

ASSESSING PHARMACY INTERVENTIONS AT SALISBURY HEALTH CARE NHS TRUST

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- **OBJECTIVE** - To record the interventions made by pharmacists, with a view to analysing prescribing errors, validating the newly implemented reporting system and deciding how intervention reporting should be taken forward
- **DESIGN** - Collecting intervention data on a manual form for two separate weekly periods and entering the information onto a database
- **SETTING** - The wards, dispensary and aseptic preparation units at Salisbury Health Care NHS Trust
- **RESULTS** - A total of 556 interventions was recorded during the first period and 770 during the second period. Most interventions were recorded at ward level. Approximately 6.5 per cent of interventions were of major significance.
- **CONCLUSIONS** - Recording interventions made by pharmacy staff gave information which could be useful in preventing future prescribing errors. Presenting the intervention analysis reports to the medicines risk group at Salisbury Health Care NHS Trust has supported the important role that pharmacists play in the identification and resolution of prescribing errors.

Reducing prescribing errors is an important issue in the National Health Service. For example, the Government has a target to reduce by 40 per cent the number of serious errors in the use of prescribed drugs by 2005.¹ Errors may occur from the initial decision to prescribe, to the final administration of the medicine. They include choosing the wrong medicine, dose, route, form or frequency or time of administration.² In particular, there is current emphasis on recording prescribing errors. It is well recognised that recording pharmacy interventions provides both qualitative and quantitative data that are clinically, managerially and educationally important in reducing prescribing errors.³

Pharmacists and trust managers at Salisbury Health Care NHS Trust were therefore concerned when a Commission for Health Improvement (CHI) review identified that not all "near misses" were being reported through the reporting scheme then in place.⁴ In particular, CHI found that, in common with practice at some other institutions,⁵ prescribing errors identified by pharmacy staff were under-reported. There was a tendency to resolve prescribing problems with the relevant prescriber without any record of the intervention being made.

It was therefore decided that a new pharmacy intervention reporting system should be introduced. The new system was essentially a "user-friendly" database which could produce qualitative and quantitative reports suitable for both presentation to trust risk managers and for analysis by pharmacy staff.

The aim of this study was to record the interventions made by pharmacists at Salisbury Health Care NHS Trust, with a view to analysing prescribing errors, validating the new system, deciding how intervention reporting should be taken forward in the trust and improving patient care.

METHODS

Setting Salisbury Health Care NHS Trust is a district hospital with 700 beds and provides general acute services to 190,000 people. It also provides specialist services, including burns, plastic surgery, rehabilitation and the Duke of Cornwall spinal treatment centre.

Standard practice is that pharmacists visit all wards once daily to review drug charts, to supply medicines and to ensure that the use of drugs is safe, efficacious and cost effective. Drug charts are screened for clarity and legality and to check, for example, that the drug, dose, and frequency of administration are suitable for the individual patient.

Data collection Pharmaceutical interventions were recorded for two separate weekly periods — 14–20 April 2002 (period 1) and 18–24 November 2002 (period 2), inclusive. These weeks were selected to enable rotational medical staff to settle in to their new areas before monitoring the prescribing errors. Interventions were recorded by pharmacy staff in the dispensary and in the aseptic unit, as well as by all ward pharmacists.

In order to minimise overheads, the interventions were manually recorded on a form. The form included sections to record the intervention type, outcome, risk management category of the intervention and its significance. The consultant code was recorded, so that analysis and reporting could be carried out at directorate level. Pharmacists were assigned a code, to permit individual performance monitoring and feedback. The hospital number was requested for all major grade interventions, in case any follow-up was necessary. A brief outline of the prescribing issue and the intervention made was also recorded, so that the clinical accuracy and the significance grade of the intervention could readily be reviewed.

Definitions and training Pharmacists received two training sessions, conducted by the clinical pharmacy tutor before the start of period 1. During the sessions, definitions and examples of significance gradings (see Panels 1 and 2), intervention types, risk management categories and outcomes were explained and workshops were held. A feedback session and refresher training session were held before the start of period 2.

