

# Prescription errors in patients on an acute medical assessment unit

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**ABSTRACT** Errors in hospital patients' drug prescriptions are common in a wide variety of clinical environments. This study reports a high incidence of prescribing mistakes (45%) in a busy acute medical unit in a university hospital in the UK. Prescription errors arising in a 'front-door' department are of particular concern because they may well be perpetuated throughout a patient's subsequent stay in hospital. In this study, prescription errors of all degrees of seriousness were recorded, and in addition, a failure to document drug allergy was discovered in 13% of the prescription charts studied. We consider this to be a particularly important observation in view of the potential for severe allergic drug reactions.

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Multiple factors contribute to errors in prescribing and it is suggested that additional resources should be directed at continuous prescription training for clinical staff and this should include audit of individuals' prescribing habits and error rates.

**KEYWORDS** Acute medical unit, drug allergy, hospital pharmacists, pharmacology training, prescribing error

**LIST OF ABBREVIATIONS** Accident and Emergency department (A&E), electronic transmission of prescription (ETP), medical emergency assessment unit (EAUM)

**DECLARATION OF INTERESTS** No conflict of interests declared.

## INTRODUCTION

Recent research indicates that prescription errors are common in hospital patients. These errors have been found in a wide variety of clinical environments, ranging from ophthalmology clinics<sup>1</sup> to paediatric critical care units.<sup>2</sup> We designed this study to investigate the frequency of prescription errors originating in an acute medical assessment unit in a large UK Hospital, hypothesising that errors in prescribing for patients in this clinical area would likely have a crucial impact on their subsequent hospital management.

The acute medical unit represents the main portal of entry for patients requiring emergency admission for non-surgical problems.<sup>3</sup> This is where the admitting doctor takes a history, examines the patient and writes the first prescription chart. Errors and discrepancies in the drug chart that arise at this stage may persist throughout a patient's hospital stay, even if they are moved to another ward or transferred to the care of another doctor. It follows that avoidance of prescription error at the stage of admission is crucial in reducing patient risk.

For these reasons, we decided to determine the frequency of prescription errors in our acute medical unit with the intention of developing strategies to reduce erroneous prescription and thereby minimise the risk for patients.

## METHODS

The study was conducted in the EAUM of the Norfolk and Norwich University Hospital. All non-surgical patients requiring emergency admission are seen in this unit where they are comprehensively evaluated by a team of doctors who are responsible for initiating management and writing the medication chart. Patients for admission are subsequently transferred to the care of the appropriate specialist physician with beds on another ward and it is important to note that the original medication chart continues to be used after this transfer of care. On average, 55 medical patients are admitted through EAUM every day. We classified 'prescription error' using the methods and checklist developed by Dean *et al.*<sup>4</sup> – using identical methodology should allow data to be compared in different settings.

Most frequent errors	Number of events	Percentage frequency	Common examples
1 Omission of pre-admission medications.	117	15.9%	Not prescribing pre-admission drugs, eg, statins, ACE inhibitors and diuretics for patients with ischaemic heart disease.
2 Regular medications incorrectly transcribed.	97	13.2%	Prescribing discontinued drugs – e.g. ACE inhibitors when previously discontinued due to renal impairment.
3 Writing an ambiguous medication order.	27	3.7%	Prescribing both intravenous and oral doses of Frusemide
4 Prescribing a drug as number(s) of tablets without specifying the dose or formulation (slow-release etc).	17	2.3%	'Diltiazem One tablet OD', with no specification as to the tablet strength or its formulation.
5 Prescribing a drug with an incorrect dose or by an inappropriate route.	7	1%	Prescribing Enoxaparin orally instead of subcutaneously.

**TABLE 1** Common errors of transcription.

The data were collected by a single pharmacist (EG) through the entire period of the study (13 Mar 2006 – 26 May 2006). During this period, EG comprehensively reviewed the medication charts and the case records of all patients on EAUM between the hours of 08.30 and 17.00, Monday to Friday. Our mean length of patient stay on the Unit at that time was ~24 hours (significantly longer at weekends) and this meant that more than 90% of records were reviewed by EG during the period of the study.

