

Is there a role for community pharmacists in identifying discrepancies in medication histories for patients admitted to hospital?

By Michael Wilcock and Joanna Lawrence

Abstract

Aim

To evaluate the extent of discrepancies in the medication history for patients admitted to hospital and to determine the value of community pharmacy patient medication records (PMRs) in identifying these discrepancies.

Design

Survey of acute adult admissions over an 18-month period.

Subjects and setting

Adult patients admitted via the emergency medical unit at Royal Cornwall Hospitals NHS Trust.

Outcome measures

The incidence and type of discrepancies between the medication history obtained by a clinical pharmacist and by a hospital doctor. The content of, and the value of, the medication history obtained from the community pharmacy PMR when compared to these two hospital-derived histories.

Results

There was complete agreement between all three sources of medication histories for only 21% of patients. Agreement between the clinical pharmacist and the hospital doctor was noted for 44% of patients, between the clinical pharmacist and the PMR for 43%, and between the hospital doctor and the PMR for 24%. For 57% of patients where the clinical pharmacist and the PMR disagreed, there were 231 medication discrepancies. 41% of these discrepancies were due to the clinical pharmacist identifying a drug not recorded in the PMR. Low dose aspirin was commonly noted to be one of the drugs not recorded in the PMR. For two-thirds of patients, the PMR added no extra value to the admission's process.

Conclusion

Determining an accurate medication history is a challenging process that depends upon information gleaned from a number of sources. A clinical pharmacist-acquired history is more accurate than that of a hospital doctor's history, and is not substantially improved by an examination of the medicines listed in the PMR. The reliability and accuracy of community pharmacy PMRs has to increase before they are seen as a valuable source of data on prescribed, dispensed and OTC medication

cannot be checked if the admission takes place outside the opening hours of GP surgeries. Likewise the repeat prescribing slip may contain items that have recently been stopped but not yet removed from the slip. An added complication is that patients who purchase over-the-counter medicines, including herbal medicines, may not consider these as real drugs or medicines and so may not declare them to the admitting hospital doctor.^{4,5}

A number of small studies, both in the UK⁶⁻⁸ and abroad^{9,10} have explored the potential for the community pharmacist to contribute to the admissions process by making available information held in their patient medication records (PMRs). These studies have produced mixed results and none has covered the potential disadvantages from using PMRs, ie, the studies assume that the community pharmacy record is guaranteed to be complete and accurate.

Pegrum⁶ requested the medication history and a PMR printout for 90 patients admitted to hospital. Fifteen interventions, mainly concerned with dose and strength issues, were made as a result of the community pharmacists' information although the author acknowledges the delay and inconvenience of having to request paper-based information from pharmacies. In another UK study, Brookes and colleagues⁷ found that 60 per cent of 109 patients had a discrepancy in their medication history on admission. Though the authors' methodology set out to compare the hospital pharmacist-acquired medication history with, among other sources, community pharmacists' records, in fact they make no mention of this aspect of their study in their results. Currie and Beacon,⁸ in a study of 128 patients, reported that a drug history obtained from the GP was the most likely to lead to an intervention on admission (50 per cent of 699 interventions). A drug history from the community pharmacist enabled only 18 per cent of interventions to be made. In an American study, Kuehl and colleagues⁹ found that information transfer between ambulatory care pharmacies and a hospital pharmacist at the time of admission enabled more in-hospital interventions to be made than for a control group of patients for whom there was no such information transfer. The most frequent types of interventions were those that resulted in the addition of a drug. However, there are some limitations to this study and the authors

The exchange of information, particularly medication-related information, between primary and secondary care is recognised as a cause of many problems. The presence of discrepancies in the medication history of patients both admitted to hospital¹ and those attending outpatient clinics² has been known for many years. Inaccuracies in the medication history can lead to duplication of drugs, unwanted drug interactions, discontinuation

of medicine use, and failure to detect drug-related problems.

