Using information to deliver safer care : a mixed-methods study exploring general practitioners' information needs in North West London primary care

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ABSTRACT

Background   The National Health Service in England has given increasing priority to improving inter-professional communication, enabling better management of patients with chronic conditions and reducing medical errors through effective use of information. Despite considerable efforts to reduce patient harm through better information usage, medical errors continue to occur, posing a serious threat to patient safety.

Objectives   This study explores the range, quality and sophistication of existing information systems in primary care with the aim to capture what information practitioners need to provide a safe service and identify barriers to its effective use in care pathways.

Method   Data were collected through semi-structured interviews with general practitioners from surgeries in North West London and a survey evaluating their experience with information systems in care pathways.

Results   Important information is still missing, specifically discharge summaries detailing medication changes and changes in the diagnosis and management of patients, blood results ordered by hospital specialists and findings from clinical investigations. Participants identified numerous barriers, including the communication gap between primary and secondary care, the variable quality and consistency of clinical correspondence and the inadequate technological integration.

Conclusion   Despite attempts to improve integration and information flow in care pathways, existing systems provide practitioners with only partial access to information, hindering their ability to take informed decisions. This study offers a framework for understanding what tools should be in place to enable effective use of information in primary care.

Keywords: information systems, integrated care, patient safety, primary care, quality of care

INTRODUCTION

The Department of Health in England has invested heavily in the implementation of information systems with the aim to reform the use of information in the National Health Service (NHS), enhance inter-professional communication across care levels and improve service quality and patient safety.[1] Despite the huge investments in information technology (IT) over the last decade, patients still experience avoidable harm. About 10% of patients admitted to hospital experience an adverse event.[2,3] However, less is known about the situation in primary care with the overall frequency of error per consultation among different studies ranging from 1–2% to 8%.[4–7] Ensuring patient safety in primary care is important, as the majority of health care contacts (around 90%) occur in this setting.[8] Around 300 million consultations take place in general practice each year, which translates into approximately a million consultations on an average weekday in England.[9]

Information technology can play a key role in improving patient safety in general practice by integrating clinical and administrative information from paper-based and electronic sources and presenting it meaningfully so that decisions can be taken to prevent patient harm. Electronic Health Record (EHR) and ePrescribing systems have been implemented in all primary care practices in England.[10,11] Such tools are used to collect and store demographic, clinical and laboratory data, as well as record, modify or communicate prescriptions, thus reducing the risk of prescribing errors and ensuring consistency in decision making.[12,13] Computerised physician order entry and computerised decision support systems interface with EHR systems and help to record, edit, review and communicate orders, as well as generate advice at the point of decision making.[14] The implementation of new clinical information systems has rightly attracted increasing attention in the UK, but the lack of reliable information hinders quality improvements at every level of the NHS and introduces risks for patient harm.[15]

Communication breakdowns at the primary–secondary care interface are a significant risk factor for errors in general practice, related, for example, to outpatient appointments or hospital discharge.[16] In this study, our goal was to capture the range, quality and sophistication of existing information systems in general practice and to explore whether important information is still missing. We also aimed to use this knowledge to create a framework that can be used to improve patient safety in general practice.

METHOD

Study setting

This study was conducted in North West London around the time when a new model of integrated care was piloted.[17–21] The North West London Integrated Care Pilot involves collaboration and exchange of information between providers from primary and secondary care, along with community, mental health and social services, with the aim to improve continuity of care for people with diabetes and the elderly. The latter are high-risk group for experiencing medication errors,[22] the most common type of patient harm in general practice.[23] A new IT tool, designed to integrate information from general practice, hospital, mental health and community care systems, was implemented to provide all those involved in care provision with online access to patient data.[20] This was expected to result in better information flow in care pathways and more information for general practitioners (GPs) to provide safer care. Given all those structural and technological changes, North West London offered an ideal context to explore the use of information in care pathways.

Study design and sample

The study adopted a mixed-method design. This involved collection of qualitative data through semi-structured interviews with GPs and quantitative data through a survey investigating their experience with existing information systems in care pathways. The interviews explored i) GPs' perceptions of existing information systems in primary care, ii) their information needs to provide a safe service and iii) factors hindering the effective use of information in care pathways. Thematisation, questions and probes in the interviews emerged from the relevant literature and experience of the multidisciplinary team of researchers at Imperial College.