Clinical pharmacist review Completed intervention forms were reviewed by the clinical pharmacy tutor. Recorded interventions were checked for accuracy and

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Panel 1: Definitions of interventions

Grade of intervention	Definition
Minor	One which, if omitted, would probably have no effect on patient outcome
Moderate	One which, if omitted or if current practice and prescribing continued, could be potentially undesirable for patient outcome
Major	One which, if omitted or if current practice and prescribing continued, could be potentially detrimental for patient outcome. A major grade intervention could also be defined as a potentially serious prescribing error. ⁶

Panel 2: General examples of major grade interventions

- Drug overdoses – exceeding maximum recommended doses, but not if this reflects accepted practice
- Drug history omissions or transcription errors for drugs which are associated with abrupt withdrawal syndromes or for essential drug treatments
- Drugs prescribed were contraindicated
- Drug allergies not recorded on drug chart
- Toxic drug levels, according to therapeutic drug monitoring

consistency. To aid consistency in form completion and identification of major grade interventions in the future, any questions or amendments were personally discussed with individuals and feedback was provided if the significance grading was altered. The clinical pharmacy tutor then entered all reviewed interventions onto the database.

Data entry and analysis The form was designed to match the entry screen on the intervention reporting system, reducing data entry time to a minimum. Approximately 40 interventions were entered each hour. Each was assigned an intervention identification number, which was written on the original form in case of further enquiry.

Codes for individual pharmacists, wards, consultants and cost centres were set up before the study started. These were updated and amended as changes occurred.

RESULTS

A total of 614 interventions were recorded during period 1. Of these, 9.4 per cent were excluded from further analysis because the consultant code was omitted. For period 2, a total of 781 interventions were recorded, 1.4 per cent of which were excluded from further analysis because the consultant code was omitted.

Most interventions (ie, 90.6 per cent for period 1 and 95.5 per cent for period 2) were recorded at ward level. Breakdowns of interventions by significance grades and directorates, intervention types, risk man-

agement categories and outcomes are shown in Tables 1 to 4. Examples of some recorded major grade interventions are shown in Panel 3. It should be noted that all major grade interventions had a risk management category of “prevents morbidity”, and an outcome of “acted on”.

Each period had a similar percentage of major grade interventions recorded (6.3 and 6.8 per cent). For both periods, most interventions were within the medicines directorate (69.6 for period 1 and 67.1 per cent for period 2). Most major grade interventions were also within the medicines directorate (77.1 for period 1 and 65.4 per cent for period 2).

Further breakdown of the intervention-data showed the following:

- Within the medicines directorate, acute medicine was the primary unit responsible for most interventions – 243 (62.2 per cent) for period 1 and 327 (63.2 per cent) for period 2
- A low number of interventions were recorded against the adverse drug reaction (ADR) intervention type – 3 (0.5 per cent) in period 1 and 10 (1.2 per cent) in period 2. From the ADR interventions that were recorded, examples of drug allergies that were omitted from particular patients’ drug charts and were then documented correctly following pharmacists’ intervention included those to aspirin, cyclizine, penicillin, teicoplanin and vancomycin

Table 1: Significance grades of interventions, by directorate

Directorate	Period 1				Period 2			
	Minor	Moderate	Major	Total	Minor	Moderate	Major	Total
Medicine	165	195	27	387	253	230	34	517
Surgery	32	42	4	78	48	50	48	104
Critical care	18	28	3	49	48	45	8	101
Family services	7	10	1	18	23	9	3	35
Ambulatory care	3	3	0	6	0	1	0	1
Others	6	12	0	18	4	7	1	12
Total	231	290	35	556	376	342	52	770

Table 2: Most frequently recorded intervention types

Intervention type	Period 1	Period 2
Review dose	124 (22.3)	183 (23.8)
Drug selection	61 (11.0)	37 (4.8)
Administration	56 (10.1)	144 (18.7)
Review duration	56 (10.1)	41 (5.3)
Drug history	47 (8.5)	64 (8.3)
Clarification	45 (8.1)	80 (10.4)
Legal issue	38 (6.8)	34 (4.4)
Non-formulary	35 (6.3)	20 (2.6)
Monitoring drug effect	31 (5.6)	29 (3.8)
Transcript error	25 (4.6)	38 (4.9)
Counsel/educate	9 (1.6)	38 (4.9)
Others (including ADR and TDM)	29 (5.2)	62 (8.1)
Total	556	770

“ADR” is adverse drug reaction and “TDM” is therapeutic drug monitoring. Figures in parentheses are the number of interventions of the relevant type, expressed as a percentage

Table 3: Risk management categories

Risk management category	Period 1	Period 2
Prevents morbidity	253 (45.5)	415 (53.9)
Rationalises treatment	226 (40.6)	172 (22.3)
Improves patient adherence	27 (4.9)	128 (16.6)
Cost reduction	50 (9.0)	29 (3.8)
Legal requirement*	0 (0)	26 (3.4)
Total	556	770

Figures in parentheses are the number of interventions of the relevant category, expressed as a percentage.