Four points of method should be emphasised. First, the results were analysed based on the number of charts with errors rather than on the total number of drug prescriptions. In future studies we intend to document the number of individual prescriptions as well. Second, as the study was undertaken primarily to assess the scale of the problem of prescribing error, no attempt was made to classify errors into minor and serious categories. We justified this approach on the grounds that it is the act of making an error that is important and on the premise that, if there is a documented tendency to make errors, some of these will inevitably prove to be serious. Third, EG examined the records specifically to ascertain if omission of a drug from the medication chart was the result of a deliberate decision, eg, omitting an antihypertensive drug in a patient found to be hypotensive on admission or discontinuing an ACE inhibitor in someone with abnormal renal function. Such deliberate decisions were not recorded as mistakes. Finally, during the period of the study, 60% of the patients on EAUM were admitted via the A&E but all patients had their inpatient medication chart initiated in EAUM, not in A&E. Our A&E uses a separate prescription sheet for immediate medications.

In the final two weeks of the study, we posted a list of the most frequent prescription errors on the notice board of the doctor's office in EAUM. This served to highlight the clinically important mistakes without naming the prescriber. This educational approach of

highlighting the problem of prescribing errors is intended to reduce the frequency of such events and the success of this and other training elements is the subject of an ongoing study.

## RESULTS

Data were collected from 736 prescription charts during the three month study period. Sixty three percent of these patients were admitted via A&E and 37% were admitted from the community, usually from a general practitioner.

Errors in prescription were found in 45% (n=335/736) of the medication charts. Allergy was not documented in 79 of the 736 charts (13%) and an incorrect record of allergy was documented in four other cases (0.54%). Incorrect writing of the prescription – that is to say transcription error – was the predominant mistake, accounting for 69% (n=231/335) of all prescription errors. Common transcription errors are shown in Table 1, and inappropriate prescribing in Table 2.

Common errors of transcription with the relative number of events in descending order are shown in Table 1. The remaining 31% (n=104/335) of mistakes were accounted for by inappropriate prescribing. Common examples, again in descending order of frequency, are shown in Table 2.

## DISCUSSION

It is important to emphasise that, in this paper, we describe only errors of transcription and prescription. Errors of dispensing and administration have not been studied.

Prescription errors have been defined as either an error in writing the prescription, or an error in the prescribing

Most frequent errors	Number of events	Percentage frequency	Common examples
1 Prescribing two drugs of the same type.	67	9.1%	Prescribing both - Frusemide and Bumetanide - Uniphyllin and Phyllocortin
2 Inappropriate dose for drugs with a narrow therapeutic index.	46	6.3%	The most common example was prescribing low molecular weight heparin without due regard for the patient's body-weight.
3 Prescribing a sub-therapeutic dose of a drug.	22	2.9%	Nicorandil prescribed once daily.
4 Prescribing drugs with important interaction(s).	10	1.3%	Prescribing Trimethoprim with Methotrexate.
5 Prescribing contraindicated drugs.	7	1%	Aspirin prescribed for patients with gastrointestinal bleeding.

**TABLE 2** Examples of inappropriate prescribing.

decision, which may impair the timeliness or effectiveness of treatment administration or have the potential for harming a patient.<sup>4</sup> Examples and frequency of these types of errors are shown in Tables 1 and 2.

As mentioned in the introduction, we have not attempted to differentiate between minor and serious errors, and we justify this approach by suggesting that the most important factor for study is the tendency for a prescriber to make an error. In addition, although not a prescribing error, we emphasise the frequent failure to document drug allergy correctly. Drug allergy was not documented in 13% of patients and in an additional 0.5% of cases an incorrect history of allergy was reported. All such mistakes are potentially serious.

