Information in general medical practices: the information processing model

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Background. The need for effective communication and handling of secondary care information in general practices is paramount.

Objective. To explore practice processes on receiving secondary care correspondence in a way that integrates the information needs and perceptions of practice staff both clinical and administrative.

Methods. Qualitative study using semi-structured interviews with a wide range of practice staff (n = 36) in nine practices in the Northwest of England. Analysis was based on the framework approach using N-Vivo software and involved transcription, familiarization, coding, charting, mapping and interpretation.

Results. The ‘information processing model’ was developed to describe the six stages involved in practice processing of secondary care information. These included the amendment or updating of practice records whilst simultaneously or separately actioning secondary care recommendations, using either a ‘one-step’ or ‘two-step’ approach, respectively. Many factors were found to influence each stage and impact on the continuum of patient care.

Conclusion. The primary purpose of processing secondary care information is to support patient care; this study raises the profile of information flow and usage within practices as an issue requiring further consideration.

Keywords. General practice, GP, information, primary care, qualitative research.

Introduction

General practice is a key element of the UK health care system. As frontline staff, general practitioners (GPs) provide comprehensive and continuing generalist care to all patients seeking medical expertise and treatment. They are ideally placed to help patients choose and obtain care from other health care providers, offering controlled access to specialists as part of their ‘gatekeeping’ role.\textsuperscript{1} General practices could also be considered a central hub for information sharing and discussion, engaging in effective communication with patients, hospital and social care services. There is an extensive body of literature existing on the timeliness,\textsuperscript{2–7} completeness\textsuperscript{2,5,8–17} and accuracy\textsuperscript{15,18–20} of information and knowledge transferred between primary and secondary care. Communication breakdowns and delays take prominence due to their impact on the continuum of patient care; the National Programme for Information Technology expects to address these difficulties.

Throughout the last decade, several UK studies\textsuperscript{21,22} have identified shortcomings in the information handling and management procedures within practices. A selective literature review, concentrating on material published in the 1990s,\textsuperscript{23} highlighted the need to evaluate different models of information delivery, monitoring GPs’ attitudes, perceptions and behaviour as they use information. Whilst literature already exists on GPs’ information needs and information-seeking behaviour,\textsuperscript{24} very little is known about how practices process information from secondary care and how it is used and flows within the practice. This study is particularly timely in the midst of current technological advances in the area of GP computing.\textsuperscript{25} We aim to explore practice processes on receiving secondary care correspondence in a way that integrates information flow, usage, needs and perceptions of practice staff both clinical and administrative.

Materials and methods

Participants

An invitation to participate in an ethically approved, exploratory study was sent to all practice managers (n = 79) within three primary care trusts (PCTs) in
the Northwest of England. Those who agreed to be interviewed (n = 26) distributed letters of invitation to other practice staff (n = 397). Nine practices were purposively selected to include as many members of the practice team as possible, one of whom was a GP.

**Interviews**

Thirty-six, face-to-face, semi-structured interviews were undertaken between January and July 2005 with GPs (n = 14) and one or more other staff members per practice (see Table 1). The piloted interview topic guide used open-ended questions to discuss the main issues of secondary care correspondence and its distribution within practices. Interviews took place at a location of the interviewee’s choice, lasted for ~25–150 minutes, were audio-taped with written informed consent and transcribed verbatim. Thematic saturation was successfully achieved when subsequent interviews yielded no new themes.

**Analysis**

Data were examined both within and across practices to gain insight into different practice processes and to look for any overarching approaches that advanced or hindered them. The original transcripts were read repeatedly and coded with the use of QSR N-Vivo version 2.0. A workable list of main and sub themes was developed, continually refined and reapplied systematically to the whole data set in accordance with the five stage ‘framework’ approach.26 The stages of the ‘information processing model’ were developed by comparing and contrasting one participant’s views and experiences with another, and moving backwards and forwards between the data set and evolving explanations using the ‘constant comparison’ technique.27 Apparent ‘negative cases’ were examined and categories adjusted accordingly. The removal of unrelated text has been indicated by ellipses (...) and words in parenthesis added to help clarify meaning. Participants’ occupation or role have been identified by the following key—DR: GP; PM: practice manager; NU: nurse and AD: administrative staff; the order of interviews have been indicated by number.

