

# Managing Quality and Safety in Real Time? Evidence from an Interview Study

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**Abstract.** Health systems around the world are investing increasing effort in monitoring care quality and safety. Dashboards can support this process, providing summary data on processes and outcomes of care, making use of data visualization techniques such as graphs. As part of a study exploring development and use of dashboards in English hospitals, we interviewed senior managers across 15 healthcare providers. Findings revealed substantial variation in sophistication of the dashboards in place, largely presenting retrospective data items determined by national bodies and dependent on manual collation from a number of systems. Where real time systems were in place, they supported staff in proactively managing quality and safety.

**Keywords.** Clinical dashboard, Performance measurement, Audit and feedback

## 1. Introduction

Health systems around the world devote considerable effort to monitoring the quality and safety of care [1]. For example, in the United Kingdom, a number of highly influential reports have emphasized the need to develop health information technology (HIT) that can provide real time data on care quality and safety, with the expectation that such systems will lead to improvement [2-4].

Dashboards are a type of HIT that can support the monitoring of care quality and safety. They provide summary data on processes and outcomes of care, making use of data visualization techniques such as graphs [5]. While quality dashboards provide information at ward or organizational level to managers to support organizational decision making [6], clinical dashboards provide feedback to clinicians to inform decision making about patient care [7].

In this paper, we report the results of an interview study undertaken with managers within National Health Service (NHS) hospital Trusts (providers) in England as the first phase of a larger study exploring development and use of dashboards to support decision making at both the ward and the organizational level.

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## **2. Methods**

### *2.1. Study Design and Sample*

We identified 18 NHS hospital Trusts within reasonable distance and so could potentially be sites for the second phase of our study. Research governance approval was successfully obtained from 15 of the 18 Trusts. We undertook one interview in each Trust, 11 with chief nurses and four with senior colleagues they nominated. This study was approved by the University of Leeds Research Ethics Committee.

### *2.2. Data Collection*

Interviews were semi-structured. Each interviewee was asked to describe the ways in which dashboards are currently used in their Trust, the measures included, who uses dashboards, the history of their development, any benefits or problems experienced to date, the HIT systems used to support data collection and presentation, and future plans for design, implementation and use. The interviews were conducted between September and November 2014. Interviews were audio recorded and transcribed.

### *2.3. Analysis*

Transcripts were analyzed using Framework analysis [8]. The researchers first listened to the audio files and read the transcripts to familiarize themselves with the data. Two members of the research team (CG and EF) undertook initial coding of a sample of transcripts and identified emerging themes. These were then shared and discussed with the research team, and an initial set of themes were agreed upon. The full set of transcripts was then coded using NVivo (version 10). The coded text was organized into a matrix with rows representing interviewees and columns representing key themes. The matrix was reviewed by members of the research team, and column headings were refined and text moved within the matrix as appropriate.

## **3. Findings**

Dashboards were used by all 15 Trusts. Dashboards were described as a graphical means of displaying data about the performance of wards and departments. The term was used to refer both to the HIT systems themselves and the outputs from these systems, typically in the form of printed reports. Information was presented in a wide range of graphical formats, distinct from written papers and detailed quantitative information in finance reports. Dashboards were seen as a key component of Trusts' processes for monitoring and managing care quality and safety. Most interviewees told us dashboard information was collated manually from a number of operational systems, including Patient Administration Systems (PAS) and Datix, the NHS system for reporting patient safety incidents. Reports were typically assembled manually by central performance management teams and retrospective reports were circulated monthly to wards, directorates and Trust boards. Two Trusts had real time dashboards, which they reported made the assembly of board reports easier. Four Trusts reported that they had plans to implement real time systems. The dashboards described would be

considered as quality dashboards, providing information at a ward or organizational level, rather than at an individual clinician level.

### 3.1. Regulators

Many of our interviewees stressed the importance of regulators in determining the information their Trusts collected and used. All Trusts were required to report to national bodies including the Care Quality Commission and NHS England (a body of the Department of Health responsible for commissioning NHS services). Several interviewees pointed out that compiling data for national reporting was onerous and we were told how regulators scrutinized Trusts' data collection and reporting. The resource intensive nature of this limited the time and resources Trusts had available for collecting additional data they felt would be helpful for monitoring and managing care:

*“the information colleagues are so busy doing the national reports and making sure things are validated that there's very little time for development.” (Site A)*

Some interviewees noted reports to regulators were aggregated, and these could mask significant variations within and between Trusts. Interviewees noted reports were now available to other Trusts and to the general public and there was a concern data might be misinterpreted. For example, local circumstances such as a Trust having a prison in its catchment area, which made some targets difficult to achieve, might not be apparent in nationally published data. On the other hand, interviewees said the availability of key national targets allowed Trusts to compare their performance with others and to benchmark themselves. Indeed, one Trust indicated it reviewed other Trusts' information to see where they have made improvements and how they could in turn improve.