*The “legal requirement” category was introduced into the intervention reporting database for period 2.

Before that, interventions which subsequently fell into the “legal requirement” category were generally recorded in the “rationalises treatment” category

- Examples of drug treatments, or drugs associated with abrupt withdrawal syndromes that were repeatedly left out unintentionally from either the medical notes or the inpatient drug charts or both and then prescribed following the

- pharmacist’s intervention included digoxin, warfarin, clonazepam, epoetin, gliclazide, prednisolone and paroxetine
- For major grade interventions, the intervention types most frequently recorded included drug history

(9 [25.7 per cent] for period 1 and 15 [28.8 per cent] for period 2) and transcription errors (7 [20 per cent] for period 1 and 10 [19.2 per cent] for period 2)

DISCUSSION

Standard of recording The increase in the number of interventions recorded during period 2 (Table 1) was probably a result of increased awareness by pharmacists following the feedback session, rather than a result of deteriorating prescribing. In particular, the increase in the number of interventions assigned to the risk management category of “improves patient adherence” suggests that there was an improved recording of patient medication counselling during period 2. Similarly, the increase in the proportion of intervention outcomes recorded as “acted on” could well be attributed to enhanced pharmacist confidence as regards intervention management and appreciation of the importance of problem resolution following attendance at the pharmacist intervention feedback session. In general, the clinical pharmacy tutor noticed an improvement in form completion during period 2. That the most frequently recorded intervention type was review dose is consistent with other studies.⁵

There were, however, aspects of intervention reporting where improvements still needed to be made. In particular, it was believed that the low number of ADRs found in periods 1 and 2 was the result of shortcomings in ADR recording, rather than there being a low number of ADRs at Salisbury NHS Health Care Trust. This initiated a review, update and educational promotion of the pharmacy ADR reporting policy. Pharmacists were also advised to screen individual patients for ADRs when reviewing the drug history. Since the update in ADR reporting policy, the percentage of interventions assigned to the ADR intervention type has increased to 11.9 per cent (although, as set out below, only major grade interventions are now routinely recorded).

Although interventions about drug history were among the most frequent type of major grade interventions recorded, it was believed that incidences of drug history errors were still being under-reported. This realisation has helped support a change in the standards of clinical pharmacy practice, by emphasising the importance of checking the drug history with individual patients and not relying solely on screening the drug chart in isolation. Since February 2003 drug history has remained the most frequently recorded intervention type, contributing on average 31 per cent to the monthly total.

Improving prescribing practice The intervention reports proved useful in pointing out recurrent problems that would poten-

Table 4: Intervention outcomes

Outcome	Period 1	Period 2
Acted on	323 (58.1)	561 (72.9)
Not acted on	5 (0.9)	3 (0.4)
Unknown	11 (2.0)	11 (1.4)
Information accepted	162 (29.1)	151 (19.6)
No action needed	55 (9.9)	44 (5.7)
Total	556	770

Figures in parentheses are the number of interventions of the relevant outcome, expressed as a percentage

tially benefit from further investigation and pharmacy audit. For example, the reports highlighted that temazepam was often being prescribed nightly to benzodiazepine-naïve patients, with pharmacists intervening to change the frequency to “as required”. As a result, a clinical pharmacy audit is to be carried out with the aim of updating the benzodiazepine prescribing policy and educating medical teams about the issue. The reports also enabled pharmacists to target prescribing support to where it is most needed. For example, an experienced clinical pharmacist now attends and participates on the acute medicine post-take round, in response to the relatively high number of interventions made within that section of the directorate. Interventions recorded on the post-take round will be monitored in the future to support pharmacist participation.

