis but nevertheless had not been scheduled for extraction). Any wrong tooth extraction would result in a 'red' rating and would stimulate the undertaking of a root cause analysis to see if lessons could be learnt
- Incidence of use of the benzodiazepine antagonist drug Flumazenil (each usage was analysed to see if its usage was for appropriate medical reasons or for inappropriate reasons)
- Compliance with NICE guidelines for wisdom tooth extraction (assessed by yearly audit)
- Compliance with quality of case note entries according to Trust policies (assessed by yearly audit)
- Compliance with quality of completion of consent forms (assessed by yearly audit)
- Compliance with a correct site surgery checklist (assessed by monthly real-time audit). We realised that one of our largest patient safety risks was the occasional extraction of the wrong tooth. This is an irreversible step and like all incorrect site surgery should be preventable. In theatres the World Health Organisation (WHO) checklist was used, however, no dentally specific checklist existed for extractions undertaken outside of this environment. To address this issue, we developed a correct site surgery policy for use whenever a tooth was to be extracted under local anaesthesia, with or without sedation, to help prevent incorrect tooth extraction occurring. To help maintain the effectiveness of this intervention, we undertook regular real-time audit of completion of the correct site surgery checklist. This allowed us to measure compliance but also acted in a teaching function to allow immediate feedback on the use of the checklist and addressed any operator confusion regarding its use.

Fig. 1 The dental division dashboard for September 2013

The initial dental division patient safety dashboard contents in December 2009 are given in Table 2. Each metric was updated monthly allowing current practice to be considered by the dental division clinical effectiveness board at its monthly meeting.

At a Trust level, the dental division clinical effectiveness board reports via the Clinical Head of Division to the Trust Clinical Effectiveness Committee, which sets the strategic direction for clinical effectiveness within the Trust. The committee is chaired

by the medical director and meets quarterly with reports submitted from relevant sub-committees including divisional clinical effectiveness boards, Trust Resuscitation Committee etc. The dental division's clinical effectiveness strategy and progress was and is also subject to review by the Trust executive team at a six monthly divisional review.

FURTHER DEVELOPMENT OF DENTAL PATIENT SAFETY INITIATIVES

Since 2009, we have continued to develop further metrics to measure patient safety in our dental hospital environment. These metrics have been developed by stimulating a culture of patient safety, encouraging incident reporting, undertaking root cause analysis where an incident resulting in significant harm occurs or is a significant 'near-miss', and learning lessons from such events. The metrics that have been developed are either a continuous incident measure of the patient safety failure occurring (for example incorrect tooth extraction) or a regular audit of compliance with the strategy put in place to minimise the risk in the future (for example, monthly real time audit of compliance with the correct tooth extraction checklist). We have also added new metrics that have been developed for Trust wide use, where appropriate for our division. These include a venous thrombo-embolic risk assessment audit undertaken on a monthly basis, and an analysis of incidents of emergency patient re-admissions within 30 days of surgery, on a monthly basis.

In 2010, dentally focused new additions to the patient safety dashboard included:

- Compliance with a checklist for patients presenting with trismus to the TMD clinic (assessed by yearly audit).

In 2011, new additions to the patient safety dashboard included:

- Incidence of incorrect placement of dental implant. These were assessed as either suboptimal but useable, or unusable (both of these events would trigger a root cause analysis of what had led to the problem and any systemic changes that could be put in place to prevent a further occurrence).

In 2012, new additions to the patient safety dashboard included:

- Incidence of trigeminal nerve damage
- Accuracy of letters from the hospital requesting dental extractions as part of an orthodontic treatment plan (assessed by yearly audit).

In 2013, new additions to the patient safety dashboard included:

- Incidence of failure of the biopsy management pathway (failure of the pathway between the biopsy being taken and the patient receiving the results in a timely fashion).

Each metric serves as a learning opportunity to improve performance and safety. The dashboard is not only discussed at each dental division clinical effectiveness board meeting, but also at the monthly divisional management board meeting (the overarching senior management board for the management of the dental division). The dashboard is on display within the staff area of the hospital.

The dashboard has driven the development of key additional patient safety measures and focused the development of relevant audits. It has increased managerial and clinical engagement in patient safety issues. The dashboard has also helped highlight relevant patient safety topics to be discussed at our quarterly 'audit and clinical effectiveness' days. These days are a protected time when routine clinical activity is cancelled. The days are divided into a session when the whole of the hospital personnel gather together to listen to and discuss relevant whole hospital clinical effectiveness issues, and a session when each clinical speciality gathers together as a team to discuss issues relevant to their speciality.

The dental division dashboard for September 2013 is shown in Figure 1.

Over time the dental division clinical effectiveness board has also evolved. The board has now been joined by a dental training grade representative, and safeguarding issues in the division are now dealt with by a separate committee which reports to the clinical effectiveness board.

DISCUSSION

Information on patient safety in dentistry is sparse. A recent paper summarising the patient safety incidents reported to the National Patient Safety Agency concluded that incidents of harm to dental patients do occur, but their reporting is not widely undertaken.⁹ It further recognised that dentists had lagged behind medical colleagues in developing patient safety programmes although there has recently been encouragement for dentistry to adopt patient safety initiatives.¹⁰

This paper sets out how the development of a patient safety dashboard within a dental hospital setting can raise awareness, encourage a hospital patient safety culture, and give focus to relevant key issues of patient safety within this environment. As far as we are aware, this is the first patient safety focused clinical effectiveness dashboard to have been developed in dentistry. It will be relevant for other dental hospitals and dentistry in general, in developing clinical effectiveness measures.

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