It is also important that the most frequent prescribing error found was the simultaneous prescription of two drugs of the same type (see Table 1); some of these errors originated from using trade rather than generic names. Prescribing errors are a global problem and have been reported in both inpatient and outpatient settings.<sup>1,2,4,6,7</sup> The reported frequency varies widely<sup>5</sup> and this reflects differences in trial design and the variable definition of prescribing error employed by different investigators. Writing a prescription is a vital part of a patient's management and studies from the US and the UK suggest that prescribing errors cause harm in about 1% of inpatients.<sup>6,7</sup> In addition to the human cost, there is an annual financial cost to the NHS, which has been estimated at £500 million.<sup>8</sup> This problem has been documented in several publications and attention has been focused on it by the Department of Health in its publication *Building a safer NHS for patients: improving medication safety*.<sup>9</sup>

Most UK hospitals now have acute medical units that provide acute care in the first 48 hours of a patient's hospital stay. With this arrangement, drugs are likely to be administered to patients before pharmacy checks can be carried out and this is a particular problem for overnight and weekend admissions.

Any initiative to reduce the prescription error rate must involve knowledge of why, where and when these errors occur. Inadequate knowledge of pharmacology will obviously predispose to poor prescribing, but environmental factors such as time pressures, staff shortages and fatigue have also been mentioned as contributory causes.

There is no 'quick-fix' for reducing prescription errors and the problem has to be addressed at various levels. Medical students are also spending less time in a ward environment and more time in tutorials and lectures and as a result the practical aspects of a junior doctor's work, such as prescribing safely, may be overlooked. In addition, medical students are spending less time studying pharmacology<sup>10</sup> Better understanding of fundamental pharmacological concepts and improved undergraduate word-based training in prescribing should help to improve prescribing practice. There is also evidence that prescribing mistakes are more common when new doctors start to work in hospitals.<sup>4</sup> We suggest that an increased awareness of the problem of drug errors together with teaching good prescribing skills should be included in any induction programme for junior doctors. There are even greater potential difficulties for locum doctors working in an unfamiliar environment and a drug chart designed to be used nationally might help to obviate this problem. Electronic prescribing has been used with some success in the US. It may ameliorate the problem of transcription error and some programmes can also warn of potential drug interactions.<sup>11,12</sup> In this regard, 'NHS Connecting for Health'<sup>13</sup> is the agency of the Department of Health in the UK which aims at modernising the NHS by delivering a new integrated IT system with services to link general practitioners and community services with hospitals. ETP is part of this and aimed at making prescribing and dispensing safer.

## CONCLUSIONS

We believe that prescribing interventions targeted at the acute medical unit should help to reduce substantially the burden of drug chart errors in hospitals. At the same time, many new drugs are available and many more drugs with complex pharmacological actions are being developed. People are living longer and polypharmacy is now common practice. Safe prescribing is therefore increasingly difficult and a comprehensive knowledge of pharmacology and therapeutics becomes increasingly important.

We suggest that hospitals need an effective internal monitoring programme to identify prescription errors. Hospital pharmacists can play an important role in the early identification of prescription errors<sup>14-16</sup> and formal review of errors by a pharmacist and a senior clinician with the prescriber would seem intuitively to serve as an effective educational tool. We suggest that reporting prescribing errors and learning from mistakes through an educational, no-blame process should be encouraged. This should help to determine the fundamental reasons for prescription errors and identify effective ways of dealing with them.

Our study was focused on the acute medical unit because of the concern that any undetected errors on the drug chart that originate at the first point of patient contact may follow the patient's pathway through the main body of the hospital. When one considers the frequency of errors documented by our study, it would seem reasonable to devote a larger proportion of clinical pharmacy services to the acute medical areas in an attempt to reduce prescribing errors at source. This seems preferable to correcting errors at a later stage and risk not picking them up at all. We believe that pharmacists may help significantly in reducing the rate of prescription errors – their focused training and their knowledge of medicines' prescribing, supply and administration support their value in 'front-door' departments.

Finally we suggest that Trusts should allocate additional educational resources to training in prescribing and incorporate continuous audit of the prescribing performance of medical staff working in our hospitals.

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### Editor's Note

One vital step in preventing drug errors is to write a correct and effective prescription in the patient's medical record. Maxwell (p. 348) discusses how this can be done later in this issue of the *Journal* and readers are referred to his paper.