Dispensing issues were also highlighted, which could then be shared with colleagues, and practice amended to minimise the chance of a similar problem reoccurring. An example of this involved a prescription for methylene blue prescribed as 50mg, but dispensed as 1 per cent. A drug dosage error resulted and was identified by the ward pharmacist. The importance of endorsing the drug chart and labelling the dispensed product with clear information to give the correct volume for a 50mg dose was discussed with dispensary staff and steps taken to minimise the potential for dosage confusion in the future.

Taking intervention reporting forward Following the study, and as mentioned above, it was decided in consultation with the trust risk manager that only major grade interventions should be recorded as routine practice by pharmacy staff, starting from February 2003. Recording all interventions of all significance grades all of the time was considered impractical, and major grade interventions were considered to be particularly important, both from an educational and clinical viewpoint. Intensive pharmacy intervention recording of all significance grades now occurs for one week, every six months, usually in April and November, to permit a settling period for rotational SHO medical staff. This system ensures that all major “near misses” that are identified by pharmacists are recorded. It also means that data are available (ie, the six-monthly data) from which the incidence of all “near misses” (regardless of significance) can be extrapolated.

As part of the new system, pharmacists attend monthly pharmacist intervention feedback sessions, when major grade interventions made in the previous month are discussed, lessons learnt and actions agreed. Individual pharmacist performance is monitored and the information obtained is useful for the regular formal six-monthly clinical pharmacy appraisals. The feedback sessions also permit the promotion of good pharmacy practice, for example, the following-up of antibiotic prescribing and the checking of microbiology sensitivity reports.

Future developments Intervention reports are available for presentation at directorate level or to the individual primary units of service that make up the directorates. In the future, the aim is to

Panel 3: Examples of major grade interventions

Intervention type	Brief record of intervention	Risk management category
Review dose or frequency of dose	Only 2.1mg of intravenous melphalan prescribed when "high dose" required. Advised dose be increased – consultant increased dose to 420mg	Prevents morbidity
Drug selection	Patient prescribed piroxicam and mefenamic acid. Treatment rationalised to single NSAID	Prevents morbidity
ADR	Patient had possible gastrointestinal bleed. Advised that celecoxib be stopped and ADR form completed	Prevents morbidity
Clarification	Prescribed drug illegible so treatment not administered. Phenobarbital treatment for tumour-induced epilepsy was confirmed	Prevents morbidity
Drug history	Aspirin for patient who had previously had a stroke was unintentionally left off inpatient drug chart. Advised aspirin be written up	Prevents morbidity
Transcription error	Newly commenced gliclazide unintentionally left off discharge prescription	Prevents morbidity
Monitoring drug effects	INR of 5.6 reported. Advised omitting warfarin dose and repeating INR measurement	Prevents morbidity
TDM	Metoclopramide had been added to digoxin 250µg (daily). Requested digoxin level, which was 3.4µg/L	Prevents morbidity
Drug interaction	Erythromycin and ciprofloxacin added to established warfarin treatment. Advised monitoring of INR	Prevents morbidity

"NSAID" is non-steroidal anti-inflammatory drug, "ADR" is adverse drug reaction, "INR" is international normalised ratio and "TDM" is therapeutic drug monitoring. All major grade interventions had a risk management category of "prevents morbidity"

present the intervention reports at a forum where information can be shared with the appropriate medical team. When junior doctors start at Salisbury Health Care NHS Trust they will also receive some major grade intervention examples as part of their pharmacy induction training. The system could also be adapted to allow the reporting and the sharing of information with community pharmacists across the primary care trust. If similar intervention reporting systems were adopted by other hospital trusts, problem areas and resolution strategies could be shared at a national level. Recording or estimating the number of prescriptions written during a set period would also enable a prescribing error rate to be determined, which would provide some estimate of the quality of prescribing between organisations.

CONCLUSION

Recording interventions made by pharmacy staff gave information which could be useful in preventing future prescribing errors. For example, problems associated with obtaining accurate drug histories, prescribing of benzodiazepines and labelling of methylene blue were identified. Presenting

the intervention analysis reports to the medicines risk group at Salisbury Health Care NHS Trust has supported the important role that pharmacists play in the identification and resolution of prescribing errors.

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Contributing material to *Hospital Pharmacist*

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