### 3.2. Trust Boards

All interviewees told us dashboards were important tools for the Boards of Directors responsible for managing the Trusts, with all boards receiving a great deal of detailed information about wards and departments. Board members used a number of different dashboards, covering a wide range of services and topics, including mortality, infection control and the nursing workforce, and presented in a wide range of graphical formats. Dashboard data presented at board level tended to be for activity four to six weeks in arrears, i.e. data for the month of May would be reviewed at a July meeting.

Most interviewees told us dashboards provided warning signs, highlighting specific wards or topics that needed monitoring or action. Trusts used color-coded dashboards – red, amber and green – to highlight areas that needed attention. Many of the Trusts reported dashboards were used to identify poorly performing services, which could be 'escalated' for senior management review if necessary. One interviewee described dashboard review as a “trigger or a proxy for escalation”.

Interviewees were aware dashboards could be viewed as instruments of control rather than opportunities for learning. There were concerns Trust level summaries could provide false positive information, with very good wards balancing out the bad wards. Furthermore, some interviewees said, at board level, problems may be masked by lack of detail in reports. Other interviewees were also wary of dashboards containing too much information for the board to understand or use.

The Trusts with real time dashboards still produced monthly board reports, which looked broadly similar to those in other Trusts; the key difference lay in the round-the-

clock availability of information, so managers did not have to wait for meetings to identify problems and act. Real time dashboards made it easier to manage dynamic problems such as admissions from accident and emergency departments or outbreaks of diarrhea and vomiting, because senior managers could review the situation continuously.

### 3.3. *Wards*

There was considerable variation between Trusts in availability of dashboards for ward staff. The majority reported management reports were prepared by a central team, were limited in scope, and reported four to six weeks in arrears. A minority told us dashboards were actively used by ward staff. One participant considered this active use to be due to the fact that the content was nurse-driven and nurses had had a big influence on how their HIT systems were designed and used.

Engagement of ward staff with dashboards was an ongoing issue across all Trusts. Interviewees offered a number of reasons why dashboards were not being used on wards, including clinicians struggling with the perceived low value of retrospective information, problems with local HIT systems, lack of staff education and training to use information, and earlier versions of dashboards having been poorly received, coloring renewed attempts to engage staff. A number of interviewees told us ward staff viewed dashboards as tools for control, rather than as a means to support their work.

As noted above, there were differences between Trusts with real time dashboards and those without them. Where real time dashboards were available, interviewees told us emerging risks could be addressed as they arose. These Trusts had implemented risk-based management systems, for example by ensuring all admitted patients had National Early Warning Scores (NEWS) and other risk metrics. These could be viewed on-screen and risks proactively managed.

## 4. Discussion

Our findings suggest most Trusts have some form of quality dashboard in place but there is significant variation in the sophistication of those dashboards, the majority of which still depend on manual collation of information from a number of systems. At board level, even in those Trusts that had real time dashboards, dashboards were largely being used for retrospective review. Our findings fit with earlier studies that have pointed to the time and resources invested by Trusts in reporting data items that are determined by national bodies [9], but what became clear in our interviews was the consequences this had, in terms of limiting Trusts' ability to collect data they felt would be helpful for monitoring care. If Trusts are to be able to collect data that is important to them for monitoring care quality and safety, there needs to be substantial investment not only in dashboards themselves but also in the underlying IT infrastructure, so the collation of data is not so time and resource intensive.

At ward level, while most Trusts were working with reports of retrospective data, a more promising picture of the potential of real time dashboards was revealed, with the two Trusts that had such systems describing how they were able to manage quality and safety risks proactively. If ward level staff do not engage with dashboards, this may be due to the nature of the information they present; non-real time quality dashboards present retrospective ward level data that does not support clinicians in making

decisions about the patients they are currently caring for. This suggests Trusts should not only be thinking about the development of quality dashboards for use at ward and organizational level but also considering how to present real time data at different levels of detail, supporting both organizational and clinician decision making. More generally, there is a need to increase engagement through involving staff in the development of dashboards, not just in terms of the interface but also the content, and to provide education and training about how staff can use these systems to improve care quality and safety.

The main strength of this study is that it has allowed us to determine what dashboards NHS hospital Trusts currently have in place, their plans for developing dashboards, and their reasons for doing so. However, we did not interview divisional managers or ward staff, and cannot claim to have captured reliable accounts of current use of dashboards below board level. For the same reason, our findings do not shed light on whether use of dashboards is associated with improvements in quality and safety of care. In the next phase of the study, we will use observations and interviews to gather detailed data on how dashboards are used. This will enable us to provide recommendations on dashboard development and how to integrate dashboard use into practice.

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