**Results**

Practice processing of secondary care correspondence involved six stages as outlined in the information processing model (Fig. 1). The ordering of these stages varied between practices, as did the person with whom responsibility lay to complete such tasks.

**Stage 1: receiving the information**

The first stage of the information processing model began on receiving secondary care correspondence (Box 1). This involved checking to make sure that mail was received by the correct practice and stamping it. The stamp provided space for the date of arrival to be entered, as well as the initials of individuals who completed the necessary tasks. It also enabled doctors’ preferred course of action to be communicated to administrative staff and indicated which stage of the process the document was currently at.

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**Table 1** Summary of practice staff details including identification code

<table>
<thead>
<tr>
<th>PCT number</th>
<th>Practice number</th>
<th>Doctor</th>
<th>Practice manager</th>
<th>Nurse</th>
<th>Administrative staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>DR1</td>
<td>PM2</td>
<td>NU3</td>
<td>AD4</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>DR15</td>
<td>PM16</td>
<td>NU17</td>
<td>AD18</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>DR23</td>
<td>PM26</td>
<td>NU27</td>
<td>AD33</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>DR28</td>
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<td>n/a</td>
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<tr>
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<td>DR17</td>
<td>PM26</td>
<td>NU27</td>
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<tr>
<td>3</td>
<td>10</td>
<td>DR12</td>
<td>PM3</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

n/a refers to situations where the practice staff were not willing to participate.

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When correspondence was not received, the majority of practices relied solely on the patient/relative to inform them. One senior receptionist perceived practice staff as being completely unaware of every patient referred and whether subsequent correspondence had been received. In contrast, one GP recounted keeping a personal list of referrals and the manager of Practice 9 a similar personal record, thus enabling them both to chase up correspondence not received. The manager also noted how such information was available on the practice computer system, thus providing a second check. This finding was supported by one of the GPs in her practice emphasizing how ‘we have now sort of made a diary of things that needed to have been done and we have deadline dates in it where they can back check appointments and scripts etc...’ (DR34:P9:PCT3).

Unawareness of patients’ hospital visits also impacted on the continuity of patient care. Some GPs were unable to visit patients at home after discharge because they were unaware of their admission. One GP provided a hypothetical example of how secondary care information could have enabled her to offer a timely one-to-one consultation to a discharged patient, thus potentially avoiding a relapse of their condition and consequent readmission.

We wouldn’t always know if, for instance, somebody went to hospital because they were going mad (…) we won’t know that they had been discharged basically (…) let’s say (…) they had been discharged with a week’s worth of quetiapine (Seroquel®) and a month later they hadn’t had their quetiapine they would be mad again. And they would need sectioning or whatever so … It is about the patient’s continuity of care really and I might have liked to offer the patient the opportunity to come and see me about their madness (DR24:P7:PCT3).

This example highlighted two significant points: it strengthens the argument against relying solely on the discharged patient to contact the practice and raises the issue of adequate medication supply to patients on discharge.

Two practices appeared to have different systems in place for certain patient groups. Particular attention was given to cancer patients, with their files kept separately and a nominated nurse and GP following up their progress in one practice. This finding may be related to the National Health Service Gold Standards Framework, which encourages practices to set up and maintain a register of all cancer patients so as to record, plan and monitor their care.

Stage 2: dissemination of information within the practice

This study suggests that some GPs did not see secondary care correspondence due to breakdowns in the practice’s dissemination process. Two problems were identified: how the correspondence was addressed by the hospital and whether checks had been carried out by practice staff as part of the dissemination. The former appeared to be influenced by the position of the GP’s name in the practice title: ‘Dr. A (…) he is the first, it’s A, B and C’ and when the hospital ‘are sending it out they just see the practice name and put his name first’ (DR12:P4:PCT1). One practice manager felt that erroneous information supplied by the patient may have had an influence and another GP reflected on the out-of-date information stored on the hospital system, with letters addressed to ‘Dr X. who retired nine years ago’ (DR24:P7:PCT3).

