Napp Pain Award 2009

Gaining consensus: the development of a county-wide guideline for persistent pain management

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Information is available nationally to assist in the management of persistent pain of various pathologies. These guidelines do not, however, always take into account local formulary restrictions on medicines use, leading to confusion among general practitioners (GPs) about which products they are able to use while remaining in line with primary care trust (PCT) advice.

The persistent pain team based in Southampton is composed of doctors, nurses, physiotherapists, psychologists and a pharmacist. In 2005, some members of the team were involved in the development and launch of a guideline to assist GPs in a local PCT in the management of patients presenting with ongoing pain. The guideline was presented on two sides of A4, including a treatment algorithm, detailed information for side-effect management and changing between medicines. The guideline was distributed to GPs in 2006, with some practices receiving a visit from a member of the pain team to discuss the contents and its potential use in practice.

A 2007 audit of GPs’ prescribing of strong opioids within one of the PCTs served by the Southampton clinic revealed poor adoption and adherence to the guideline recommendations. The guideline was due for review in 2008 and it was decided that a complete redesign was required to improve its usability and consequent adoption of the recommendations into local practice. In addition, since publishing the first guideline, a number of products have been launched for pain management or have had new data emerge to support their use. Importantly, two local PCTs, one of which was served by the Southampton pain clinic, have now merged forming a single large trust, accessing specialist pain services from three different pain clinics across the region.

Objectives
- To design and write a guideline for the pharmacological management of persistent pain based on current best practice and best available evidence.
- To design the guideline so that prescribing information was easily viewed and logically presented.
- To gain consensus for the guideline across three secondary care specialist centres within the PCT areas, to ensure that all GPs have access to the same information and that patients’ access to medicines is equivalent across the region.

Method
A review of the 2006 guideline was undertaken by requesting feedback from a small group of GPs, prescribing advisers and members of the persistent pain team. Additional information regarding referral to the service, red and yellow flags (clinical and psychosocial indicators, respectively) and advice on diagnosing neuropathic pain were added.

The draft guideline was sent to 18 local GPs for comments and feedback. Meetings were held with two well respected GPs who lead on local prescribing committees, to get more detailed reaction to the information and, in particular, the likely application in practice.

The model for the new guideline was based on that issued by the Isle of Wight pain team with changes to reflect local practice and more detailed prescribing information. The prescribing information to be included in the new guideline was discussed and agreed by the Southampton pain team. Additional information regarding referral to the service, red and yellow flags (clinical and psychosocial indicators, respectively) and advice on diagnosing neuropathic pain were added.

The draft guideline was sent to 18 local GPs for comments and feedback. Meetings were held with two well respected GPs who lead on local prescribing committees, to get more detailed reaction to the information and, in particular, the likely application in practice.

The guideline and four formulary applications went to the district prescribing committee (DPC) for approval. The DPC consists of pharmacists and physicians from primary and secondary care. The condition of approval was that the guideline gained consensus from all three specialist pain clinics within the two PCT areas covered by the DPC. The guideline was sent to lead consultants for the other two pain services and their comments used to adjust the guidance to ensure that they fitted in with existing practice. The guideline received final sign-off by the chair of the DPC in May 2009.
Results
The new guideline, at seven pages, is a larger document than that it supersedes. However, the feedback from GPs is that the document is clearer and user-friendly and, importantly, that prescribing advice is easily found and followed.

Guidance is divided into an algorithm for overall management, an analgesic ladder and separate guidance for neuropathic pain, referral guidelines and information on red and yellow flags. The guideline will be sent to GPs as an A5-size booklet and will also be available on PCT and acute trust websites.

Discussion and conclusion
Consensus was gained between all three specialist centres and the two PCTs, ensuring that, for the first time, pain management guidance for primary care is consistent across the region. In addition, due to the new formulary additions, patients will also have access to the same medication within primary care. GPs will also have a clear indication of the therapies they will be expected to have tried in their patients prior to referral to specialist services.

The guidance was originally written for GPs served by the Southampton pain service and, therefore, achieving consensus was not straightforward. The three centres operate slightly differently and the recent merger of PCTs highlighted differences in formulary inclusions and consequent disparities in the treatment regimens currently being used for management in the community. This led to active discussion, mainly via emails between all stakeholders, about the placement of certain products within the guidelines. An area for concern was how it might affect local primary care practice, which has been based up until now on the advice issued from the specialist centres.

Although dialogue was vigorous, once it was established that the guideline would not adversely affect the autonomy of the pain specialists themselves, it became clear that there were no significant differences in the primary management of patients. Additionally, the overall enthusiasm for the end product ensured that consensus was reached. The work has led to improved communication and relations between the clinics and an understanding between the specialists of the way the services operate. It is hoped that this activity will lead to continued joint working between the centres to enhance pain management services across the region.

Persistent pain is an increasing burden on the NHS and specialist services are coming under greater pressure from developments such as the 18-week pathway. By improving the quality of information provided to GPs, including red and yellow flag data, it is hoped that a greater number of patients will receive rational and effective treatment, reducing unnecessary referrals; and, conversely, those less likely to do well will be identified earlier for specialist care.

ACKNOWLEDGEMENTS
The persistent pain teams based at Southampton University Hospitals NHS Trust; Basingstoke and North Hampshire NHS Foundation Trust and Winchester and Eastleigh Healthcare NHS Trust. Also Dr Nigel Dickson, Dr Peter Goodall, Martin Stephens, Julia Bowey and Neil Hardy.

References
3 Davies E. Collated audit of strong opioid prescribing within Southampton City PCT. June 2008.

Novartis Antimicrobial Management Award 2009
An electronic referral system for joint pharmacy-microbiology ward rounds in a teaching hospital

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Therapeutic intervention by a multidisciplinary antimicrobial treatment team (AMT) composed of pharmacists, a clinical microbiologist, and an infectious diseases specialist, has been shown to reduce length of stay and hospital costs. A non-significant trend towards reduction in mortality was also reported. AMT ward rounds are recommended by the UK Department of Health and the Infectious Diseases Society of America as an important element of antimicrobial stewardship in hospitals.

Weekly joint microbiology-pharmacy infection ward rounds have been operating in the hospital since 2000 in selected specialties. Pharmacists and consultant medical microbiologists (CMMs) were consulted in team meetings about the existing paper and fax-based system of referring patients. Common themes that emerged from this consultation included: administrative difficulties with the fax system; concerns over communication of advice from the CMM to the ward doctors with pharmacists and CMMs reporting occasional misinterpretation of advice, and lack of timely feedback to ward pharmacists. There was also no robust system for capturing metrics on the ward round workload, the nature of referrals or the ward round outcomes.

Objective
To commission, design, develop and implement an electronic referral (e-referral) system for specialist pharmacist and medical microbiologist ward round review of patients with complex infection problems.

Methods
The hospital AMT submitted a business case and funding was secured from the South Central Strategic Health Authority in September 2007 to develop computer software to support e-referral of patients with infection, by ward pharmacists. A project manager from hospital information management and technology (IM&T) was assigned to support the AMT. The existing hospital clinical information system was selected for adaptation to allow pharmacists to request an infection ward round referral in the same way that a doctor requests an ultrasound investigation.

The e-referral project team drafted a specification for the software and solicited opinion from the ward pharmacists and CMMs. A final specification was delivered in February 2008 to the software contractor — Scorpio Information Systems, part of the Ascribe group. Prototype versions of the electronic referral software were made available to early adopter ward pharmacists and CMMs from March 2008 and the final version was derived from an iterative process of repeated testing and feedback, going live in November 2008. Ward round metrics were exported to Microsoft Excel and analysed using descriptive statistics.

Results
The e-referral software was designed and developed by Scorpio Systems for a pre-agreed cost of £15,000. Development and implementation of the e-referral system is estimated to have consumed approximately 60 hours of senior pharmacist time, 40 hours of hospital IM&T time and 20 hours of CMM time. Development time from specification to launch of the live system was 14 months and total cost including trust personnel time was estimated at less than £20,000.
To select the most appropriate tool.

To test the reliability of the tool.

A department is exploring the potential for using the system outputs to secure funding from primary care commissioners for CMM ward round outcomes to demonstrate the value of the service. The microbiology specialisms are general surgery; medicine and elderly care; cardiothoracic; trauma and orthopaedics; and neurosciences. An average of 175 patients is reviewed per month. Table 1 summarises the typical reasons for review of patients was the most common reason for referral. The ward round recommendations through the standard hospital results following infection ward rounds. Advice in infection ward rounds by creating secure electronic records of patient selection of pre-specified outcome categories and a free-text narrative.

Table 1: The ten most common reasons for pharmacist e-referral to infection ward rounds

<table>
<thead>
<tr>
<th>Reason</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>General microbiology review</td>
<td>494</td>
</tr>
<tr>
<td>Request plan for course length</td>
<td>375</td>
</tr>
<tr>
<td>Off-guideline antimicrobial</td>
<td>109</td>
</tr>
<tr>
<td>Can treatment be stopped?</td>
<td>96</td>
</tr>
<tr>
<td>Narrow-spectrum alternatives</td>
<td>62</td>
</tr>
<tr>
<td>Appropriate antimicrobial (no guideline)</td>
<td>45</td>
</tr>
<tr>
<td>IV-to-oral switch eligibility</td>
<td>30</td>
</tr>
<tr>
<td>Need for antimicrobial?</td>
<td>24</td>
</tr>
<tr>
<td>Low-risk alternative (Clostridium difficile)</td>
<td>17</td>
</tr>
<tr>
<td>Toxic or subtherapeutic serum levels</td>
<td>16</td>
</tr>
</tbody>
</table>

Using the hospital clinical information system provided advantages of user access control, ready access to pertinent biochemistry and haematology results and automatic mapping of demographic details. This approach is not transferable between hospitals using different clinical information system providers but the principles are applicable to any UK hospital environment and benefits can be realised for a relatively modest resource outlay by modifying existing hospital clinical information and pathology systems.

References

Hameln oral presentation prize

The selection, modification and reliability testing of a tool for rating the significance of pharmacists’ clinical contributions

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Pharmacists routinely contribute to the clinical and pharmaceutical care of patients. Information on the significance of these clinical activities can be used to assess their value, prioritise the allocation of resources and identify the most important systemic problems with care processes. A consistent method should be used for rating. This study is carried out to produce an up-to-date, reliable, simple to use tool for rating the clinical significance of pharmacists’ contributions to individual patients’ therapy.

Objectives
- To identify tools which can be used to score clinical pharmacy contributions
- To select the most appropriate tool
- To modify/update the selected tool, if necessary
- To test the reliability of the tool

Method
The lead investigators agreed on the most important criteria for the tool. A literature search was carried out. Papers that discussed the classification, categorisation or scoring of clinical pharmacy contributions with enough detail to enable replication were reviewed against the criteria. By testing against scenarios from our contributions database, the selected tool was reworded and updated with examples to reflect modern UK clinical pharmacy practice.

Thirty-four pharmacists used the tool to independently rate 21 randomly selected contributions from our database. Training for the pharmacists consisted of a short explanation of the tool descriptors. Reliability was assessed by determining inter-rater agreement using weighted kappa coefficients (κ). Weighted kappa allows close scores on an ordinal scale to reflect better agreement than scores that are further away. Raters were first randomly paired and weighted kappa calculated. To test if pharmacists’ experience had an effect on reliability, they were then paired according to their years of experience, stratified into four levels. STATA/SE10 was used for analysis. Raters’ comments were then used to amend the tool.

Figure 1: Recommendations from infection ward rounds (November 2008 to July 2009)

System functionality allows CMMs and pharmacists to generate a patient list by ward and specialist in advance of the ward round. The system also provides for recording of ward round recommendations by selection of pre-specified outcome categories and a free-text narrative reported to doctors in the same way as a radiologist report on an ultrasound investigation. Ward pharmacists can print a report following the ward round that details all recommendations from the ward round.

In the nine months since the e-referral system went live, over 1,500 patients have been reviewed on joint ward rounds in five specialisms: general surgery; medicine and elderly care; cardiothoracic; trauma and orthopaedics; and neurosciences. An average of 175 patients is reviewed per month. Table 1 summarises the typical reasons for review of patients was the most common reason for referral. The reason for referral was not recorded in around 200 cases self-referred by CMMs.

Figure 1 illustrates the most common recommendations coded by CMMs in the e-referral system following infection ward rounds. Advice to stop antimicrobials or recommend a stop date represented the most frequent ward round intervention.

Discussion and conclusion

The e-referral system for infection ward rounds has been successfully implemented and is embedded in routine workflow for ward pharmacists and CMMs. The system has improved clinical governance of the infection ward rounds by creating secure electronic records of patient referrals within the hospital clinical information system and reporting ward round recommendations through the standard hospital results reporting system. The e-referral system allows monitoring of ward round workload to inform resource requirements, evaluation of reasons for referral to guide education and training, and reporting of ward round outcomes to demonstrate the value of the service. The microbiology department is exploring the potential for using the system outputs to secure funding from primary care commissioners for CMM ward round activity.
AWARD WINNERS

Table 1: Inter-rater agreement results

<table>
<thead>
<tr>
<th>Experience</th>
<th>Weighted K</th>
<th>Range Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomised pairings</td>
<td>0.10 to 0.60</td>
<td>0.38</td>
<td>0.39</td>
</tr>
<tr>
<td>Experience level 1</td>
<td>0.28 to 0.45</td>
<td>0.37</td>
<td>0.37</td>
</tr>
<tr>
<td>Experience level 2</td>
<td>0.42 to 0.50</td>
<td>0.46</td>
<td>0.46</td>
</tr>
<tr>
<td>Experience level 3</td>
<td>0.47 to 0.75</td>
<td>0.63</td>
<td>0.68</td>
</tr>
<tr>
<td>Experience level 4</td>
<td>0.26 to 0.47</td>
<td>0.37</td>
<td>0.38</td>
</tr>
<tr>
<td>All paired experience levels combined</td>
<td>0.26 to 0.75</td>
<td>0.46</td>
<td>0.43</td>
</tr>
</tbody>
</table>

Kappa of 0.21 to 0.40 is taken to represent “fair” agreement; 0.41 to 0.60, “moderate.”