When a patient is admitted to hospital the admission procedure starts with the patient being "clerked" in by a doctor on the ward. Since medical admissions, in particular, are often untimely and unexpected, information on a patient's medication history may be incomplete and of poor quality. As part of this process of obtaining a medication history the doctor may have access to a number of information sources, eg, the patient, relative or carer, a letter from the patient's GP, a copy of the GP repeat prescribing slip or medicines brought in by the patient. Unfortunately it is well documented that the accuracy of these information sources can be unreliable.³ The patient, especially if on a multi-drug regimen, may be uncertain of their medication or they may not have brought all their medicines into hospital, especially if admitted urgently. Often the GP's admission letter lists medicines but omits doses and frequencies. These details

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recognise the need for further work to establish the value of information exchange. Van Hesse and colleagues¹⁰ used the records of a Dutch community pharmacy as the source of outpatient medication for 205 patients admitted to hospital and identified 263 out of 709 outpatient medicines that had been discontinued on admittance to hospital. Only 15 of these (among 12 patients) were deemed to be serious inadvertent omissions. The authors support the use of information held by community pharmacies as a source of medication histories, but the Dutch situation, where patients tend to be registered with just one pharmacy, differs from that in the UK.

The accuracy and completeness of PMRs depends on a high degree of patient loyalty to the same pharmacy. In the UK, expressions of loyalty (ie, the patient regularly uses the same pharmacy) have ranged from 60 per cent to over 80 per cent.^{11,12} It may be suspected that patients living in a rural area would show greater loyalty to one pharmacy than those living in an urban area with more choice of pharmacies.

Electronic communication between primary and secondary care, and within primary care¹³ may improve the quality of patient data, and in the UK there is a move towards developing a national electronic patient record. Access to electronic health records will be essential if community pharmacists are to contribute effectively to patient care as members of the health care team. However it is unclear how community pharmacy is to be involved, if at all, in the delivery of electronic health records and electronic patient records. In future, community pharmacy PMRs (plus other additional information such as pharmacy interventions and recommendations) may be made accessible electronically to other health professionals in both primary and secondary care, as described elsewhere.^{14,15} Yet the question still remains as to their value as a complete and accurate source of information on a patient's medication history.

The aim of this study was to assess the value of PMRs to the process of obtaining a medication history for patients admitted to hospital via an emergency medical unit (EMU). The primary objective was to compare and contrast three different data sources of the medication history of patients admitted to hospital. These sources were the history as taken by the admitting doctor, the history as taken by a hospital clinical pharmacist, and the medication profile held on the community pharmacy PMR.

Method

The local research ethics committee gave approval for the study and all patients gave signed informed consent.

Obtaining the medication history

Based on an admission rate into EMU, during early 2001, of over 650 patients per quarter we hoped to recruit 500 eligible patients into our study over a 10-month period.

Table 1: Examples of value of PMR to the admissions process

Score	Example (including specific examples where appropriate)
4 — extreme added value	Patient clerked in on, among other medicines, thyroxine 75µg daily with clopidogrel started as a new treatment upon admission. PMR listed thyroxine dose as 100µg daily and clopidogrel as having been dispensed approximately three weeks before admission
3 — some added value	Patient clerked in on candesartan (plus six other medicines). PMR also listed lisinopril as having been dispensed four days before admission
2 — little added value	PMR listed quinine sulphate 200mg at night. This medicine was not identified by hospital doctor or clinical pharmacist
1 — no added value	Either the PMR record agreed completely with the clinical pharmacist's record or the PMR record appeared to be incomplete

To be eligible for entry into the study the patient had to be aged over 16 years and taking two or more regular oral medicines at the time of admittance into hospital. They had to be able to communicate with the clinical pharmacist and provide written consent allowing us to request details of any medication (other than creams or ointments) recorded in the PMR held by their nominated regular community pharmacy. The clinical pharmacist visited the EMU twice daily (apart from at weekends). A medication history from the patient was acquired using all available sources, such as information from the patients and their carers, the patients' own medicines and information from GPs. This pharmacist-acquired history was recorded on a previously piloted data collection form, as were the medicines prescribed by the hospital doctor. A letter was then sent to the nominated pharmacy explaining the purpose of the study, enclosing the patient's consent form and requesting a copy of the patient's medication details for a period of at least three months before admittance. Pharmacies were specifically asked for a record of all oral and inhaled medicines. Data on topical preparations were not recorded if supplied. Details could be supplied as a print out from the pharmacy PMR system or by completion of a previously piloted data collection form. A prepaid envelope in which to return the medication details was also supplied. Pharmacies were advised that a nominal payment of £3 would be made for each PMR received. Any non-responders were telephoned 10 to 14 days after the initial postal request was made.