The second reason related to whether computer checks (facilitating the identification of the referring GP) had been carried out by practice staff prior to dissemination. Practice 7, which admitted not carrying out such checks and relying solely on the receptionists’ recollection and experience, found that some hospital correspondence was disseminated unintentionally to non-referring GPs. This created ‘problems in the practice because Dr. A goes “I don’t remember referring her”’ (DR24:P7:PCT3). In other practices, it was also possible for a GP to have seen the patient and not know that such correspondence had been received.

Working patterns of the referring GP also created difficulties, as explained:

I’m only in the practice three days a week so if information comes on a Monday or Tuesday I may actually not get it. That obviously creates

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**Box 1** Types of correspondence received from secondary care at hospital discharge

| Discharge summary: | A brief one page, preformatted document that is usually completed by a hospital doctor to convey immediate summary discharge information to the GP on a patient’s discharge from hospital. |
| Discharge letter: | The later report produced by a hospital doctor to convey more detailed information regarding an inpatient’s stay to the GP with ongoing responsibility for the patient’s care. |
problems... often messages are confused or lost or a colleague has to deal with it (DR24:P7:PCT3).

From this GP’s account, there appeared to be no system in place to ensure that she was reliably informed on her return. Practice 2, in comparison, had a system where each GP had a nominated ‘partner’ and any correspondence for a doctor who was absent would go to that partner to be actioned.

Stage 3: amending or updating practice records
The amendment or updating of practice records was carried out by GPs, whilst simultaneously (‘one-step’ approach) or separately (‘two-step’ approach) actioning secondary care recommendations (Stage 4). The one-step process offered potential advantages over the two-step process, with fewer people involved and a reduced likelihood of possible errors occurring.

The one-step approach. GP difficulties in carrying out a one-step approach appeared to Centre on secondary care correspondence being delayed, illegible, inaccurate or incomplete. One GP felt that the hospital only wrote ‘the new drugs they are on and you don’t know if they are still on the old ones or not, and has that been stopped and if so why’ (DR12:P4:PCT1). The assumption was often made that all medicines had remained unchanged if not informed otherwise by the discharge correspondence. The speediness with which patients’ records were amended was also apparent, thus facilitating those who might need a repeat prescription. As one doctor stated:

if there is anything that needs doing then we pretty much do it that day. So... when the patient phones up to ask for more it is already there (DR11:P4:PCT1).

One GP relied on the hospital specialists to inform him of how long a patient should be maintained on a particular medicine, as he found it hard to always stay up-to-date with the latest guidance. Omission of such information by the hospital, therefore, increased the possibility of short-term drugs being entered on the patient’s record without a discontinuation date. Discrepancies were also reported between medication listed on a patient’s discharge summary and discharge letter (Box 1). One GP reported ‘go(ing) along with the green discharge (summary)’ and amending patients’ records accordingly, whilst carrying out a second check ‘when the typed written letter comes’ (DR19:P6:PCT2). She was keen to point out, however:

that’s again sometimes where you get a discrepancy because you have stopped that one because it is not on the green one, and then ‘oh, on the white one (hospital letter) yes, they are still on it’. (DR19:P6:PCT2).

In the absence of further information, she presumed that the discharge letter was correct.

The two-step approach. In practices using a two-step approach, administrative staffs were authorized to add medication listed on the discharge summary to the patient record, as well as changing drug dosage and strength. GPs then reviewed the updated records and actioned any recommendations. One GP perceived this process to work safely and efficiently, although admitted later in the interview:

obviously with all the people involved you can get no end of permutations of errors (...) the girls may erroneously change some things and make a human error that they just added five things on, rather than take five off, so now they have got ten (DR28:P8:PCT3).