Table 2: The final tool

<table>
<thead>
<tr>
<th>Rating</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Contribution that leads to an undesirable outcome</td>
</tr>
<tr>
<td>I</td>
<td>A contribution that does not involve an incident that causes or could potentially cause harm or clinical benefit to the patient, but is good practice. It has no clinical effect on the patient, and may be an error in a legal requirement, or a therapeutic substitution. Eg, unsigned prescription</td>
</tr>
<tr>
<td>II</td>
<td>A contribution that may benefit patient care to a minor degree, OR may make treatment easier, OR which prevented an incident of minimal harm to the patient. OR an error which could have required extra observation. Eg, changing dose timings for convenience or to improve adherence</td>
</tr>
<tr>
<td>III</td>
<td>A contribution that prevented an incident that could have potentially led to reversible organ failure or harm, OR a contribution which resulted in improved treatment to evidence based standard. Eg, post MI patient no statin prescribed, pharmacist recommended starting a statin</td>
</tr>
<tr>
<td>IV</td>
<td>A contribution that prevented an incident of permanent organ damage or severe harm, OR an error which could have potentially caused major permanent harm. Eg, pharmacist noticed that a patient being fed via NG tube had an increased dose of insulin administered despite feed having been stopped hours before. BMs measured on pharmacists’ advice, result was 0.6mmol/L.</td>
</tr>
<tr>
<td>V</td>
<td>A contribution that prevented an incident that could have resulted in a life or death situation.</td>
</tr>
</tbody>
</table>

Results

The agreed criteria were that the tool needed to be simple, but able to distinguish between different levels of potential harm; usable by individuals rather than a panel or several individual raters; consist of a single scale for both medication errors and pharmacists’ non-error interventions; there should be evidence of validation; and it should have been used in a secondary care/acute medicine setting. The chosen tool was a scale based on the widely used Hatoum et al instrument. 1 Tables 1 and 2 show the main results.

Discussion

A tool from the literature has been modified and updated for rating UK pharmacists’ clinical contributions. It is a single scale for rating both interventions and prevention of medication errors and does not need a panel discussion or more than one independent rater. The tool has fair to moderate reliability after minimal training. Reliability is seen to improve between pharmacists with similar levels of experience.

The next stage of development is to improve reliability by rewording the descriptors and adding more scenarios. Inter-rater agreement can also be improved by giving raters more training. As versions of the original tool have been widely used and adapted, it already has face validity. However, further validation is needed.

References

2 Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics 1977;33:159-74.

Hameln poster prize

Patients do not want to talk to hospital pharmacists: a survey of adult patients discharged from a teaching hospital

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The UK Government White Paper, “Pharmacy in England: building on strengths — delivering the future”, published in April 2008, asserts that providers of pharmaceutical services and their staff need a better understanding of the needs of those to whom they provide services by having processes in place which help them to shape service provision. 1 This report describes the results of a survey of hospital inpatients designed to elucidate the patient’s need for information about medication, to what extent those needs were addressed and patient attitudes regarding the hospital pharmacy service in a UK teaching hospital.

Objective

To canvass views of inpatients at the time of discharge from hospital on specific aspects of their inpatient care relating to medication and the hospital pharmacy medicines management service.

Methods

The pharmacy service at Southampton General Hospital includes ward pharmacy. Over 50 wards are visited at least once daily by ward pharmacists and/or pharmacy technicians and 95% of inpatient drug prescriptions are reviewed daily. A questionnaire was developed to seek patients’ views on the roles of various healthcare professionals in relation to medicines and their experience of the pharmacy service during their inpatient stay. Questionnaire design was influenced by the validated Picker Patient Experience Questionnaire and used mainly closed questions to facilitate quantitative analysis but opportunities for unstructured responses were also provided. 2 The questionnaire was piloted face to face with five patients and modified before finalising. The study took place over one week in March 2009. Questionnaires were distributed to adult patients in all specialities by the ward pharmacist or ward pharmacy technician for completion while the patient awaited dispensing of their discharge prescription. Patients judged by pharmacy staff to be likely to have difficulty with completing a questionnaire (eg, patients with dementia) were excluded. Responses were anonymous: patients sealed completed questionnaires in an envelope addressed to the pharmacy department via hospital internal mail. Data were managed using SNAP4 Professional (Mercator Systems) and analysed using descriptive statistics. Approval from the University Biosciences Research Ethics Committee was sought and obtained prior to the study commencing.

Results

Approximately 500 patients are discharged per week and 74 questionnaires were returned completed; therefore around 15% of potentially eligible patients were sampled. The response rate could not be calculated as the total number of questionnaires distributed by pharmacy staff was not recorded. There was an even distribution of responses from male and female patients and 64% were over 55 years old.

Over 80% of respondents recalled being seen by a member of pharmacy staff during their stay but only one-fifth (14/74) expressed the view that it was the pharmacist’s main responsibility to tell them about their medicines. Nineteen out of 61 patients (31%) who reported being seen by a member of pharmacy staff indicated that the pharmacy staff member did not explain how to use their medicines and 62% were not told about side effects. However, most patients (90%) believed that the pharmacy staff listened to them either very well or quite reasonably. When
asked if they would have liked more time with a hospital pharmacist to discuss their medications, 73% (54/74) patients responded they would not. Table 1 illustrates the relationships between perceptions of healthcare professional roles and desire for more time with a pharmacist. One-third of patients who responded to the question about changes to medication (25/68) indicated that their medications had changed while in hospital. Of this group, 30% (7/23) expressed a desire for more time with the pharmacist to discuss their medication.

**Discussion**

The role of the hospital pharmacist/technician in counselling patients on medication is called into question by this survey. The results could be the ward pharmacy service or; weak demand for medication counselling. Regarding the question of whether patients would have valued more time with a pharmacist to discuss their medication, this group, 30% (7/23) expressed a desire for more time with a pharmacist to discuss their medication.

**Discussion**

Discriminating betwixt the healthcare professional roles and desire for more time with a pharmacist. One-third of patients who responded to the question about changes to medication (25/68) indicated that their medications had changed while in hospital. Of this group, 30% (7/23) expressed a desire for more time with the pharmacist to discuss their medication.

**Discussion**

Discriminating betwixt the healthcare professional roles and desire for more time with a pharmacist. One-third of patients who responded to the question about changes to medication (25/68) indicated that their medications had changed while in hospital. Of this group, 30% (7/23) expressed a desire for more time with the pharmacist to discuss their medication.

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**Table 1. Patients’ perceptions of healthcare professional roles regarding medication counselling and influence upon desire for more time with a pharmacist**

<table>
<thead>
<tr>
<th>Healthcare professional</th>
<th>Total (n=74)</th>
<th>Yes</th>
<th>No</th>
<th>No reply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacist</td>
<td>14 (19%)</td>
<td>14</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Pharmacy technician</td>
<td>2 (3%)</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Doctor</td>
<td>45 (61%)</td>
<td>12</td>
<td>28</td>
<td>5</td>
</tr>
<tr>
<td>Nurse</td>
<td>9 (12%)</td>
<td>1</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Other (respiratory unit)</td>
<td>1 (1%)</td>
<td>1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>No reply</td>
<td>3 (4%)</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

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**References**


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**Hameln poster prize**

Improving prescribing of vancomycin in a paediatric intensive care unit

**Hill C**, **Dunsmure L**

*Preregistration Pharmacist and 'Advanced Clinical Pharmacist, Leeds Teaching Hospitals*

**Vancomycin** is a glycopeptide antibiotic with bactericidal activity against Gram-positive bacteria. It is reserved for potentially life-threatening staphylococcal infections that have not responded to penicillins or cephalosporins. Vancomycin is principally renally excreted and so dose reductions are necessary in renal impairment.1 It has a narrow therapeutic range therefore it is important that vancomycin levels are monitored regularly. Side effects include nephrotoxicity, otoxicity, neutropenia and hypersensitivity reactions.1

A previous audit at Leeds Teaching Hospitals in 2006 discovered errors in vancomycin prescribing and poor serum level monitoring on the paediatric intensive care unit (PICU). The audit found that 33% of patients had their vancomycin incorrectly prescribed. In response to this a vancomycin prescribing chart was designed to facilitate best practice. The chart aims to aid the prescribers in calculating the correct loading dose (based on BNFC), and prompt the vancomycin levels to be recorded before the third dose. It also gave suggestions for dosage alterations (based on clinical experience) if the vancomycin level is outside of the reference range.

The chart was introduced on PICU and a repeat audit was undertaken.

**Objectives**

The objectives of the audit were to determine the proportion of patients prescribed the appropriate initial vancomycin dose (standard aimed for = 100%), the proportion of patients that had levels measured before the third dose (standard aimed for = 100%) and the proportion who have vancomycin levels within the therapeutic range at the first level. The audit also aimed to determine whether subsequent dose adjustments are in line with guidance (standard aimed for = 100%) and whether they provide levels within the therapeutic range. These results were to be compared against the results from the audit in 2006 to see the impact the prescribing chart has had.

**Method**

Inclusion criteria were infants, children and adolescents aged one month to 18 years prescribed vancomycin on paediatric intensive care wards at the LGI (wards 2 and 4). During the audit period (October 2008 until February 2009) all patients on vancomycin were identified by the pharmacists covering PICU and data collected by reviewing case notes and prescription charts. Vancomycin levels for patients in the audit were monitored using the trust’s online results service.

**Results**

Eleven patients were audited in total. All received the correct loading dose and 10 (91%) received the correct initial eight-hourly dosing. This was an improvement since the audit in 2006 when only 66% (n=9) patients had the correct starting dose. Of the 10 patients with correct sample time, six (60%) had their first level within the therapeutic range, which is a slight improvement since 2006 when 56% had their first level within range. Of the other patients, two (20%) had high serum levels and two (20%) had low serum levels. The results are summarised in Table 1.

Where the first vancomycin serum level indicated a dose adjustment was required, in all cases (100%) the dose adjustments were in line with guidance. It was difficult to evaluate whether or not the recommended dose adjustments were effective since only four patients had their doses altered in response to their first vancomycin level.

During later stages of treatment, high vancomycin levels occurred in three patients (27%). These patients did not have their treatment restarted or repeat levels taken. This could be intentional but raises concerns of treatment failure or resistance and could indicate that staff had excessive concerns about vancomycin toxicity. Problems were also found with prescription documentation in three patients (27%), indicating the need for training to support the introduction of the new chart.

**Discussion**

Vancomycin prescribing on PICU has improved since the introduction of the prescribing chart and all dose adjustments in response to the first vancomycin level were in line with guidance. Future recommendations include auditing more patients to see the effectiveness of dose adjustments and to develop an education programme to raise awareness of the vancomycin chart on the PICU.

**Table 1: Summary of audit results**

<table>
<thead>
<tr>
<th>Criterion</th>
<th>2009 (new chart)</th>
<th>2006 (pre-chart)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct loading dose</td>
<td>100%</td>
<td>–</td>
</tr>
<tr>
<td>Correct eight-hourly dosing</td>
<td>91%</td>
<td>66%</td>
</tr>
<tr>
<td>Level taken before third dose</td>
<td>90%</td>
<td>–</td>
</tr>
<tr>
<td>First level within therapeutic range</td>
<td>60%</td>
<td>56%</td>
</tr>
<tr>
<td>Dose adjustment according to guidelines</td>
<td>100%</td>
<td>–</td>
</tr>
</tbody>
</table>
Pfizer preregistration prize

Audit: Amiodarone monitoring for adverse effects

Jheeta S
Leeds Teaching Hospitals NHS Trust

Amiodarone is indicated for the treatment of ventricular and supraventricular arrhythmias. It is widely acknowledged that amiodarone can cause numerous potentially harmful adverse effects. The British National Formulary and summary of product characteristics therefore recommend that patients on amiodarone therapy are routinely monitored for signs of adverse effects. This includes monitoring for pulmonary, liver and thyroid toxicity through routine chest X-ray, liver function tests (LFTs) and thyroid function tests (TFTs), respectively. The Leeds Teaching Hospitals NHS Trust’s (LTHT) document “Amiodarone shared care guidelines” (SCG) clearly outlines the responsibilities for monitoring and managing unwanted effects for both specialists initiating treatment in hospital and GPs continuing care in the community. It is hoped that adherence to these recommendations should reduce incidence of irreversible adverse effects, as it would promote prompt identification of complications. The cardiology team at LTHT requested than an audit was carried out to identify if prescribers were adhering to the amiodarone SCG following identification of adverse effects in some patients taking amiodarone.