A five-point Likert scale survey measuring health professionals' experience of integrated care was developed through consensus among a multidisciplinary group (MDG) of researchers and clinicians at Imperial College. The survey was piloted with a convenience sample of five GPs who had consented to participate in an interview exploring staff experience with the pilot. As a result, one item was removed and two questions were reworded to improve clarity. The final questionnaire, which overall consisted of 25 items, included three items measuring GPs' satisfaction with i) the quality and range of information in general practice, ii) access to patient data and iii) IT integration in care pathways. In this paper, we report GPs' responses in relation to these items. Integrated care-specific results are reported in another publication.[17]

A purposive sample of 25 GPs from 15 practices in North West London was invited to take part in the interviews. Those individuals were considered particularly informative as they were from practices that joined the pilot during its first wave (June–August 2011) and therefore had over 6 months experience with the new IT tool and other systems used in the pilot to communicate information between primary and secondary care providers. Their knowledge about the IT system was enhanced through participation in monthly MDG meetings, which provided a context for learning and knowledge sharing among health professionals. Moreover, paper-based, self-completed questionnaires were distributed to 200 health care professionals. Survey participants were invited to complete a questionnaire during 12 MDG meetings taking place between May and June 2012. Attention was given to avoid response duplication and

maximise representativeness by selecting participants from three different MDG meetings in each of the following geographical areas in North West London: Hammersmith and Fulham, Kensington and Chelsea, Westminster, and Ealing. All these MDGs were established within 3 months from the launch of the pilot in June 2011.

Data collection

Qualitative data were collected in the first half of 2012. All interviews were conducted separately at the participants' practices. The average length of each interview was approximately 40 min. Informed consent was obtained before each interview. The questionnaires from the health professional survey were distributed and collected by the researcher before the start of the MDG meetings. Some respondents completed the survey at the end of those meetings and returned it by post.

Data analysis and synthesis

Interview data were audio recorded, transcribed verbatim and analysed thematically using the framework analysis approach.[24] Questionnaires were analysed using the Statistical Package for Social Sciences (v19). Descriptive statistics were used to outline the relative proportion of practitioners who were (un-)happy with the quality, range, access and integration of information in care pathways. Survey data were categorised into positive (strongly agree, agree somewhat), negative (strongly disagree, disagree somewhat) and neutral (neither agree nor disagree) to provide a clearer picture of the direction of responses. Interview and survey data were synthesised thematically.[25]

RESULTS

Demographics

Of the 25 GPs who received an interview invitation, seven agreed to take part. The group consisted of five men and two women with an average age of 47 years. All participants had over 6 months experience with the IT tool, which went live less than a year before the start of this study. In addition, 51 of the 200 health professionals who were invited to complete the survey returned their questionnaire giving a response rate of 25.5%. Of those, 31 were GPs and were included in the analysis. No demographic data were collected for the survey respondents.

Information systems in general practice

EHR systems are the main sources of information in general practice. Interview participants said that existing systems provide them with access to patients' records and protect against medication errors by flagging up alerts about potential side effects or drug interactions. GPs use those systems to access information which is collected in general practice and stored directly into patients' records, including medical history, allergies, immunisation history, medications and repeat prescriptions. They can also

access information collected in other settings, such as pathology and radiology results, discharge summaries, accident and emergency (A&E) reports and clinical letters from outpatient visits and investigations. Overall, participants were happy with the quality, simplicity and usefulness of those systems (Box 1).

Box 1 GPs' perceptions of existing information systems

GP01: *EMIS [Egton Medical Information Systems, EHR system] has everything. I am pretty happy with it. It is practical, it is easy. It flags any side effects, any interacting drugs.*

GP03: *I can have a very good overview of regular medicines, medical history, allergies, the latest things they have been in for in under 30 seconds really.*

GP06: *It [EHR system] brings the results back to us, X-ray results, blood results, hospital letters, they get scanned onto it. All the consultations, the past medical history, all the medications, all the allergies, all the immunisation history, all the documents.*

Information needs in general practice

Despite the satisfaction with EHR systems in general practice, the dominant perception was that important information is still missing. Interview respondents reported that data collected in hospitals are often shared late or not at all. In addition, hospital documents need to be scanned and attached to a patient's record rather than seamlessly integrated into records. As a result, GPs said that they sometimes have to make clinical decisions with little or no information. There was a general agreement that GPs need high-quality electronic discharge summaries indicating medication changes, new tests and investigations, and changes in the diagnosis and management of patients close to real time, results of findings from clinical tests and online access to pathology results ordered by hospital specialists (Box 2).