Comparing the sources of information

Upon receipt of a patient's PMR, comparisons were made between the three sources of information — medication history obtained by hospital doctor, history obtained by clinical pharmacist and medication listed in the PMR. If needed, further contact was made with the relevant community pharmacy to clarify specific details, otherwise details of medication and discrepancies between the three sources were noted. If the pharmacy PMR did not contain "as required" medication such as glyceryl trinitrate tablets or spray, simple analgesics or antacids, then this was not considered an omission as these may have been dispensed outside the three-month notification period.

Table 2: Reasons for exclusion of 311 patients

Reason	Number	%
Dispensing doctor patients	125	40.2
Out-of-county patient	101	32.5
Not loyal to single pharmacy	43	13.8
Discharged and readmitted or transferred from another hospital	26	8.4
Refused	10	3.2
Other	6	1.9

Value of the community pharmacy PMR

One of the investigators (MW) considered the content of the PMR compared to the medication history obtained by the clinical pharmacist. A score for the value of the PMR was then deduced based on the question "How would immediate access to the details held on the PMR have changed the acute management of the patient when admitted into hospital?". Possible scores were 1 (no added value to the admissions process), 2 (little added value), 3 (some added value) or 4 (extreme added value). Actual examples of this scoring system are shown in Table 1.

In order to validate this scoring system and to minimise potential bias, half way through the project a clinical panel¹⁶ was convened. The investigator (MW) acted as the facilitator, but did not take part in the decision making process of the panel. This panel consisted of the consultant in EMU, a staff grade EMU doctor, a general practitioner, a community pharmacist, and two clinical pharmacists (including one of the authors, JL). The panel was presented with a brief description of the project and the two sources of medication history (clinical pharmacist and PMR) for a random sample of 25 patients for whom the researcher had already allocated a score of greater than 1. Panel members were then asked to score independently the value of the PMR to the admissions process. Friedman's test (two-way analysis of variance) was used to compare the scores of the assessors.

During the course of the study, and for a number of reasons (see below), it became clear that the initial target of 500 patients was not going to be reached and we rescaled our target to receiving PMR details for 250 patients over a slightly longer period.

Table 3: Number of medicines per patient by age band

Age band	Number of patients (%)	Mean number of medicines/patient
Over 80 years	17 (7)	5.2
61–80 years	163 (65)	6.9
41–60 years	64 (26)	5.8
21–40 years	6 (2)	3.7

Table 4: Value of PMR to the complete admissions process

Score	Patients	%
4 — extreme added value	10	4
3 — some added value	38	15
2 — little added value	34	14
1 — no added value	168	67

Table 5: Mean scores/patient by clinical panel for random sample of 25 patients where researcher scored 2, 3 or 4

Score	Mean (SD)	Min, max score
Consultant	1.88* (0.526)	1, 3
Clinical pharmacist B	2.32 (0.852)	1, 4
General practitioner	2.76 (0.779)	1, 4
Researcher	2.84 (0.746)	2, 4
Clinical pharmacist A	3.0 (0.707)	2, 4
Staff grade doctor	3.0 (0.577)	2, 4
Community pharmacist	3.08 (0.702)	2, 4

* Significantly different from others $P < 0.0001$, Friedman test

Results

During the study period from October 2001 to March 2003, 568 patients were approached, of which 311 (55 per cent) were ineligible for reasons described in Table 2.