Objectives
• To audit if patients initiated on amiodarone were receiving routine baseline tests according to LTHT’s amiodarone SCG.
• To audit if patients admitted to hospital already taking amiodarone had been receiving regular tests according to LTHT’s amiodarone SCG.

Methods
The audit was carried out on cardiology and cardiothoracic wards at Leeds General Infirmary during December 2008. Patients were included if they had been initiated on amiodarone therapy, or admitted already taking amiodarone for at least seven months prior to admission. To comply with guidelines patients initiated on amiodarone must have received baseline chest X-ray, LFTs and TFTs within six months prior to initiation or seven days post-initiation (audit standard 100%). Patients already taking amiodarone should have had at least six-monthly LFTs and TFTs for up to two years (audit standard 90%). Data sources included the pharmacy computer system and the hospitals’ results database. The data recorded included the date, ward, date of birth, sex, date of amiodarone initiation, dates of baseline or regular chest X-ray, LFTs and TFTs where applicable. LFT results including alanine aminotransferase (ALT), bilirubin, and alkaline phosphatase (ALP) and TFT results including thyroid stimulating hormone (TSH) and free T4 were recorded where appropriate. Data were analysed using Microsoft Excel.

Results
Twenty-seven patients were initiated on amiodarone on the cardiology wards. Table 1 represents incidence of baseline tests. It was also identified that of the baseline ALT, bilirubin and ALP tests, 36%, 24% and 32% of patients had abnormal results, respectively. Of the 20 patients who received baseline TFTs, only 5% had an abnormal raised free T4. Results from the cardiothoracic ward were analysed in isolation: 22 patients were initiated on amiodarone, 23% patients received baseline chest X-ray, 100% had received LFTs and only 14% had TFTs. In addition, 50% and 41% of patients had abnormal ALT and ALP tests, respectively. Table 2 represents the incidence of regular monitoring for 22 patients admitted to hospital already taking amiodarone. TFTs fell particularly short of the audit standard of 90%.

Discussion
It would be expected that incidence of baseline LFTs would be high as they are routinely recorded for inpatients. Incidence of baseline TFTs and chest X-ray did fall short of the audit standard significantly. The incidence of baseline tests from the cardiothoracic ward are specific and representative of cardiothoracic surgical patients. These patients have routine LFTs prior to surgery and are started on amiodarone often for a period of six weeks with no intention to continue long term. Despite this, TFTs should still be carried out as thyroid toxicity can manifest early on in treatment and some of these patients do continue on amiodarone. Although no further clinical information was known about the patients, the abnormal baseline results recorded highlight that some patients may not be stable during amiodarone initiation and may require particularly close monitoring with regard to adverse effects. In addition, incidence of regular monitoring for patients who had been on long-term therapy was low, particularly incidence of TFTs. Factors which may have limited the results obtained include: the data sources may not provide a complete history of the patients’ test results; chest X-rays may have been recorded on a different system used by the medics; and medical notes were not used.

The results from the audit suggest that monitoring responsibilities as stated in the amiodarone SCG are not being adhered to by specialists and GPs and there is scope for improvement.

The findings of this audit were presented at the LTHT departmental cardiology meeting in March 2009; as a result the findings are to be taken further with the PCT. The amiodarone SCG have also been reviewed in April 2009, and now include a section for prescribers to agree to “share care” and improve communication between prescribers. In response to the audit a patient-held monitoring reminder card is being developed as an aid to improve monitoring through patient empowerment. Further suggestions to improve incidence of routine tests include implementing reminders in GP software and further education for healthcare professionals, including community and hospital pharmacists and GPs.

ACKNOWLEDGEMENTS
Whitehead A (Cardiology Pharmacist, LTHT), Baig W (Cardiology Consultant, LTHT).

References

Table 1: Baseline tests prior to amiodarone initiation — cardiology wards (n=27)

<table>
<thead>
<tr>
<th>Test</th>
<th>Percentage of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest X-ray</td>
<td>41%</td>
</tr>
<tr>
<td>LFTs</td>
<td>93%</td>
</tr>
<tr>
<td>TFTs</td>
<td>74%</td>
</tr>
</tbody>
</table>

Table 2: Regular tests during long-term amiodarone therapy — cardiothoracic wards (n=25)

<table>
<thead>
<tr>
<th>Test</th>
<th>Percentage of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFTs</td>
<td>60%</td>
</tr>
<tr>
<td>TFTs</td>
<td>28%</td>
</tr>
</tbody>
</table>
1 Detecting adverse drug events using trigger drugs: a point prevalence study

Cavell G, Rodgers K
Pharmacy Department, King’s College Hospital NHS Foundation Trust

The use of “trigger drugs” to detect adverse drug events (ADEs), including unpreventable adverse drug reactions (ADRs) and preventable medication errors, has been described. Some of these drugs are included in the global trigger tool which is increasingly being used in NHS hospitals and promoted by the Patient Safety First Campaign. However, retrospective review of medical records to search for triggers indicating potential adverse drug events is time consuming and duplicates the work of pharmacists who regularly and frequently review drug charts. Locally a list of “trigger drugs” has been promoted to encourage reporting of adverse drug events. Voluntary reporting of medication safety incidents has limitations as it is difficult to guarantee that every adverse drug event identified is reported. It is therefore difficult to measure actual rates of adverse drug events without using proactive methods.

This study applies point prevalence methodology to the detection of adverse drug events using trigger drugs.

Objectives

- To apply a list of trigger drugs to inpatient drug charts to measure the incidence of adverse drug events across the trust
- To determine the feasibility of point prevalence as methodology for ongoing measurement of the incidence of adverse drug events

Methods

All wards, excluding the neonatal unit, within an acute teaching hospital were visited by the investigator. Available current inpatient drug charts were screened for trigger drugs prescribed and administered. The presence or absence of a drug trigger was noted. The reason for the use of the trigger drug was investigated from the patient record and documented. The number of days of drug administration on the current drug chart was recorded. The incidence of adverse drug events detected by the application of the trigger drug list per 1,000 bed-days was calculated.

Results

Drug charts for 576 patients were screened for prescriptions for trigger drugs. Trigger drugs had been prescribed and administered on 66 occasions for 53 patients (Table 1). 24 patients had been in hospital for less than 24 hours. The remaining 552 patients had been inpatients for a total of 3,076 bed-days.

Four adverse drug events associated with four prescriptions for trigger drugs were identified. Three were non-preventable ADRs and one was a preventable adverse drug event (Table 2).

Adverse drug events were identified in 4/352 patients (0.72%) at a rate of 1.3 per 1,000 (4/3076) bed-days.

Discussion

The use of point prevalence methodology has enabled us to measure an adverse drug event rate by screening inpatient drug charts for trigger drugs prescribed and administered. It does not identify adverse drug events which may be identified from laboratory data or clinical signs and symptoms not treated by trigger drugs so this rate may not be absolute.

It is understood that the ADE trigger drugs are not always administered in response to ADEs and this study has identified a large number of false positives where trigger drugs have been prescribed for indications other than adverse drug events e.g. hydrocortisone and chlorphenamine prior to the administration of monoclonal antibody preparations in haemato-oncology.

<table>
<thead>
<tr>
<th>Table 1. Summary of trigger drugs prescribed and administered</th>
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</thead>
<tbody>
<tr>
<td>Trigger drug</td>
</tr>
<tr>
<td>Calcium gluconate</td>
</tr>
<tr>
<td>Calcium resinum</td>
</tr>
<tr>
<td>Chlorphenamine IV</td>
</tr>
<tr>
<td>Gelofusin/Volplex</td>
</tr>
<tr>
<td>Hydrocortisone IV</td>
</tr>
<tr>
<td>Naloxone</td>
</tr>
<tr>
<td>Omeprazole IV</td>
</tr>
<tr>
<td>Topical steroid</td>
</tr>
<tr>
<td>Vitamin K</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2. Reasons for trigger drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger drug</td>
</tr>
<tr>
<td>Calcium resinum</td>
</tr>
<tr>
<td>Chlorphenamine IV</td>
</tr>
<tr>
<td>Naloxone</td>
</tr>
<tr>
<td>Omeprazole</td>
</tr>
</tbody>
</table>

These data were collected by one individual who screened all charts. Although this does guarantee a consistent approach to identification and documentation of required data it still represents duplication of effort when this type of activity should be a core part of a ward based clinical pharmacist’s role.

Recognising the limitations of relying on many individuals to collect data regular serial point prevalence studies might be a good way to capture limited data on the incidence of adverse drug events on an ongoing basis. Such data could form the basis of a measure of the quality of medicines for inclusion in a quality scorecard.

Conclusion

Despite its limitations measurement of adverse drug event rates by screening inpatient charts for ADE trigger drugs using simple point prevalence methodology appears to be effective and will be incorporated into our annual audit programme. Data collected will be fed back into the medication safety governance structure.

References

An evaluation of an electronic Controlled Drugs cabinet and electronic Controlled Drugs register at King’s College Hospital NHS Foundation Trust

Brinklow N, Weerasooriya N, Alexis C, Smith P
Pharmacy Department, King’s College Hospital, London

The Department Of Health allows for Controlled Drugs Registers (CDRs) to be maintained either in a paper bound or electronic format. One of the benefits of an electronic CD storage system is the potential to move from a paper bound CDR to an Electronic Controlled Drugs Register (ECDR). The storage of CDs in such systems and use of electronic CDRs in the UK is a recent development and there is little data available to support and validate their use. Specific requirements for ECDRs are detailed in Statutory Instrument SI 2005/2864. The Royal Pharmaceutical Society of Great Britain (RPSGB) Law and Ethics Bulletin sets out the mandatory fields required in an ECDR. Since April 2009, Pharmacy has been trialling the storage of CDs in a five-cell Omnicell electronic storage system provided by Avantec within the Pharmacy department. The aim of this project was to evaluate the possibility of electronic CD storage and to validate the use of an ECDR.

Objectives
To measure compliance with current legislation; to measure the validity of an ECDR when compared with the paper bound CDR; to measure and compare the time taken to process CD orders pre and post ECDR; to measure staff satisfaction on factors such as ease of use, time taken to dispense CDs, impact on working day and to analyse the results to provide a comparison pre and post ECDR.

Method
A review of current legislative and regulatory documents and guidance was undertaken. Daily ECDR reports were compared with the paper bound CDR records over a three month period. In month three a task time observational study was undertaken to record and compare the time taken for all CD transactions for two days with a paper bound CDR and for two days with an ECDR. Finally, an anonymous online staff survey was developed and was emailed to all Pharmacy staff for their feedback.

Results
Current legislation allows for an ECDR to be maintained provided that all the requirements described in the RPSGB Law and Ethics Bulletin are fully met. Of the 13 requirements listed in the bulletin, the current system was fully compliant with eight of them, partially complaint with one (“CD Storage” was used in a heading rather than the words “Controlled Drug Storage”) and not yet complaint with four. Specifically the requirements not met were the ability to include in the ECDR: the name and address of a supplier; details of the person collecting a CD; proof of ID requested and proof of ID provided. Therefore, a full electronic audit trail was not possible. The results of the task time observational study (Table 1) demonstrated savings in time for dispensing CDs, impact on working day and to analyse the results to provide a comparison pre and post ECDR.

Discussion
There remains some work to be carried out in order to fulfil all the legal requirements of ECDR Mandatory Fields, particularly with regards to the collection of controlled drugs. All transactions were recorded in the ECDR and 18 discrepancies were identified. Unrecorded transactions in the paper bound CDR were identified by the ECDR. This type of discrepancy could have remained undetected for some time. Of the other discrepancies, it was felt that none were significant and steps had been taken to reduce the risk of recurrence. The Omnicell system allows only one user at a time and this can cause queues at certain times during the day. However, an ECDR could save around 6.25 hours a week in Pharmacy on processing orders received from wards and departments.

There is a good level of staff support for the system with most respondents being either satisfied or very satisfied with the system. Provided that the outstanding issues are resolved then it is our recommendation the current pilot is made permanent. The limitations of this study were that the ECDR was used for a relatively short period of time and many staff did not have an opportunity to use the system during this time. Also, we were unable to test the software being developed to aid the recording of controlled drug collection in the ECDR.