Box 2 GPs' perceptions on information needs in general practice

GP03: *There is no system where they [clinicians] can say this is why they [patients] were in, this is what we did, this is the main difference on discharge or any changes in medicines please this is the main change or this person has low sodium, could you please measure it in 1 week.*

GP05: *Scan results, like often, a specialist organises a scan or something and we don't get a copy. A copy of the results is always useful with patients who come back to us.*

GP07: *I certainly think a transparent system of pathology results, wherever a patient has a test done you could see it wherever you are.*

Barriers to information usage

The analysis revealed a number of factors constraining the use of information in general practice. First, the communication gap between primary and secondary care needs to be addressed. Sometimes GPs are unaware of their patients' recent tests, scans and medication changes as their hospital colleagues often omit to include these findings in reports to practices. In addition, when these documents do arrive, they are often poor containing ambiguous or inadequate information to make clinical decisions, or arrive too late, when decisions have already been made. Specifically, respondents said that A&E reports are usually received within 3 days, whereas discharge summaries and outpatient letters often take up to 3 weeks to arrive. This is particularly problematic for patients who visit their GP soon after their discharge from hospital. Participants felt that would be useful to have this information electronically shared in real time, but the minimal IT integration between hospital and general practice systems hinders effective information sharing in care pathways and increases the risk of medical error in general practice (Box 3).

Box 3 GPs' perceptions on the barriers to the effective use of information

GP02: *When hospitals send them [A&E and discharge summaries) through we have all the information, although sometimes you do not get those through.*

GP03: *The home system is integrating with nothing. The only thing that automatically populates is blood results, but we are the ones that have ordered them, not the hospitals. The fundamental thing would be that the hospital doctors next door each time they saw a patient, they would just log on, call in the patient, look at the system, all that I can see they can see, put their bits and pieces like what they have seen or what they have found, any test results would also come back, so that there would be one continuous moving record. That's the ultimate.*

GP04: *If you have got a diabetic patient, where you wonder what his controls are like, with data, to see if he is being well controlled, and you send off a blood test, to check his sugars, and he says oh, I had that done at the hospital, but the letter from the consultant says he is doing very well and he is fine, but there is no data, they don't write down the number.*

GP07: *Written discharge summaries are usually pretty terrible, very variable quality of information. What we really need is good and timely data.*

GP experience survey

The results from the health professional experience survey verified the interview findings. GPs were asked whether all the required information was in place to provide a safe service. Of the 31 GPs who took part, 14 (45.2%) responded no,

while only 9 (29%) were happy with the existing range of data in general practice. Participants were also invited to indicate whether they had access to all the required data through the new IT tool, with over 60% (*n* = 19) of GPs replying that they needed more information to deliver high-quality care. Finally, most GPs (*n* = 17, 55%) shared the view that available IT systems do not integrate well, hindering the provision of a better service in primary care (Table 1).

Table 1 GP experience with existing information systems (*n* = 31)*

	Agree	Disagree
I have all the information that I need to provide a safe service	9 (29%)	14 (45.2%)
The IT tool provides me with access to all the information that I need to deliver high-quality integrated care	4 (12.9%)	19 (61.3%)
The IT tool fits well with other tools that I use and in combination helps me to provide a better service	5 (16.1%)	17 (54.8%)

*The remaining participant number (from 31) and percentage (from 100%) for each question pertains to neutral responses

DISCUSSION

Principal findings

This study provides new findings on the flow and use of information in primary care by examining practitioners' experience with information systems in an integrated care environment. Despite the expectation that integrated care would improve communication between providers,[20] the results show that GPs remain dissatisfied with the quality and timeliness of information in care pathways at this early stage of the pilot and often have to make clinical decisions based on missing or limited information, potentially exposing patients to safety risks. GPs were often unaware of a patient's admission to hospital, new prescriptions and test results. Clinical communication was patchy with discharge summaries indicating changes in the diagnosis and management of patients often failing to be shared with GPs or being shared with up to 3 weeks delay compared to the 24-hour target. Despite the large investment in IT, technical integration in the NHS is still in an early phase, adding to the communication problem between primary and secondary care (Box 4).