Unlike the one-step approach, negative aspects of the two-step approach included the potential disadvantage of having a number of individuals involved and the difficulties that may occur at the ‘handover’ stage. Administrative staff in Practice 8 also reported difficulties in interpreting hospital information, with one explaining how the terminology often confused her:

sometimes, it can be on your screen as diabetic type II and it will come in on the letter diabetic type I because obviously they have changed... well I’m not too sure... we (receptionist and GP) will go through them... Sometimes it’s the way the hospital has worded it. Because I’m obviously not medical, I don’t know really what that is... and I have tried my best to get in on and then Dr. B will say well if you type it in as LVF etc. it will come up (AD33:P8:PCT3).

In relation to diagnoses, discharge letters were felt to contain ‘clearer’ information; one manager showed hesitation in inputting information from discharge summaries and considered it more appropriate to delay the entry until further information (usually in the form of a discharge letter) was received.

actually angina is probably one of the worst because you will get ‘possible angina’ as a reply from the hospitals and then of course we won’t put it on the computer as angina because if we do then it obliges us to send them for this test, do this, do that, you know so we will hang on until somebody actually really tells us (PM35:P9:PCT3).

Staff in this practice appeared aware of the consequences of entering an uncertain diagnosis and records...
containing potential inaccuracies. Supporting the views expressed previously by GPs about the one-step approach, administrative staff voiced their unease at deciphering the length of time patients should be on particular medicines for. The final decision appeared to rest with the GP.

The timing of amendments was important, with one receptionist recounting how: ‘we get people ringing up and it is not on the computer but it is there in the notes and they know. They say “Oh, I’ve been told to start something”‘ (AD33:P8:PCT3). According to one GP, such delays had led to prescriptions being issued from out-of-date medication records; their manager proposed just using the information contained in discharge summaries rather than discharge letters to combat the expected delay.

Stage 4: reading and actioning recommendations

Although occurring simultaneously with Stage 3 in practices exerting a one-step process, the analysis suggests that timeliness and attention to detail were significant when actioning secondary care recommendations.

Timeliness. Delays in actioning secondary care recommendations appeared to relate to GPs’ characteristics, workload and prioritization of tasks. The fact that Practice 2 operated from a split site was also pointed out by one receptionist; 48 hours was considered a realistic time within which to have looked at everything. One GP offered another perspective, reflecting on how delays were inevitable if medication changes were not made until the GP saw the patient.

the patient thinks that if they have been to the hospital and we have had a letter that when they send for the next prescription any corrections will have automatically been made. And that is not always the case. If we haven’t seen the patient, we won’t usually alter their prescription (DR5:P2:PCT1).

One of the perceived benefits of the two-step approach was the speed with which changes could be made, as administrative staff did not have to wait for doctors to look at post.

Attention to detail. One GP using the two-step approach emphasized the perceived dangers of results being presented in hospital correspondence without remark.

sometimes they (results) can be massively abnormal and nobody (hospital clinicians) has actually acted on them at all and they have just kind of stapled to the back of a letter and that can be quite entertaining too especially I have certainly encountered lots of doctors who will scribble ‘file’ on all the notes and they won’t actually have seen it at all so that issue was not addressed (DR24:P7:PCT3).

This account highlights two important points: the lack of clarity with which certain secondary care recommendations are made and the attention to detail paid by GPs when actioning recommendations. Another GP offered similar evidence, explaining that ‘where it falls down (is) because some doctors file it’ (DR28:P8:PCT3) implying that amendments may not have been checked or recommendations actioned.

Stage 5: scanning and filing of information

This stage varied widely in its order among the various stages in different practices’ processes. When performed early, one GP appeared enamoured by his ability to view all the latest correspondence on screen:

I mean we have an in-tray … and I can read all the letters and mark them that I have seen them (DR2:P1:PCT1).