References

<table>
<thead>
<tr>
<th>Transaction type</th>
<th>Average transaction time using paper bound CDR (range: min-max) [seconds]</th>
<th>Average transaction time using an ECDR (range: min-max) [seconds]</th>
<th>Time difference per transaction [seconds]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orders [72%]</td>
<td>201 (81–389)</td>
<td>119 (63–342)</td>
<td>-82</td>
</tr>
<tr>
<td>Deliveries [7%]</td>
<td>258 (98–444)</td>
<td>386 (122–1410)</td>
<td>+129</td>
</tr>
<tr>
<td>Outpatient prescriptions [5%]</td>
<td>285 (260–384)</td>
<td>255 (220–282)</td>
<td>-30</td>
</tr>
<tr>
<td>Returns [9%]</td>
<td>329 (213–535)</td>
<td>147 (81–253)</td>
<td>-182</td>
</tr>
<tr>
<td>Discharge prescriptions [7%]</td>
<td>185 (102–268)</td>
<td>197 (121–275)</td>
<td>+12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description of discrepancy</th>
<th>Incidence</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item issued or returned on cabinet, but not entered in paper bound CDR</td>
<td>10</td>
<td>This would not have been picked up without an ECDR, though it would have been picked up at the next countback request</td>
</tr>
<tr>
<td>Incorrect requisition number entered</td>
<td>3</td>
<td>This type of error is unpreventable, though the risk is the same as for paper bound CDRs</td>
</tr>
<tr>
<td>Items booked to same ward on Omnícill i.e. destination not changed between orders from different wards/departments</td>
<td>3</td>
<td>Avantec are incorporating a change to display a message with current ward details. This will make it more difficult to forget to change wards/departments between orders</td>
</tr>
<tr>
<td>Incorrect quantity for new delivery booked in on Omnícill</td>
<td>1</td>
<td>This would have been picked up at the next countback request and a discrepancy report would have been printed for investigation</td>
</tr>
<tr>
<td>Timed out and “null transaction” registered and not noticed by the user</td>
<td>1</td>
<td>Avantec have lengthened the “time-out” function to its maximum settings to prevent this type of error reoccurring</td>
</tr>
</tbody>
</table>
Evaluating the Technician Level Development Framework — a professional development framework for pharmacy technicians in medicines management

Hough JE*, Van Damme C†, Obiols Albiiñana L‡, Bates IP†
*Department of Pharmacy, Oxford Radcliffe Hospitals NHS Trust; †Competency Development and Evaluation Group (CoDEG)

Continuing professional development using tools such as the General Level Framework (GLF) and the Advanced Level Framework (ACLF) clearly support the professional development of pharmacists, and both of these development frameworks are now in common use across the UK and Australia (www.codeg.org). The net result is a continuing development of skills and competencies for the pharmacy workforce that enables role development, and hence workforce development towards a more cognitive service provision. The pharmacy technician workforce, by comparison, is a neglected sector with unfulfilled opportunity for development — both of individuals and the health care activities of the workforce. If pharmacy technicians undertake complementary medicines management activities to pharmacists then such a framework would be a valuable addition for individual development.

Objectives
- To construct a developmental framework that includes behavioural competency statements relevant to pharmacy technicians working in medicines management (Technician Level Framework — TLF).
- To pilot the TLF, evaluate it over time and to compare self and reviewer assessment.
- To validate the TLF for this sector of the workforce.

Method
A task group drawn from across the UK of interested managers of medicines management technician services, and technician educationalists met during 2007 to reconstruct the GLF according to previously described principles. Medicines Management activities carried out by pharmacy technicians are very variable, so the new technician framework needed to cover a wide range of competencies. The task group highlighted those competencies they considered to be core or optional and indicated what they considered to be an acceptable level of competence for most pharmacy technicians. The group changed some of the terminology; “never” as a frequency became “rarely” and numbering of behavioural statements made cross referencing with the supporting handbook easier. The approval of the CoDEG board to pilot was given.

The TLF pilot was launched in January 2008, and test sites were asked to identify at least one experienced pharmacy technician and one new to the role of medicines management. The pharmacy technicians self-assessed their competence at time zero (baseline) and at the same time were observed by a site-based reviewer. The reviewer carried out further assessments at six and 12 monthly intervals. The data from the assessment was coded for analysis using SPSS.

A validation tool was developed to ask specific questions about each of the 114 behavioural statements. The lead investigator made site visits during the summer of 2008. The notes from these meetings, the feedback from the validation tool and the results from the analysis of the assessments were used to triangulate the findings of the quantitative analysis and are being used to revise the TLF.

Results
Twenty-seven pharmacy technicians from ten acute trusts (five teaching and five non-teaching) and two Mental Health Trusts completed the year long pilot. Sixteen of the technicians had at least one year of experience of medicines management and eleven were new to the role.

In general, the technicians (n=21) overrated themselves on the “Delivery of Patient Care” cluster (this cluster is more task related and considered easier to self-assess). Pharmacy technicians are less familiar with the concept of reflection, and tended to underrate themselves on the “Personal” and “Problem solving” clusters.

There was an improvement over time (n=23) in all four clusters, with an example given in Figure 1. The improvement was tested by the Kendall’s W test (p < 0.001) over the three successive time points.

Comparison of the 95% confidence intervals for Teaching and Non-Teaching Trusts showed no significant differences.

Triangulation of the results with the validation tool suggests the behavioural statements are valid, and the handbook generally easy to follow. However nine statements could be merged, and 25 need modification or further explanation in the handbook. Most of the management and organisation cluster was not relevant to most technicians. The outcomes are being used to refine the TLF.

Discussion
The TLF supports a development of competence over time and is a valid framework for pharmacy technicians in medicines management. Further work will be undertaken to ensure applicability of the findings to those pharmacy technicians working in Primary Care Trusts.

References

Figure 1: Mean scores over time for delivery of patient care cluster
Identification of causes of medication error at points around discharge from hospital in Ireland

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*Adelaide Hospital, incorporating the National Children's Hospital, Dublin; §School of Pharmacy, Royal College of Surgeons in Ireland, Dublin; ‡Clinical Pharmacy Development and Evaluation for East and South East England Specialist Services NHS; §School of Pharmacy, University of London, London

Medication error is common on discharge from hospital in Ireland and has the potential to cause patient harm.1 Deficits in the integration of care between hospital and community settings compromise patient safety and the appropriate use of medication across healthcare sectors.2 It is important to understand the human factors causes of medication errors and the organisational safety culture to develop strategies to improve safety.

Objectives
Identify the causes of medication error at points around discharge from hospital in Ireland by undertaking a stakeholder analysis with the key informants involved in the medication use process (MUP) across the primary secondary care interface.

Methods
The research design was qualitative stakeholder analysis comprising postal surveys, focus groups and face-to-face interviews. The opinions of primary care practitioners concerning medication management on discharge were gathered by means of semi-structured postal surveys with a convenience sample of general practitioners (GPs) and community pharmacists (CPs) and focus groups with GPs practising in the vicinity of the study hospital. Insights into the service delivered in hospital were obtained using face-to-face interviews with a purposive sample of non consultant hospital doctors (NCHDs) and clinical pharmacists. Qualitative data were transcribed, imported into QSR NVivo8 and analysed using the framework approach. Reason's model of accident causation, adapted for use in healthcare settings, was employed to identify error vulnerabilities and attributes of the safety culture.4,5 The opinion of the local Ethics Committee was that a formal submission was not required.

Results
There was a response rate of 48% for CPs (n = 90) and 34% (n = 94) for GPs and three focus groups were undertaken with further GPs. Interviews were conducted with 13 NCHDs from the study hospital and 14 clinical pharmacists from seven acute hospitals in Ireland. Error vulnerabilities and attributes of the safety culture were identified.

Individual factors included incompatible goals between the NCHDs' priorities for acute patient care and medication management; perceptions of the consultant's expectations to minimise length of stay and achieve discharge targets; wellbeing of the clinician; a propensity to copy senior colleagues' behaviour and an authority to violate or disregard input from non-medical colleagues. Team factors included deficits in communication and documentation; lack of clarity concerning roles and functions; problems with supervision and responsibility; lack of multidisciplinary engagement and partnership. Task factors included lack of defined standards of practice resulting in heterogeneity in the approaches to the MUP; perceived lack of complexity of prescribing and transcribing tasks; lack of intrinsic meaning in documenting or communicating medication details; absence of an independent checking system. Work environment factors included high workload; frequent distractions; lack of time for error detection and correction; deficiencies in the tools of the trade, for example the layout of the discharge summary; difficulty accessing the preadmission medication list or absence of a system to communicate with primary care; perceived requirement to prescribe for unfamiliar patients. Organisational factors included inadequate provision of training and assessment of competence; incompatible goals between meeting discharge targets and planning discharge; lack of definition and deployment of the requisite skill mix to undertake medication management tasks; failure to recognise and act on error vulnerability signals (housekeeping). Institutional factors included the lack of a national strategy for medication management or clinical pharmacy services and the absence of an accreditation model or standards for medication management.

Discussion
These findings indicated the need for professional leadership to steward culture change and to develop and implement a national medication management strategy, which would improve allocation of roles, functions and lines of responsibility and accountability. Prioritisation and promotion of medication safety by hospital management and the Health Services Executive would encourage true team work and partnership. Further steps mandated by the findings include: implement medication reconciliation at points around transfer of care; establish balance in performance monitoring between productive and protective outcome measures by assessing the frequency of medication reconciliation at points around transfer; use clinical audit and provide feedback to clinicians and management; review undergraduate and workplace education and training, assess competence. These steps should engender a generative safety culture by facilitating understanding of the benefits of changed behaviour. The process changes indicated by the findings include: revise the layout of the discharge summary; minimise transcription in the MUP; establish a functioning and accessible mode of communication between the hospital and primary care.

This study was the first qualitative assessment of the causes of medication errors at points around discharge from hospital in Ireland, and assessment from the perspectives of primary and secondary care practitioners was novel. The causes of error identified were consistent with previous findings in hospitals in the UK and Australia.6,7 The findings informed the development of a framework to advance the safety culture and to facilitate appropriate medication use at points around discharge. Future work should focus on implementation and evaluation of this evidence based framework in Ireland.

References

Identifying criteria for use in assessing the quality of pharmaceutical care: A modified Delphi study

Onatade R*, Zuhair A†
*Pharmacy Department, King's College Hospital NHS Foundation Trust; †School of Pharmacy, University of London

Measuring quality is high on the NHS agenda. The quality of pharmaceutical care provided to patients should also be subject to assessment. Assessing the appropriateness of prescribing is only one
aspect. Experienced clinical pharmacists use their knowledge and expertise to implicitly assess the quality of care provided to individual patients.

This study aimed to produce explicit criteria as a tool for quality improvement of pharmaceutical care.

**Objectives**
- To develop a list of criteria that can be used to assess the quality of pharmaceutical care provided to individual patients in an acute inpatient setting.
- To gain agreement on the relevance and objectivity of the criteria.

**Method**
Ethics approval was not deemed necessary. The study was conducted in three rounds by email between March and June 2008. Preliminary themes and criteria (subthemes) were produced through literature review and discussions with senior clinical pharmacists. Participants were recruited via UKCPA message boards and the local clinical pharmacy network. Two panels were created.

**Round 0:** The first panel commented on and rated the initial criteria as “important”, “unimportant” or “unsure” as to their usefulness for the assessment of the quality of pharmaceutical care. They also suggested new themes and criteria. Criteria which were considered important or uncertain by at least 50% of respondents were retained; all which were considered not important were removed. The results were used to construct a 2nd questionnaire and sent to the second panel.

**Round 1:** Panellists rated each theme for relevance and individual criteria for relevance and objectivity on a seven point Likert scale. They also proposed new criteria. The RAND/UCLA method was used to determine numbers needed to achieve agreement.1 Median ratings of 1–2 = irrelevant or subjective, 3–5 = equivocal, and 6–7 = relevant or objective. Themes and criteria achieving agreement for relevance were discarded. Those with disagreement, those in the equivocal range and all new criteria were resent to responding panellists for round 2. Relevant criteria and themes achieving agreement were retained and not resent.

**Round 2:** For each theme/criterion resent, panellists were told their individual ratings, all group comments, the group median and the range. Panellists were asked to review and consider amending their ratings if any remained more than one point away from the median. The results of round 2 were used to construct the final list.

**Results**

**Round 0:** 13 themes and 47 criteria were sent to panellists. 48% (14/29) questionnaires were returned. One criterion rated as important by only 33% of respondents was removed. Four new themes and 28 new criteria were proposed.

**Round 1 and 2:** 17 themes and 74 criteria were sent in round 1. Response rate was 57% (20/35). 1/20 was received too late for the results to be used. 14 new criteria were suggested and included in round 2. Response rate to round 2 was 70% (14/20).

Table 1 shows the top rated criteria.

Other relevant themes were transfer of information at discharge, failure to receive medication and response to therapy. Other relevant criteria were response to therapy, whether drug histories are taken and documented, and whether general housekeeping issues (e.g. are drug charts signed by pharmacists), are completed correctly.

**Discussion**

The opinions of clinical pharmacists from across the UK were solicited to produce a list of the most relevant, objective criteria for use in assessing the quality of pharmaceutical care provided to individual patients.

These generic criteria can also be used to identify gaps in care as well as to aid training and prioritisation. Poor documentation may hinder the utility of some criteria. The criteria will be tested for feasibility in practice.