Box 4 Key findings

- Existing information systems provide GPs with variable in quality and consistency access to hospital generated information.
- GPs often take clinical decisions based on limited information exposing patients to safety hazards.
- Structural and technical barriers hinder effective information sharing in care pathways.
- Discharge summaries commonly reach primary care in 3 weeks, well above the government's 24-h target.

Implications of the findings

Communicating information about a patient's journey in hospital in a timely and accurate manner is fundamental for the provision of safe care. GPs referred to the variable quality and consistency of clinical letters across hospitals and specialties indicating that there are problems in all stages of the communication process. The NHS needs to revise existing documentation and communication policies and develop effective systems to support the information flow between primary and secondary care. Review of current learning structures, assessment of existing knowledge and reporting skills and targeted training to all those involved in the documentation of patient information can improve the quality of hospital documents. Electronic sharing of discharge summaries can speed up the communication process, provide GPs with timely access to information and ultimately reduce medical errors and unnecessary readmissions while saving costs and administration resources for hospitals. Indeed, a recent study in England showed that, by improving the transmission rates of electronic discharge summaries sent within 24 h to GPs, care handover was improved and costs reduced.[26] In our study, GPs were happy with the simplicity and usefulness of existing systems, but frustrated with the complexity of the new IT tool for care planning. Technologists may use the findings of this study to improve existing IT systems and design tools that integrate well with general practice systems and workflows to enable practitioners make effective use of information. Designing information systems that provide relevant and accurate information at the point of decision making can reduce patient harm.

Comparison with previous research

GPs considered the communication gap between primary and secondary care as the most common barrier to the effective use of information and serious threat to patient safety. Other studies have also highlighted the consequences of communication breakdowns on prescribing and patient monitoring in primary care.[6, 22, 27, 28] A UK study assessing quality and safety in chronic obstructive pulmonary disease (COPD) pathways with secondary care staff found that often GPs do not receive discharge summaries due to communication failures.[29] In this study, GPs identified additional information that fails to reach primary care, including findings from outpatient investigations and laboratory tests. Our study also found that electronic information sharing was minimal, involving only access to pathology results. Discharge summaries were scanned and attached onto patients' records. A similar picture was obtained in a study examining the use of EHR systems in care pathways in Midlands, with information sharing being slow and patchy.[30] Discharge summaries should reach primary care within 24 h of a patient's discharge.[31] However, our analysis revealed that hospitals in North West London

have failed to meet the 24-h discharge summary target, resulting in GPs often missing important information when they issue new or repeat prescriptions or order blood tests and scans for their patients.

Limitations of the study

The study has some limitations. First, the number of interview participants was too small to generate fine-grained themes. However, given the exploratory aim of the study and the homogeneity of participants, the sample size was sufficient to develop high-level, meaningful themes and interpretations.[32] Second, we did not conduct a power calculation for the provider survey and therefore our sample may not be adequately powered, although it should be sufficient to give relatively precise responses. Third, although we tried to invite GPs from different practices and areas in North West London, there may be a selection bias limiting the representativeness of our sample and therefore the generalisability of our findings. Finally, considering that technology adoption is complex and multidimensional,[33,34] the time from implementation to evaluation was relatively short to assess the performance of the new IT tool. Therefore, no conclusive evidence can be drawn about the usefulness of the system.

Call for future research

Future studies could explore the variability in the quality and consistency of clinical letters across hospitals and specialties and the role of technology in the communication process. Future research could ask what is the variation in time from discharge to letter within the trust and identify what factors contribute to the variable quality and consistency of hospital documents. Researchers could also look at the role of technologies, such as mobile phones, in speeding up communication in care pathways and explore how to normalise those tools to sustain effective information sharing.

CONCLUSIONS

Despite attempts to improve integration and information flow across care levels, our findings confirm that the communication gap between primary and secondary care has yet to be bridged. Existing information systems provide GPs with incomplete information to take well-informed decisions. It is vital for the NHS to put systems in place to ensure that discharge summaries and other documents reach primary care within 24 h of hospital discharge. This study offers a framework for understanding what information tools should be in place to enable effective use of information in the UK primary care and may be used by other NHS trusts and IT providers to inform future information sharing initiatives.

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