This had the potential to eliminate dissemination problems previously discussed, as all GPs could access correspondence once scanned. Receptionists described it as a relatively straightforward task, especially if GPs wrote on the correspondence ‘which problem they want it linking to. So say … if it is a baby, it is linked to a pregnancy’ (AD14:P4:PCT1). Practices appeared to benefit from reduced paper build-up, with one shredding scanned hospital letters 4 weeks after they had been received.

Stage 6: informing the patient

Practice policy dictated whether patients were informed of drug changes (in accordance with secondary care recommendations) or not. Practice 4 always informed patients by telephone, thus providing them with an opportunity to see the doctor and discuss the changed or new medication. Patients were informed of test results to avoid any ‘slipping through the net’. In Practice 8, however, the decision appeared to rest with the individual GPs; new drugs were added without informing the patient. Unfortunately, this caused problems with the receptionist recalling how patients would:

ring up and say “I’ve got this. What is this? I have never seen it?” (…) they don’t even know they are supposed to be taking (AD33:P8:PCT3).

One GP regarded himself as acting appropriately by hesitating to inform patients and placed the blame firmly on the hospital for not providing more detailed information both in their correspondence and directly to the patient.
Discussion

The main strength of this study, as far as we are aware, was that it is the first to explore the various stages involved in practice processing of secondary care information and to develop an information processing model suggesting how such stages may be arranged. It is clear that a diverse range of processes existed in the nine practices studied, and, as such, it was difficult to put together a model representative of general practices as a whole. Undertaking the study within a single Strategic Health Authority in the Northwest of England might also have negatively influenced the transferability of these findings. Notwithstanding these limitations, common themes did emerge, and the breadth of participants' backgrounds enabled multiple perspectives to be gained from both within and between practices.

This study identified broad shortcomings in practices' information needs and usage, with staff sometimes unaware of patients' hospital attendance and subsequent correspondence received. However, such unawareness may have stemmed from practice staff's inability to exploit the potential of computer software and generate lists of recorded hospital referrals. Problems associated with information handling procedures were also exposed, including breakdowns in practices' dissemination process. Such breakdowns were believed to be partly responsible for referring GPs not receiving hospital correspondence. This appears to be the first study to raise important concerns about the practice process and suggests that this may have contributed to delays reported in the literature.3,29,30 The introduction of the new General Medical Services Contract31 may also have accentuated the problem by retaining the patient's legal right to see a GP of their choice subject to availability. Although such choice is important, the chosen GP may have differed to the one they are registered with or who referred them; this has the potential to jeopardize the continuity of patient care.

This study introduced the concept of the one-step and two-step approach, revealing how amendment or updating of practice records was carried out whilst simultaneously or separately actioning secondary care recommendations, respectively. Although the latter may help reduce GP workload, it exhibited potentially more information-related problems than the former. Administrative staff's inability to interpret, and hesitation to input, hospital information from discharge summaries may have given rise to potential inaccuracies in data recording and possible omissions. Such a finding gains increasing impetus with the NHS Connecting for Health programme and subsequent good practice document25 highlighting the importance of consistency and accuracy in data entry and reviewing and changing practice procedures if necessary to help meet this goal. Our study also highlights the possibility of drugs being entered on patient records without a discontinuation date, thus enabling future prescriptions to be generated on request. This has the potential to contribute to NHS costs and put patients at risk of medication being continued for longer than intended. Drawing on the work of Griffin et al.,21 allocation of a specific person with overall responsibility for the completeness and accuracy of patient records may help reduce the likelihood of omissions or errors. To conclude, we identified six stages involved in practice processing of secondary care information and explored the difficulties experienced by staff, which align with other anecdotal accounts.32 We have also highlighted how essential information may have been entered erroneously into patient records or possibly excluded. This places the patient at increased risk of medication error by either taking more medicines than intended or medicines that are incompatible, thus increases the risk of complications.33 The primary purpose of processing secondary care information is to support patient care; this study raises the profile of information flow and usage within practices as an issue requiring further consideration.

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Declaration

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Conflicts of interest: None declared.

References