**References**

<table>
<thead>
<tr>
<th>Table 1. Criteria with median relevance ratings of 6–7 AND median objectivity ratings of 5–7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>If you were assessing the quality of pharmaceutical care for an individual patient using case/medical notes, how relevant would it be to assess...</strong></td>
</tr>
<tr>
<td><strong>Drugs with a narrow therapeutic index</strong></td>
</tr>
<tr>
<td><strong>The dose of drugs with a narrow therapeutic index</strong></td>
</tr>
<tr>
<td><strong>If the dose was adjusted appropriately</strong></td>
</tr>
<tr>
<td><strong>If appropriate action was taken in response to significant drug/disease/food interactions</strong></td>
</tr>
<tr>
<td><strong>If any doses had been missed</strong></td>
</tr>
<tr>
<td><strong>Antibiotic use</strong></td>
</tr>
<tr>
<td><strong>If the choice of antibiotic(s) was appropriate</strong></td>
</tr>
<tr>
<td><strong>If the antibiotic dose was appropriate</strong></td>
</tr>
<tr>
<td><strong>If the duration of therapy was appropriate</strong></td>
</tr>
<tr>
<td><strong>Adherence to local restricted policies</strong></td>
</tr>
<tr>
<td><strong>If IV, whether the IV route was appropriate</strong></td>
</tr>
<tr>
<td><strong>If IV, if it was changed to oral as soon as possible</strong></td>
</tr>
<tr>
<td><strong>Available laboratory investigation results</strong></td>
</tr>
<tr>
<td><strong>Whether the lab data is outside expected limits</strong></td>
</tr>
<tr>
<td><strong>Whether appropriate action was taken with regards to the laboratory data</strong></td>
</tr>
<tr>
<td><strong>If there was proactive (not just reactive) input from a pharmacist</strong></td>
</tr>
<tr>
<td><strong>For all drugs, side effects and ADRs suffered</strong></td>
</tr>
<tr>
<td><strong>If an allergy was detected, whether this was documented correctly</strong></td>
</tr>
<tr>
<td><strong>For the presence of any contraindicated drugs</strong></td>
</tr>
<tr>
<td><strong>If the prescription or administration of the contraindicated drug was avoidable</strong></td>
</tr>
<tr>
<td><strong>If the patient suffered any adverse consequences arising from being prescribed and/or administered a contraindicated drug</strong></td>
</tr>
<tr>
<td><strong>In the event of adverse consequences, if subsequent patient management was appropriate</strong></td>
</tr>
<tr>
<td><strong>Whether a contraindicated drug was stopped or an overriding principle recorded</strong></td>
</tr>
<tr>
<td><strong>The presence of significant drug interactions</strong></td>
</tr>
<tr>
<td><strong>Whether appropriate action was taken after a drug interaction was identified</strong></td>
</tr>
<tr>
<td><strong>If there were any adverse consequences to the patient from the drug interaction</strong></td>
</tr>
<tr>
<td><strong>If there were adverse consequences from the drug interaction, was subsequent patient management appropriate</strong></td>
</tr>
<tr>
<td><strong>PREVENTATIVE MEDICATION – If preventative medication was prescribed as necessary</strong></td>
</tr>
<tr>
<td><strong>PATIENT COUNSELLING – If the patient counselling was documented</strong></td>
</tr>
</tbody>
</table>

6 The selection, modification and reliability testing of a tool for rating the significance of pharmacists’ clinical contributions

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Winner of Hameln oral presentation prize. See pS3.
Study to identify the reasons for initiating monitored dosage systems and the burden of time they impose on pharmacy staff

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Monitored dosage systems (MDS) are weekly containers allowing tablets and capsules for oral administration to be sealed in compartments corresponding to appropriate times of administration on each day of the week. They may be used to promote compliance or to allow carers to administer medicines.

Carers in Oxfordshire are not insured to issue medicines from original packs and require all the doses to be in an MDS. The responsibility for the correct medicines being given lies with the pharmacy, while the carers ensure the medicines are taken at the right times.

The National Institute for Health and Clinical Excellence (NICE) recommend in guidance on Medicines Adherence that because there is little evidence that MDS increase adherence they should only be used if a specific need is identified. The process of filling MDS is time consuming and expensive. It is important that those initiated are appropriate. Medicines with stability problems, liquids and those needed “when required” are not suitable for MDS. Patients commenced on an MDS may be disempowered as they lose responsibility for their medicines.

Objective
The aim of the research was to obtain an overview picture of MDS use within the Oxford Radcliffe Hospitals NHS Trust (ORH) hospitals including the John Radcliffe (JR) and Horton sites. Information was gathered to determine the number of MDS issued, the number initiated by the ORH, the reasons they were commenced and the amount of time spent or ganising and preparing them.

Method
Part A – A data collection form was developed and piloted on a medical ward. Data was collected prospectively over two weeks between 18 May and 1 June 2009. Information was recorded for any patient (on all wards at the JR and Horton) who was dispensed an MDS in that period. Pharmacists were responsible for identifying patients. The dispensary contacted the pharmacist to ensure the form was completed when an MDS was filled. Data recorded included the reason for the MDS and the amount of time pharmacist and dispensary staff spent organising and preparing them. The investigator checked on the pharmacy computer system to determine if any additional MDS were issued during the investigation period. Approval was not sought from an ethics committee for either Part A or B as this was not felt to be necessary as the research was assessing current pharmacy/ward practice.

Part B – It is routine practice to fax copies of an MDS discharge prescription to the patient’s pharmacy and GP surgery. The fax header has a section where the pharmacist records whether this was established or newly initiated. A pharmacist covering one general medical ward retained copies of faxed prescriptions between 1 July 2008 and 18 June 2009 (Monday to Friday). A retrospective audit was performed by the investigator to determine the proportion of patients already established on an MDS compared with those initiated during admission. The investigator checked the pharmacy computer system to ascertain how many additional MDS were issued during the investigation period. Additionally the total number of MDS dispensed in the hospital over one year (3 June 2008 to 2 June 2009) was obtained from the pharmacy computer system allowing an estimate of pharmacy time spent organising MDS in one year.

Results
Part A – Forms were completed for 34 of 54 patients (62%) who were dispensed MDS during the two-week period across all three sites. There were five newly initiated MDS (9%), all of which (100%) were to enable carers to administer medicines. On five forms (9%), the pharmacists had not completed the time taken to contact the GP surgery and local pharmacy and screen the prescription. See Table 1 for a summary of the results.

Part B – In the 12-month period, the pharmacy computer system recorded a total of 67 MDS issued on the one general medical ward investigated. Of these, 59 prescriptions (88%) were retained. 51 faxes (86%) examined were for already established MDS and eight (14%) were newly commenced. The reason for the new MDS was not recorded on two occasions (2/8), was due to carers on five occasions (5/8) and was requested by the patient’s daughter and the occupational therapist on one occasion (1/8). There were 1,638 MDS issued in the hospital over the 12-month period investigated as recorded in the pharmacy computer system. Using an estimated time of 80min per MDS, this equates to 2,184 hours pharmacy time.

Discussion
Five patients (9%) had MDS initiated at the ORH during the study period, in all cases due to carers. On the general medical ward over one year, eight (14%) were commenced during admission and five of these were due to carers. When a patient has carers to administer medicines, an MDS must be used. It is not possible to determine from this research if an MDS was the most appropriate compliance aid or whether the patients may have been able to manage their medicines with a different form of aid.

Forms were completed for 62% of the MDS issued. The Horton site had a large difference between the mean and median times due to two prescriptions that took a long time to prepare. Due to five incomplete pharmacist sections, the time calculations are an underestimate. The results obtained do highlight the large burden of time that MDS impose. The approximation of 2,184 hours of pharmacy time per annum spent on MDS is greater than one whole time equivalent (1,950 hours).

The ORH needs to develop more efficient ways of managing MDS and further research may be required as to whether MDS are appropriate or with alternative compliance aids patients may be able to administer their own medicines.

Table 1: Summary of research results over the two-week period

<table>
<thead>
<tr>
<th>Hospital site</th>
<th>Number of MDS issued</th>
<th>Number of forms</th>
<th>Number of new MDS</th>
<th>Pharmacist time (5 forms)</th>
<th>Dispensary time (8 forms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Radcliffe</td>
<td>32 (53%)</td>
<td>23 (67%)</td>
<td>11 (50%)</td>
<td>11h 30m (11h 30m)</td>
<td>3h 30m (11h 30m)</td>
</tr>
<tr>
<td>Horton</td>
<td>22 (78%)</td>
<td>21 (75%)</td>
<td>3 (14%)</td>
<td>11h 30m (16h 30m)</td>
<td>3h 30m (16h 30m)</td>
</tr>
<tr>
<td>Total</td>
<td>54 (53%)</td>
<td>44 (75%)</td>
<td>14 (14%)</td>
<td>11h 30m (11h 30m)</td>
<td>3h 30m (11h 30m)</td>
</tr>
</tbody>
</table>

References
Who needs the needles? — influencing compliance with IV-to-oral antibiotic prescribing

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†School of Pharmacy and Biomedical Sciences, University of Portsmouth; ‡Pharmacy Department, Southampton University Hospitals NHS Trust; §Microbiology Department, Southampton University Hospitals NHS Trust

Intravenous (IV) antibiotics are essential for life-threatening infections but, compared to oral therapy, their use is not without increased risk and expense. Intuitively, switching from IV to oral therapy at the earliest opportunity compatible with protocol should result in safer, more cost-effective therapy.

Pharmacy-led campaigns have met with some success, but guidance on the best way to ensure effective IV to oral switch therapy (IVOST) is often conflicting. As we report a study to improve adherence to a pocket guide on antibiotic prescribing for hospital inpatients, containing the prevailing IVOST policy.

Objective
To investigate the influence of a pharmacy-driven campaign to improve compliance with hospital IVOST policy.

Methods
The study took place during March to April 2009. A piloted data collection form (DCF) was designed to capture data on compliance with the IVOST policy through access to patient drug and observation charts and clinical notes, on three medical wards, three surgical wards and five elderly care wards. Length of unnecessary IV antibiotic therapy and the duration of unnecessary IV access were also documented. All patients receiving IV antibiotics or who had received them in the previous seven days were included, by sequential quota sampling.

The first data collection phase (DCP1) recruited 70 patients over five consecutive weeks to establish a baseline of compliance with hospital IVOST policy. This was followed by a three-week gap, in which the intervention was initiated. This consisted of placing an innovative poster referring to a famous local landmark (the Needles, Isle of Wight) with the strap line “Who needs the Needles?” in each ward treatment room and encouraging clinical pharmacists to place custom-designed stickers indicating switch inclusion and exclusion criteria (Table 1) met or unmet, the pharmacist’s recommendation and space for the prescriber to justify their subsequent course of action, in the drug charts of all patients receiving IV antibiotics.

Table 1. IV-to-oral switch criteria

- Still on IV therapy after 24-72 hours
- Clinical improvement
- Haemodynamic stability
- Afebrile for >24 hours
- Administration of oral formulations feasible
- Satisfactory oral antibiotic alternative available
- Functioning gastrointestinal tract
- No deep-seated infection requiring continued IV antibiotics

A second, data collection phase (DCP2) was then initiated. Data were managed using SNAP4 Professional (Mercator Systems) and analysed using descriptive statistics.

This study received a favourable opinion from the Chair of the Southampton and Southwest Hampshire Research Ethics Committee.

Results
Seventy patients were recruited in both DCPs. In DCP1, 44 (63%) were eligible for switching from IV to oral in DCP of which 17 (39%) were switched appropriately. In DCP2, 59 (84%) were eligible of which 36 (61%) were switched appropriately. The increased proportion of appropriately switched patients was statistically significant (chi2=5.04, p=0.025). The trend was most pronounced for the medical wards (chi2=5.937, p=0.015). For those patients who were eligible for switching but who were not switched, the median number of days of excess IV antibiotics was reduced from two in DCP1 to one in DCP2 (Mann-Whitney, p<0.0001), with a range of one to seven days in DCP 1 and just one to two days in DCP 2. Similarly, the median number of days of unwanted IV access was reduced from two in DCP1 to one in DCP2 (Mann-Whitney, p<0.0001). Patients in DCP1 had up to five days recorded unnecessary access compared to two in DCP2.

Discussion
The study was conducted against a background of pressure, applied throughout both phases of the study by the Trust infection prevention team, to review IV therapy daily to reduce the risk of hospital-acquired infection. Yet still the poster/sticker intervention was successful in achieving a greater number of appropriately switched patients in DCP2 compared to DCP1 overall. It was successful at reducing both the time patients had unnecessary IV antibiotics and unnecessary IV access.

It was noted that the stickers were not used universally before and during DCP2. This study suffers from the limitations of an uncontrolled before-and-after study design. However, hospital-wide data on the consumption of IV antibiotics suggest that the study findings were independent of a stable background IV antibiotic prescribing rate (data not shown) and are therefore unlikely to be explained by regression to the mean.

The role of pharmacy staff in producing a favourable shift in appropriate IV to oral antibiotic prescribing has been noticed elsewhere. Clearly the present intervention was only partially successful. Although the nature of the intervention may not be as important as the degree of prosecution, we aim to repeat the study with further emphasis on the use of stickers and undertake a cost analysis of the data to assess the financial impact of the intervention. As with most audits, it is likely that ongoing carer education will be required to sustain the favourable changes seen here.

References

Patients do not want to talk to hospital pharmacists — a survey of adult patients discharged from a teaching hospital

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Winner of Hameln poster prize. See pS4
The impact of postoperative paediatric analgesia guidelines in a district general hospital

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Adequate prescribing of post-operative analgesia is important, particularly in paediatric patients who may find it difficult to verbally communicate that they are in pain. Although most doctors are familiar with the dosing of appropriate adult analgesics, surgical doctors can find it difficult when prescribing to children since doses vary depending on the patient’s body weight. Subtherapeutic dosing in post-operative paediatric patients has been well reported, with rates ranging from 33–94%. Excessive dosing is less well described, although Helgadóttir et al. did find 21% of prescriptions were above therapeutic range. Prescribing guidelines were implemented for paediatric patients following surgery in a district general hospital. The impact of the guidelines on prescribing error was then assessed.

Objective
The present study was undertaken to establish the impact on prescribing error following the introduction of postoperative paediatric prescribing guidelines.