In addition to these patients who were deemed ineligible for entry into the study, two problems were experienced with patient recruitment. First there was an unexpectedly high number of patients who, because they were unconscious or inhaling oxygen, were unable to communicate with the clinical pharmacist. Second, structural changes were made to the EMU partway through the study resulting in a loss of inpatient beds and ultimately a decrease in throughput of patients into this unit. For instance, only 146 patients were admitted during January to March 2002, compared with four times as many for the same quarter in 2001. Hence 257 patients were enrolled into the study and PMRs for these patients were requested from a total of 56 community pharmacies. Details were received for 250 of these patients (97 per cent response rate), and it is these 250 that are the subject of this analysis.

Of the 250 patients, 169 (68 per cent) were female. The mean age of the cohort was 66 (range 22 to 91). Table 3 shows the age

breakdown of the patients (65 per cent were aged 61–80) and the prevalence of medication by age band. On admission the 250 patients were taking 1,611 drugs (mean number of medicines per patient 6.4, range 2 to 21). As expected the older the patient (apart from the small number of those aged over 80 years), the more drugs taken on admission.

Comparing the sources of information There was complete agreement between all three sources of information (ie, medication history taken by the clinical pharmacist agreed with that taken by the hospital doctor and agreed with that recorded on the pharmacy PMR) for only 54 (21 per cent) patients. Agreement between just two of these sources was higher when comparing the medication history between the clinical pharmacist and the hospital doctor (44 per cent of patients) and between the clinical pharmacist and the PMR (43 per cent). Agreement between the hospital doctor and the PMR remained poor (24 per cent).

For the 143 patients (57 per cent) where the clinical pharmacist disagreed with the PMR, there were 231 medication discrepancies between the two information sources. This gave a mean discrepancy rate of 0.92 per patient for the full cohort of 250 patients. These discrepancies consisted of 163 instances of the absence or presence of a drug, and 68 instances where there was inconsistency in formulation, strength, dose or frequency of a drug. Sixty-seven (29 per cent) of these discrepancies were due to the PMR listing a drug that the clinical pharmacist had not identified, and 96 (41 per cent) were due to the clinical pharmacist identifying a drug not recorded in the PMR; 24 of these instances related to low dose aspirin being absent from the PMR.

Value of the community pharmacy PMR In our opinion, access to the PMR, at the time of the admission would have added no value to the information gained by the clinical pharmacist for two-thirds of the patients (Table 4). However, for 10 patients (4 per cent) it was judged that medication details on the PMR would have provided extreme added value.

The results of the clinical panel are summarised in Table 5. Statistical analysis revealed that the consultant assessor gave statistically significant ($P < 0.0001$) different responses, while the scores of the researcher were consistent with other panel members.

Discussion

Obtaining an accurate drug history when patients are admitted to hospital is important as it allows continuity of vital medicines, and enables doctors to make informed decisions regarding drug therapy. Previous studies have shown that obtaining such a medication history is fraught with difficulties,^{17,18} although it is generally agreed that pharmacists are able to obtain a more accurate drug history than doctors.^{19,20} The value to this process of ob-

taining information from the patient's community pharmacy has been explored in the UK in only a small number of studies.^{6–8}

Our study has shown that communication to hospital of the details held on community pharmacy PMRs has the potential to provide additional information to that solicited by an experienced clinical pharmacist for one-third of patients admitted into an EMU. However, for only 4 per cent patients was this added value classified as extreme. For 43 per cent of patients, the PMR helped to confirm the information that the clinical pharmacist had already obtained from other sources. For some patients though, the PMR generated confusion over the medication history. Confusion arose either by the PMR listing a drug regimen that was different from that identified from other sources (GP letter, patient's own drugs), or by not recording a drug, the use of which was supported by other sources, eg, patients declaring that they took low dose aspirin. It is unsurprising that we identified low-dose aspirin as a commonly omitted drug from the PMR because an appreciable number of patients purchase aspirin even without their GP being aware that they take it regularly.²¹