Methods
A prescribing guideline was introduced in a district general hospital in December 2008. In May 2009, the first 32 paediatric patients undergoing surgery were identified, of which 31 (97%) notes were available (mean age 6.2 years). The prescription charts were then examined to determine whether prescribed doses of analgesia were appropriate for the patient’s weight, which was recorded on all charts. As a control 32 consecutive post-operative paediatric patients in May 2008 were identified from surgical records. The notes were requested and of the 32, 29 (91%) were available (mean age 5.8 years). Averages are given as medians and interquartile ranges. Significance was investigated with a Chi square test. During the study these doses were considered: paracetamol (60–90mg per kg per day), ibuprofen (20–30mg per kg per day), and codeine phosphate (3–6mg per kg per day).

Results
The most commonly prescribed analgesia were paracetamol, ibuprofen, and codeine phosphate. There were 25 (8 excessive doses and 17 subtherapeutic doses) incorrect prescriptions in 2008, and 16 (all subtherapeutic doses) in 2009 (Table 1).

Paracetamol In 2008, five (17%) of the 29 patients were prescribed a greater daily amount of paracetamol than the recommended maximum daily dose. They were prescribed on average an excess of 396mg (123–510mg), 48% (40–48%) more than the maximum recommended dose. In terms of subtherapeutic dosing, four of the 29 patients in 2008 received an average 140mg (37–174mg), 3% (2–8%) less than the therapeutic dose. In 2009, none of the 31 patients were prescribed more than the recommended daily dose. In contrast, underdosing of ibuprofen was common, with on average 32% (2008) and 40% (2009) less than the therapeutic dose being prescribed. However, this study did not assess patient pain levels so we cannot be certain that the subtherapeutic dosing resulted in patient discomfort. As a result of the significant reduction in paracetamol overdosing, and the reduction in ibuprofen prescribing error we advocate the introduction of this guideline in other NHS trusts, although acknowledge people need to be encouraged to follow the guidelines.

Ibuprofen In 2008, four (82%) of the 17 patients were prescribed an incorrect dose. Two (12%) of the 17 patients received an excessive dose (3mg (0.5%) and 510mg (100%) more than the recommended dose) and 12 (71%) patients received a subtherapeutic dose (87mg (44–137mg) less than the therapeutic dose). This equates to a dose that was 32% (5–38%) lower than the recommended dose. In 2009, none of the 22 patients were prescribed more than the recommended daily dose. Seven patients still received subtherapeutic dosing, being prescribed an average 96mg (60–122mg) less than the therapeutic dose, which in terms of percentage of dose was 40% (21–42%) less than the therapeutic dose.

Codeine phosphate One of the six patients in 2008 was prescribed an excessive dose (11mg), while neither of the two patients prescribed codeine phosphate in 2009 was prescribed an excessive dose. Subtherapeutic dosing occurred for one patient in 2008, (7mg / 16% less) and none in 2009.

Discussion
The current study showed no significant differences in the overall prescribing error with the introduction of the prescribing guidelines, however there was a significantly lower rate of paracetamol overdosing of patients after the introduction of the guidelines. The amount of underdosing of paracetamol was so small it is unlikely to be clinically significant. Ibuprofen was only prescribed in excessive amounts in two of the 19 patients during the study, although on one occasion this was twice the recommended dose. In contrast, underdosing of ibuprofen was common, with on average 32% (2008) and 40% (2009) less than the therapeutic dose being prescribed. However, this study did not assess patient pain levels so we cannot be certain that the subtherapeutic dosing resulted in patient discomfort. As a result of the significant reduction in paracetamol overdosing, and the reduction in ibuprofen prescribing error we advocate the introduction of this guideline in other NHS trusts, although acknowledge people need to be encouraged to follow the guidelines.

ACKNOWLEDGEMENT
Thanks to Rosin Kavanagh for help implementing the guidelines.

References

Table 1. Number of patients with analgesia prescription errors in May 2008 and May 2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Drug</th>
<th>Patients prescribed analgesic</th>
<th>Excessive therapeutic dose</th>
<th>Subtherapeutic dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>Paracetamol</td>
<td>29</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>2009</td>
<td>Paracetamol</td>
<td>31</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>2008</td>
<td>Ibuprofen</td>
<td>17</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>2009</td>
<td>Ibuprofen</td>
<td>22</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>2008</td>
<td>Codeine phosphate</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2009</td>
<td>Codeine phosphate</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Pharmacy discharge prescription writing: is this the way forward?

Gujral S, Wong A
King’s College Hospital Foundation Trust, London

The day before discharge (D–1) system was introduced in 2007 to engage the multidisciplinary team in planning discharges in advance. On the surgical wards at King’s College Hospital, patients being discharged the following day are identified the day before discharge ward rounds. D–1 requests are communicated by the nurse in charge to the pharmacist. The patients are visited by a Senior Clinical Pharmacist and the discharge medication (TTA) is ordered on the electronic patient record (EPR). The discharge prescription is sent to pharmacy if any medication is needed. The clinical information on the discharge prescription is completed by the doctor and (s)he is responsible for checking the discharge medication ordered by the pharmacist. Once the doctor is satisfied with the order, (s)he can print out the TTA and sign a copy. As a result all the medications are available on the ward at the time of a planned discharge.

Studies have shown that pharmacist transcribing discharge prescriptions increase the number of pharmacist interventions, decrease prescription turnover time, and make cost savings by using patients’ own drugs (PODs), decrease workload for the on-call team, decrease prescription error rates compared to junior doctors and reducing workload for junior doctors. 1–3

Objectives
1. Identify the proportion of discharge prescriptions written by pharmacy against the D–1 requests and reasons for not being completed if requested.
2. Compare the number and nature of interventions made on TTAs written by doctors and pharmacists.
3. Quantify the time taken for pharmacists to complete the D–1 requests.

Method
Data was collected over two one-week periods in November 2008 and January 2009 for five surgical wards during pharmacy working hours. D–1 requests were recorded by the Senior Clinical Pharmacist on a daily basis. Any discharge prescriptions written for these patients were identified. If a discharge prescription was not ordered then the reason for this was documented. A second check was conducted for all discharge prescriptions written by doctors and pharmacists, by another surgical pharmacist, and any interventions highlighted. The time taken to complete the D–1 requests for each ward was assessed. This time included obtaining the D–1 requests, gathering any information needed in order to complete the TTA, checking PODs and writing the TTA.

Results
Over the two week data collection period a total number of 134 D–1 requests were made and 45 (34%) discharge prescriptions were written by pharmacists. The most common reasons for those not written were the TTA already completed by the doctor (31/89; 35%), partially completed TTAs by doctors (20/89, 22%) and drug charts not being available due to patients in theatre (17/89; 19%).

The results showed that 40% (60/149) of TTAs prescribed by doctors needed to be amended by the ward pharmacist. These included 29/85 (34%) omission of drugs, 11/85 (13%) wrong formulation, 11/85 (13%) drugs no longer being indicated and 11/85 (13%) wrong dose being prescribed. However, only one (2%) intervention was made on the 45 drug lists ordered by pharmacists. This involved the wrong strength of drug being ordered.

The time taken for pharmacists writing TTAs on each surgical ward varied and is demonstrated in table 1 below.

Discussion
Discharge prescriptions were written by pharmacists for 34% of D–1 requests made. 57% (51/89) of the remaining requests were either completed or in the process of being completed by the doctors. In order to increase the number of TTAs written by pharmacists, communication needs to be improved between pharmacy and the multidisciplinary team to enhance the quality of the D–1 requests. Improvements can also be made by pharmacists taking responsibility for the partially completed TTAs and ensuring all discharge medications are available in advance. Development of a pro-forma for common short stay elective procedures, including antibiotic duration and choice of analgesics, will address the problem of drug charts not being available when needed. Pharmacy input in pre-assessment, with the use of this pro-forma, will allow TTAs to be written prior to admission.

Ward pharmacists made interventions on 40% of TTAs written by doctors compared to 2% on those written by pharmacists, indicating that the discharge prescriptions written by pharmacists were more accurate. Time can therefore be saved as the ward pharmacist does not have to contact doctors as frequently regarding TTA discrepancies.

Ward 1 is an elective, short stay ward, with minimal changes to regular medications. This is reflected by the higher number of D–1 requests and a shorter average time spent for pharmacists to write a TTA. However, Ward 3 and 4 are both non elective surgical wards and often have more complicated patients, with longer length of stay, resulting in fewer D–1 requests and a longer average time spent writing each TTA.

There are improvements that can be made to the D–1 process to increase the number of TTAs written by pharmacists. Fewer interventions are made on TTAs written by the pharmacists compared to those written by doctors, resulting in time saved for the pharmacist in dealing with TTA queries. Therefore the time pharmacists spend screening TTAs could potentially be used on completing the D–1 requests.

Table 1. Time spent completing D–1 on each ward over two five-day periods

<table>
<thead>
<tr>
<th>Ward</th>
<th>Number of D–1 requests</th>
<th>Average time per TTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ward 1</td>
<td>56</td>
<td>7.7 minutes</td>
</tr>
<tr>
<td>Ward 2</td>
<td>23</td>
<td>10.2 minutes</td>
</tr>
<tr>
<td>Ward 3</td>
<td>18</td>
<td>13.9 minutes</td>
</tr>
<tr>
<td>Ward 4</td>
<td>17</td>
<td>12.4 minutes</td>
</tr>
<tr>
<td>Ward 5</td>
<td>20</td>
<td>9.8 minutes</td>
</tr>
</tbody>
</table>

References

A review of a pharmacist discharge prescription writing service in a large teaching hospital

Considine A, Onatade R, Knighton S, Leung K
Department of Pharmacy, Kings College Hospital NHS Trust

The efficient and seamless discharge of patients from hospital has historically been a difficult objective to achieve. Although the discharge process is influenced by a multitude of factors and involves a multidisciplinary approach, one way of improving the process is for pharmacists to write the discharge prescription (TTA). Across our Trust there are several wards including liver, surgery, haematology/oncology and neurosciences where specialist pharmacists currently write TTAs as part of the normal clinical pharmacy service (PTTAs). The specialties differ in terms of patient length of stay, discharge processes and patient complexity. The following performance measures are reviewed when the
latter service is undertaken on a ward: 75% of discharge prescriptions to be written by the pharmacist a day in advance of the patient's discharge date; 75% of discharge prescriptions written by pharmacists will not be changed after dispensing has been completed; 90% of patients will have their medication on the ward before they are ready to go home.

The aims of this study were to assess the impact and quality of the PTTA service.

**Objectives**

To assess:
- The times that PTTAs are written in relation to the date of discharge
- The impact of PTTAs on the availability of medications before the day of discharge
- Whether pharmacists writing TTAs had an impact on achieving a target discharge time of 11am
- The number and type of amendments needed when pharmacists write TTAs
- The number and type of errors made by pharmacists writing TTAs

**Method**

Data was collected over a five-week period (March–April 2009) in all four specialities (10 wards, 234 beds) where the PTTA service is in place. The pharmacy prescription tracking system was used to identify when TTAs were dispensed and sent to the ward. For two of these weeks prescriptions were double checked by another pharmacist. One speciality was excluded from the double checks.

**Results**

901 patients were discharged during the study period. 35% (314/901) received PTTAs. Table 1 shows the breakdown by speciality. The number of items per prescription ranged from one to 21 items (mean and median = six items). The reported time taken to write the prescriptions ranged from 1–30 minutes (mean = 9 mins, median = 10 mins). Table 2 highlights the performance compared to the targets.

**Table 1. Breakdown of performance by speciality**

<table>
<thead>
<tr>
<th>Speciality</th>
<th>Total number of discharges</th>
<th>Total number of PTTAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speciality 1</td>
<td>202</td>
<td>167 (83%)</td>
</tr>
<tr>
<td>Speciality 2</td>
<td>23</td>
<td>8 (35%)</td>
</tr>
<tr>
<td>Speciality 3</td>
<td>47</td>
<td>47 (100%)</td>
</tr>
<tr>
<td>Speciality 4</td>
<td>629 (approx)</td>
<td>92 (15%)</td>
</tr>
<tr>
<td>Total</td>
<td>901</td>
<td>314 (35%)</td>
</tr>
</tbody>
</table>

**Table 2. Comparison of performance with targets**

<table>
<thead>
<tr>
<th>Performance measure</th>
<th>Overall (n=291)</th>
<th>Range</th>
<th>Performance measure target</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTTAs written before day of discharge</td>
<td>80%*</td>
<td>64–88%*</td>
<td>–</td>
</tr>
<tr>
<td>PTTAs written one day before discharge</td>
<td>40%*</td>
<td>32–58%*</td>
<td>75%</td>
</tr>
<tr>
<td>PTTAs written more than one day before discharge</td>
<td>37%†</td>
<td>13%–71%†</td>
<td>–</td>
</tr>
<tr>
<td>PTTAs amended or updated before discharge</td>
<td>8% (32 amendments)</td>
<td>&lt;25%</td>
<td></td>
</tr>
<tr>
<td>PTTAs available on ward before discharge (n=234)</td>
<td>85%</td>
<td>–</td>
<td>90%</td>
</tr>
<tr>
<td>Patients discharged before 11am</td>
<td>26%</td>
<td>0%–52%</td>
<td></td>
</tr>
<tr>
<td>Second screened PTTAs needing corrections due to errors</td>
<td>10% (19 corrections)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Excludes Speciality 2, where the service is based on writing prescriptions at day 10 of admission
† Excluding Speciality 2, these figures are overall = 36%, range = 13%–26%

Of the PTTAs requiring amendments before discharge, 19 (96%) were on prescriptions written more than one day before discharge.

**Discussion**

The visible contribution of this service to a key Trust priority has led to further requests from other specialities for this service to be implemented. Feedback from the specialities and patients has been very positive and has improved the profile of the pharmacy service and integration into the multidisciplinary team.

Overall only 35% (314/901) of patients had a PTTA however this figure masks the wide variation between specialities which needs further investigation as the service specification states the aim is to write a minimum of 75% of prescriptions.

The time of discharge did not appear to be affected by this service. The quality of data regarding discharge times was poor therefore this is probably not a good indicator of the value of the service. However early availability of discharge medication will not necessarily prevent delays unless the other steps in the discharge process are optimised. The performance of this service on the number of discharge prescriptions written and available before the patients' discharge is much better than normally obtained from the traditional system.

8% of PTTAs requiring amendments compares well with results from other studies within the Trust which shows that 50–70% prescriptions written by doctors require amendments by pharmacists. However, errors were identified on PTTAs. Further work is needed to evaluate if PTTAs should be subject to the same scrutiny as TTAs written by doctors.

A lack of accurate discharge data may have led to an underestimation of some results.

This study has highlighted the positive achievements of a PTTA service and the results will be used to support further roll out.

**7 Design of a documentation system to support continuity of pharmaceutical care for patients with acute coronary syndrome (ACS) on discharge from the hospital cardiology unit**

Petrie S, Kinnear M, Reid K, Veitch H

NHS Lothian Pharmacy Service, Royal Infirmary of Edinburgh and Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Glasgow

In the near future it is predicted that 90% of chronic health care shall be provided in primary care.1 Acute coronary syndrome (ACS) patients are being discharged from hospital more rapidly so it is important that good communication links exist between hospital and community pharmacists so that ongoing pharmaceutical care issues such as up-titration of ACE inhibitors and beta-blockers are not always resolved during the hospital admission.2

It has been reported that problems exist at the interface between primary and secondary care and that discharge information provided to GPs is inadequate.3 Errors that occur on discharge are commonly detected in community pharmacies4 but most community pharmacists do not routinely receive information about their patient’s discharge from hospital.

**Objective**

The present study was undertaken to design and evaluate a referral and follow-up system for maintaining continuity of pharmaceutical care for
patients discharged from the cardiology unit, with particular emphasis on appropriate titration of ACE inhibitors and beta-blockers.

**Method**
The hospital clinical pharmacist identified suitable PCIs for transfer to community pharmacists by studying a baseline group of patients admitted to hospital who had a previous episode of ACS with outstanding PCIs. A referral form was designed, based on previous work 5 for sharing with the primary care team, in particular the community pharmacist when ACS patients were discharged home from the cardiology unit. Educational sessions for community pharmacists were organised through the lead pharmacist for community pharmacist development. The hospital pharmacist designed and delivered a case study based session illustrating the benefits of continuity of pharmaceutical care. Sessions were organised within regular locality meetings in two geographical areas of the health board area. The hospital pharmacist then recruited patients from these defined geographical areas served by a large teaching hospital and with patient consent transferred the completed forms to the patient's community pharmacist. A questionnaire specifically designed for the study and based on previous work 5 was posted with a stamped addressed envelope six weeks after the patient was discharged from hospital to obtain the community pharmacists’ opinions on the transfer document and to find out how many PCIs had been actioned and resolved.

**Results**
Up-titration of ACE inhibitors and beta-blockers had been undertaken in 30.0% and 17.6% of the baseline patient group (n=34) respectively since the previous admission [mean (SD) duration 36 (39) months]. The designed document was field-tested in 28 patients [19 (68%) male, mean (SD) age 67(12.7)] and of 212 PCIs transferred to community pharmacists 63 (29.7%) were resolved by responding community pharmacists. “Lack of time” was the reason most frequently cited by community pharmacists for not resolving transferred PCIs. Of 28 questionnaires sent to community pharmacists, 20 (71%) were returned. One (5%) patient had their beta-blocker dose increased after discharge and five (25%) had their ACE inhibitor dose increased. Two thirds (62.5%) of community pharmacists provided smoking cessation advice. Sixteen (80%) of community pharmacists found the information contained in the transfer document “useful”.

**Discussion**
The transfer document enabled the hospital pharmacist to transfer PCIs to community pharmacist colleagues who acted upon approximately one third of PCIs. Although most participating community pharmacists responded with positive attitude to the transfer document, pharmaceutical care issues which required communication with the prescriber such as the need for up-titration of ACE inhibitors and beta-blockers were actioned less frequently than direct actions required of the community pharmacist such as smoking cessation advice. Further work is required to engage community pharmacists with the healthcare team responsible for the quality of prescribing. Observation of this responsibility may encourage patient participation in such service developments. Patient feedback is required in further development of such a model of care. The document requires evaluation in a wider group of patients and with a longer follow-up period to establish its impact on patient care prior to integration with electronic communication systems.

**References**
1. “Building a Health Service Fit for the Future” Scottish Executive, May 2005
3. Moloney N, Jobling M, Bere L. Good communication and support can improve medicines management. Pharmacy in Practice Sept 2004-209-211

8 Pharmaciststs: Never settle for second best. Recruiting pharmacists for Southampton University Hospitals Trust

Millen S
Head of Clinical Pharmacy, Southampton University Hospitals Trust

Within Southampton University Hospitals Trust (SUHT) we have successfully recruited staff to many of our vacancies using focused marketing. Vacancies within hospital pharmacy are well recognised. A recent review by the workforce review team suggested an average vacancy rate of 13% for NHS hospital pharmacists in England.1 Vacancy rates for hospital pharmacists at band 6 were 22%. Within our trust recruitment mirrored the national picture. The clinical team had 31% vacancies, the majority at band 6 and 7. This level of vacancies was seriously compromising the service despite a full skill-mix review.

Traditional advertising in the pharmaceutical journal had always been utilised to recruit to posts. This was unsatisfactory and achieved poor response rates (see Table 2). Advertising in this way was unable to portray the multiple messages required or target the wide audience of potentially appropriate pharmacists.

**Objectives**
To identify the needs of the workforce to enable the creation of a promotional, recruitment campaign for SUHT to allow appointment to vacant posts.

**Method**
The trust viewed pharmacists as a valuable resource where demand exceeded supply and consequently, significant investment was obtained to develop a promotional recruitment campaign.

The department organised a series of market-research sessions with pharmacists and senior management, supported by human resources, to ascertain the needs and wants of the target market and what we could offer to support these.

A suitable recruitment company was identified to advise and lead on promotion and recruitment of pharmacy staff.

A recruitment plan was formulated incorporating the production of the Pharmacist brand and supporting slogan (Never Settle for Second Best) and a budget was agreed.

A micro site was developed (www.pharmafirst.org.uk) and advertising media and search terms approved.

The campaign launched just after Easter with the dates carefully arranged with consideration to bank holidays.

All staff were asked to further support additional publicity by adding the details of the website to their automatic email signatures.

All shortlisted candidates were interviewed over a few, centrally co-ordinated, days and offers made.

**Results**
The results are shown in Table 2.

**Discussion**
Successful recruitment is clearly multifaceted but market research, to understand the target market, and promotion has been key. Stepping out of the traditional mould of advertising and providing potential employees with a feel for our department and an individual identity for some of the staff we employ, through the micro site, has allowed us to successfully recruit to many of our pharmacist posts and increase the number of external appointments.

Our market research highlighted workforce needs similar to those identified in The Times top 100 businesses. Staff need to feel valued as individuals, communicated with well and have clearly defined training.
paths irrespective of grade. Support with publication also featured. Responding to these needs and creating a brand identity (Pharmacists) and linked slogan (never settle for second best), has allowed us to capture interest and recruit into many vacant positions. This is clearly highlighted by the increase in hits on NHS jobs and subsequent applications.

It is clear from the data that we have collected where future investment should be placed when advertising. The use of google for advertising gave us three times as many hits on our site than the combined use of traditional advertising in conjunction with personal advertising via our own automatic email signatures although we would like to confirm with new recruits how they found our site.

The team at SUHT has learnt many valuable lessons from the process we embarked on and we understand how and why marketing matters. It is clear from the appointments that we have made that our modern marketing techniques succeeded where the traditional methods previously employed had failed. Acknowledging this and further building our brand identity will guide our future practice.

So if you are interested in a career at SUHT and you would like to join our team please visit www.pharmafirst.org.uk.

Acknowledgements
The support of the entire department has allowed this initiative to be a success. However particular thanks are due to Andy Fox, Jacqui McAfee, Steve Harris, Lorna Mills, Simon Wills and Adriane Mackay for all their guidance to support the delivery of thromboprophylaxis to hospitalised patients. Venous thromboembolism (VTE) causes an estimated 25,000 preventable deaths. As a result prevention and management of VTE is promoted within the NHS. The National Institute of Clinical Excellence (NICE) has issued guidance on the use of thromboprophylaxis in surgical patients but not yet in medical patients. The all-party parliamentary thrombosis group has also conducted a national audit of acute hospital trusts to investigate how organisations have responded to this agenda.

Anticoagulants are the cornerstone of successful prophylaxis and are one of the classes of medicines most frequently identified as causing preventable harm to patients as recognised by the National Patient Safety Agency (NPSA).

In recognising this area as a national priority, Southampton University Hospitals Trust (SUHT) established a Thrombosis Committee, developed local guidelines and formalised a structure to implement them. To ensure that the guidelines were being used effectively five audits have now been conducted.

Aims and Objectives
The aim of this project was to ensure that a multidisciplinary and trust wide approach was taken for thromboprophylaxis to ensure that robust guidelines were developed, introduced and implemented so that all inpatients were risk assessed for thrombosis and received appropriate thromboprophylaxis by staff with the correct skills.

Method
1. Key members of staff were identified by the chair of the drugs committee to set up and lead on this initiative.
2. There were four key members of the team: (1) a pharmacist, with a specialist interest; (2) a senior clinical director, who was also a pharmacist; (3) the haematology nurse specialist; and (4) a medical consultant.
3. The Thrombosis Committee was set up with terms of reference. A member of clinical staff, with a specialist interest, from each care group was asked to support the initiative.
4. Expert advice was sought from key NHS hospitals leading in the area and local experts in this area of practice. The committee worked through the complex information to reach a final guidance. Where members could not attend they were kept up to date on progress and their opinion sought. If agreement could not be reached within the committee then members of the Thrombosis team were asked to take the issues back to the key clinical areas for resolution e.g. timing of post operative doses was discussed at forums with both Surgery and anaesthetics led by specialists from those areas.
5. The clinical director worked collaboratively with clinical effectiveness to raise the profile of thromboprophylaxis to the trust executive and ensure that it became embedded within the key performance improvement framework (PIF) for the trust.
6. A band 6 nurse was employed to support existing staff and develop an education and training package, implement the training program and assist with implementation of the guidelines. On 31st March 2008 the guidelines were launched trust wide.
7. Work continued to audit, guide, review and analyse gaps with practice while also setting an action plan for the future work required to reach exemplary practice. This work included the development of a business case highlighting the skill mix and staff required to deliver practice.

Results
We introduced guidelines and through trust wide audit we have shown that these guidelines are adhered to. Low Molecular Weight Heparin prescribing has escalated by 28% so more patients receive prophylaxis than before the guidelines. It has also been identified that prescribers are prompted by risk assessment stickers to assess and document the risk. We have moved from 10–20% compliance to 80% correctly provided thromboprophylaxis immediately following the launch and the latest audit has shown 74% compliance (see Figure 1).

<table>
<thead>
<tr>
<th>Media</th>
<th>Views (%)</th>
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</thead>
<tbody>
<tr>
<td>Google Organic Pay per click</td>
<td>64</td>
</tr>
<tr>
<td>Direct Traffic</td>
<td>22</td>
</tr>
<tr>
<td>Other online methods</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 1. How individuals found our website

<table>
<thead>
<tr>
<th>Campaign date</th>
<th>No. of posts</th>
<th>No. of views on NHS Jobs</th>
<th>No. of applications</th>
<th>Total short-listed</th>
<th>Appointment</th>
<th>No. of external appointments</th>
</tr>
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<tbody>
<tr>
<td>April 2009</td>
<td>15</td>
<td>2,647</td>
<td>64</td>
<td>29</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>2008</td>
<td>14.5*</td>
<td>1,409</td>
<td>42</td>
<td>Unknown</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

* Figure includes jobs classified by the author as similar to posts advertised in 2009 and excludes posts advertised multiple times. Actual number of posts advertised was 23.9

Table 2. Recruitment

In the last three years multiple bodies have published expert opinion and guidance to support the delivery of thromboprophylaxis to hospitalised patients. Venous thromboembolism (VTE) causes an estimated 25,000 preventable deaths. As a result prevention and management of VTE is promoted within the NHS. The National Institute of Clinical Excellence (NICE) has issued guidance on the use of thromboprophylaxis in surgical patients but not yet in medical patients. The all-party parliamentary thrombosis group has also conducted a national audit of acute hospital trusts to investigate how organisations have responded to this agenda.

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Discussion and conclusion

The complexity of the evidence, clinicians’ personal experience and the huge number of stakeholders, meant creating a practical, evidence based and trust wide guideline was difficult. However this strong political agenda was seized as an opportunity to influence patient care by linking the national agenda to local work, at the highest trust level, by ensuring the issue was made mainstream – with the Trust’s improvement framework. Where evidence was lacking the ability to empower others, to lead discussions outside the committee and bring a decision back to the table was fundamental. A key to the success of the project was the jointly held vision for safe and effective care. The shared core belief that the service should protect the patient enabled us to obtain a pragmatic consensus where evidence had ambiguity.