Overall, we found that for 57 per cent of patients there was a discrepancy between the clinical pharmacist-recorded medication history and that obtained from the PMR (our primary outcome); for 56 per cent of patients there was a discrepancy between the clinical pharmacist-recorded medication history and that obtained by the hospital doctor. These results are consistent with other recent UK studies highlighting inaccuracies in the medication history taken by hospital doctors, although we recognise differences in the case mix of patient population under investigation, as well as the types of medicines studied. In addition we concentrated mainly on systemic medicines, while acknowledging that topical medicines (eg, eye-drops) are not always prescribed correctly during hospital admission.²²

Limitations Although we had a 97 per cent response rate from the community pharmacies, over half of the 568 patients initially approached were ineligible for our study (Table 2). For nearly half of these ineligible patients, the reason was either because the patient did not reside in Cornwall, or because the patient admitted to not being loyal to one particular pharmacy. Hence our results may not apply to other parts of the UK, although we have no grounds for supposing that the quality and accuracy of PMRs maintained by pharmacies located outside Cornwall should be of a higher or lower standard.

Limitations with the apparent lack of recording of low-dose aspirin on PMRs are two-fold. First, patients who correctly advised the clinical pharmacist that they were taking low-dose aspirin may have been obtaining it not on prescription but by OTC purchase and this purchase may have been made from a non-pharmacy outlet. Secondly, low-dose

aspirin obtained on prescription may have been prescribed in quantities of longer duration than three months and therefore the most recent supply before hospital admission may not necessarily have been within the three-month period for which we requested medication details. However, at the time of the study, local prescribing data suggest that only 8 per cent of GP prescriptions for low-dose aspirin were for 100 tablets or more.

While the scoring system used to assess the value of the PMR was a subjective measure, it did seem to give reasonably consistent results. The scoring throughout the study by one researcher also reduced variability. The lack of significant difference between the researcher's scores and the panel's scores (apart from the consultant) indicates some confidence in the results. There are a number of limitations with using only a small random sample (10 per cent) of patients for the panel to assess. The fact that there was high agreement among the panel members (apart from the consultant) may be because cases were not discriminatory enough. Also the investigator (and the panel members) considered only the age and sex of the patient plus comparative medication details, and there was no consideration of the reason for the hospital admission. Knowledge of the patient's condition at the time of admission may have influenced any judgement of the usefulness of the PMR. There are some additional limitations with interpreting the scores of the clinical panel members. This was an artificial situation involving a retrospective review of the sample with members reflecting on the added value of the PMR. If immediate access to the PMR is ever a reality, the acute nature of an emergency admission may impact on how EMU doctors interpret, understand and value the medication details provided by the PMR. The panel members had widely differing experiences of the admissions process into EMU, ranging from an experienced consultant, and a relatively new staff grade doctor, through to a community pharmacist with no knowledge of the nature of the severity of illness of those patients who are admitted into this unit. The GP, for instance, may have been more concerned than the consultant with an inaccurate medication history resulting in discrepancies, even minor ones, which then end up on the discharge summary.

Finally patients admitted to hospital via the EMU may differ from those admitted in other ways (eg, elective admissions) and our results may not necessarily apply to less acutely ill patients, although, again, there is no indication to believe this is so.

Conclusions

Attempting to obtain an accurate medication history from commonly used sources remains fraught with difficulties. Improving this process has been associated with a decrease in mortality during hospital stay.²³ Community pharmacy PMRs have limited value (in the

acute setting) to a medication history taking process that involves a suitably experienced hospital pharmacist, providing no additional information to that obtained by the pharmacist for two-thirds of our patients. We are confident, however, that the overall value of the PMR would have been higher if compared to just the hospital doctor-generated medication history (rather than the generally accepted "gold standard" of a clinical pharmacist-acquired medication history). If electronic transfer of medication information between pharmacists and hospitals ever does become a reality, the reliability and accuracy of community pharmacy PMRs have to increase before they are seen as a valuable source of data on prescribed, dispensed and OTC medicines. Patient registration with pharmacy would add to this value, while increased recording of appropriate OTC medicines (eg, aspirin) is a necessity.

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IPSF

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The focal point of IPSF activities is its 10-day annual congress. This includes general assemblies, at which policy issues and future projects are discussed, plus symposia, workshops, a poster exhibition and social

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