Huge inroads into thromboprophylaxis have been made within our trust. This is because of both the leadership skills of the four key individuals involved and their passion to deliver the vision in a practical way. We have celebrated how far we have come and we look forward to moving this project forward.

Acknowledgements

The team would like to thank the following for the support given: Dr. Rashid Kazmi, Consultant Haematologist, Mr Roger House, Consultant Surgeon and Mr David Warwick, Consultant Surgeon (T&O). They would also like to thank Kings College Hospital thrombosis team and Jacqueline Harris ,Sanofi Aventis.

References

1 Report of the independent expert working group on the prevention of venous thromboembolism in hospitalised patients. March 2007, DOH; Gateway Ref 7666
2 Sir Liam Donaldson, Letter, April 2007 DOH; Gateway Ref 6855

What is the potential impact of an electronic alerting system for laboratory results?

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*Centre for Medication Safety and Service Quality, Imperial College Healthcare NHS Trust, London; †School of Pharmacy, University of London

Currently, many laboratory tests are carried out and reported each day for hospital inpatients. The results of some of these have important implications for ward pharmacists in monitoring drug therapy. However, in practice, pharmacists do not have the time to check every laboratory result for every patient every day; instead they check results only for those patients about whom they have particular concerns. This means that potentially important results for other patients might go unnoticed and not acted upon.

There is now the potential to use information technology to create a system for alerting pharmacists (and other health care professionals) to key laboratory results, highlighting those outside of the desired range. This would assist ward pharmacists in prioritising patient care and could potentially allow them to intervene in a more timely fashion. We therefore wanted to explore the potential benefits of such a system.

Objectives

- To establish a list of laboratory results with which ward pharmacists would wish to be aware, categorised into different levels of importance.
- To record all the laboratory results reported on two study wards that would be included in this list.
- To establish the proportion of these that the ward pharmacist actually accessed (in the absence of any alerting system), and identify those that resulted in an intervention.
- To establish the risks, if any, of not being aware of other abnormal results.

Method

The study took place on a medical and a surgical ward. Each had 28 beds, admitted patients from several consultant teams and received a ward pharmacy service from a specialist pharmacist. Laboratory results for individual patients could be accessed via the trust’s result reporting system (“ICE”).

A list of laboratory tests and associated reference ranges was created in collaboration with the ward pharmacists for the study wards. The final list presented a list of tests, together with ranges that would be considered to merit red, amber and green warnings. “Red” results were those considered very likely to need further investigation or intervention by the ward pharmacist, “amber” results were those that may require further investigation or intervention, and “green” results were those with which the pharmacists would wish to be aware for information only.

Data collection took place over three weeks. To identify all laboratory results available, an investigator accessed results from ICE each weekday and recorded all those that would fall into the categories of red, amber and green. These data were recorded shortly after the ward pharmacist’s visit. During the same period, the two ward pharmacists recorded details of all results that they accessed from ICE, together with whether or not they resulted in an intervention. An intervention relating to a laboratory result was defined as any situation where advice was given to the prescriber; this included advice concerning monitoring as well as recommendations to change a drug or dose. Each afternoon, the two ward pharmacists were given a list of the “red” results identified by the investigator, so that they could act upon any with which they were not previously aware. Again, any resulting interventions were recorded.

We calculated the proportion of all results in the categories of red, amber and green that the pharmacists accessed, and the proportion of those that resulted in an intervention.

Results

The investigator recorded 1,313 blood level results (mean 73 per working day) from ICE, of which 387 (29%) were classified as “red”, 230 (18%) as “amber”, and 696 (53%) “green”.

Overall, only 95 results (7.2%) were accessed by the ward pharmacists. These comprised 56 (14%) of red results, 32 (14%) of amber results and seven (1%) of green results. Of the 56 red results accessed by the ward pharmacist, 26 (46%) resulted in an intervention. In contrast, only five (16%) of amber results resulted in an intervention and only one (14%) of green results. Expressed as a percentage of all results accessed by the investigator, 6.7% of all red results, 2.2% of all amber results and 0.1% of all green results resulted in an intervention.

Only one additional intervention resulted from a “red” result which was accessed by the investigator but not seen by the ward pharmacist.
This related to a patient with a potassium level of 3.3; once this result had been highlighted to the ward pharmacist, the pharmacist recommended that the medical team start a potassium supplement.

### Discussion

Despite the pharmacists being unaware of 174 (86%) of all “red” results, only one of these (0.3%) resulted in an intervention once the pharmacist was made aware of it. This suggests that pharmacists are checking those results which are most relevant and likely to require an intervention.

We found that many of the amber and green results were not relevant to the ward pharmacists; the list of results and ranges could be amended accordingly, perhaps taking into account the requirements of different wards. Further work could also explore the sensitivity and specificity of reporting different tests so that the maximum utility could be obtained from an electronic alerting system. Although we did not identify any major risks associated with the laboratory results that are not currently being checked, further work could also assess the time currently taken by ward pharmacists accessing laboratory results, together with the anticipated time saving that might be realised by an electronic alerting system. This should include the time taken performing calculations using the Cockcroft and Gault equation for assessing renal function, and correcting phenytoin levels for low albumin, as these calculations could be embedded into an electronic system.

Limitations include the inclusion of only two wards. It is not known how the results may differ on other wards or in other hospitals. However, since we chose one medical and one surgical ward, there should be reasonable generalisability to other areas. The two participating ward pharmacists were experienced pharmacists who routinely provided services to the wards concerned. The results may therefore differ on wards covered by other less experienced pharmacists or on wards where there is less continuity of pharmacy services. There may also have been some Hawthorne effect since the ward pharmacists on the two wards knew that the study was taking place and may have placed more emphasis on checking laboratory results during the course of the study.

In conclusion, we found that pharmacists were already accessing the most important laboratory results and that an electronic alerting system may not have dramatic patient safety benefits. There may be resultant time savings which should be explored in future work.

### Continuous infusion of antimicrobials in the Intensive Care Unit (ICU) — is there enough evidence to justify the technique and guide practice?

**Magennis P*, Clements R*, Ferguson A1, Laird S*, McCorry A*  
*Pharmacy Department and 1Intensive Care Unit (ICU), Craigavon Area Hospital, Portadown**

Antibiotics are central to modern medicine, however resistance is problematic and there are limitations to the introduction of newer agents into practice. Although intermittent intravenous administration is standard practice on the intensive care unit (ICU), the concept of administration by continuous infusion (CI) has received much interest due to the associated potential benefits including optimising the therapeutic potential of available antibiotics,1 better patient tolerability,1 improved therapeutic outcomes,1 greater convenience for nursing staff2 and reduced cost.1 Limitations to this method of drug administration include poor drug stability over prolonged periods,1 incompatibilities with other drugs,2 risk of developing thrombophlebitis1 and intravenous line infections.2 The consultant anesthetist was interested in introducing this method of antibiotic administration to ICU for six frequently used time-dependent antibiotics: amoxicillin, aztreonam, meropenem, piperacillin-tazobactam, teicoplanin and vancomycin. The feasibility of this in relation to the evidence-base was researched and evaluated as a preregistration pharmacist project.

### Objectives

The project was undertaken to critically evaluate the evidence surrounding continuous antibiotic infusions (CI) in the ICU setting.

The feasibility of this method of administration was evaluated by assessing:

- Clinical efficacy of antibiotics as continuous infusions
- Stability of antibiotics in the commonly used infusion bags over 24 hours
- Pharmacoeconomic benefit
- ICU staff opinion

### Method

A literature search was conducted using Medline to obtain papers on the continuous infusion (CI) of the antibiotics. Studies were critically evaluated to assess the clinical efficacy of administration by CI. Stability information was obtained from the manufacturers summary of product characteristics (SPC)3 and ‘The Handbook on Injectable Drugs’, Trissell.3 The pharmacoeconomic impact was assessed from the studies evaluated and extrapolated to expenditure data for ICU at Craigavon Area Hospital. A questionnaire was developed to gather qualitative data on ICU staff opinion of CI.

### Results

Amoxicillin had minimal evidence supporting clinical efficacy when administered as a continuous infusion, since only one study was found which was undertaken in rats.4 Aztreonam had evidence to support its use as a continuous infusion, however the study was small scale,5 and no studies were available evaluating use in the intensive care setting. Meropenem was shown to be clinically effective when administered as a continuous infusion in critically ill patients, and this method permitted use of a lower dose.6 There was some evidence to support the use of piperacillin-tazobactam in ICU patients as a continuous infusion using lower doses, however the studies were small scale.7 The evidence to support the use of teicoplanin as a continuous infusion was limited.8 Vancomycin had evidence to support administration by continuous infusion. This resulted in good clinical outcomes, less variable serum concentrations and associated easier dose adjustments and therapeutic drug monitoring.9 A continuous infusion policy for vancomycin has been successfully implemented in other centres.

The stability information for each drug over 24 hours is summarised in Table 1.

Estimated cost savings varied in the literature, and were therefore difficult to ascertain. A 33% reduced cost was estimated, based on pharmacokinetic modelling. Additional cost savings could be gained from decreased nursing time required to prepare multiple infusions and reduced requirement for serum level monitoring, but they are more difficult to quantify.

The qualitative questionnaire showed that nursing staff felt antibiotic administration was time consuming and that CI could decrease their workload. Staff also raised concerns about safety and relevance to practice.

### Table 1. Antibiotic stability information

<table>
<thead>
<tr>
<th>Drug</th>
<th>Stability information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>Poor</td>
</tr>
<tr>
<td>Aztreonam</td>
<td>Good (in sodium chloride 0.9%)</td>
</tr>
<tr>
<td>Meropenem</td>
<td>Poor</td>
</tr>
<tr>
<td>Piperacillin-tazobactam</td>
<td>Good</td>
</tr>
<tr>
<td>Teicoplanin</td>
<td>Good</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>Good</td>
</tr>
</tbody>
</table>

**References:**

2. Orenstein AU. Nurs Stan. 1999;16:166-70
A multidisciplinary approach to improving outcomes for patients receiving parenteral nutrition in a District General Hospital

Patnaik C, Jones KA, Laland K
Harrogate and District Foundation Trust

In early 2006, a small cluster of eight patients developed parenteral nutrition (PN) related catheter infections (n=7 Candidaemia (n=1 with sight threatening complications); n=1 Bacteraemia) identified by positive blood cultures at Harrogate and District Foundation Trust (HDFT). PN guidelines had been developed in 2003, however, these were not approved through any formal process (Clinical Governance) with many staff unaware of their existence. Initial analysis of the existing PN policy highlighted the following issues. The number of patients receiving PN was approximately 1–2 per month with many patients on PN for less than five days; the decision to start PN in individual patients was made by the patient’s Doctor without prior discussion with a Dietitian or a Pharmacist. It was therefore very likely that many patients may have received PN without assessing suitability for enteral nutrition first. Investigations conducted by Infection control team suggested that PN related catheter infections may have been due to contamination of venous catheters most likely a result of suboptimal catheter care.

Objectives

To develop an action team consisting of representatives from Pharmacy, Nutrition and Dietetics and Infection control to review and reissue the PN policy; to submit the new PN guidelines through the Trust’s Clinical Governance process and to educate all members of nursing staff on aspects of intravenous catheter care for patients receiving PN. To evaluate the impact this change in practice on patient outcomes, in particular the numbers of patients prescribed PN and the rates of PN related catheter infection.

Methods

The PN policy and guidelines were revised and accepted by Trust’s Clinical Governance process in January 2007. The Infection Control Policy for Intravenous procedures was revised and reissued. The prescribing of PN was restricted to those patients who have had a multidisciplinary assessment (patient’s Consultant, a Pharmacist and a Dietitian). The prescribing of PN was restricted outside of normal working hours and at weekends where it would be difficult to conduct a multidisciplinary assessment. Unless there were compelling reasons to the contrary, patients requiring PN must have a single-lumen line inserted for the purpose and subsequent study days for senior nurses on aspects of intravenous catheter care and PN were held in February 2007. The Infection control team would monitor patients receiving PN closely.

Results

Since implementation of the PN policy the numbers of patients receiving PN has reduced from n=27 patients prescribed PN in 2006 to n=15 in 2008. There are also marked reductions in patients being prescribed PN for less than five days. The numbers of patients with PN related catheter infection has been reduced from n=8 to n=1 in the two years after implementation of the PN policy (see Table 1).

Discussion

Since implementation of the PN policy, all new requests for PN are discussed with the requesting Consultant, a Dietitian and a Pharmacist. Appropriate prescribing by multidisciplinary assessment has resulted in fewer patients receiving PN and a reduction in the numbers of patients receiving PN for less than five days. Improved infection control surveillance and nurse education has resulted in one case of PN related catheter infection since the implementation of the policy two years ago. Continual audit of patients receiving PN and regular feedback to all members of the multidisciplinary team should ensure reinforcement of the key messages from the policy.

The results of this simple intervention clearly demonstrate the impact of a multidisciplinary approach to improving outcomes for patients receiving PN.

References

2. An organisation with a memory: Report of an expert group on learning from adverse events in the NHS Chaired by the Chief Medical officer. Department of Health 2000

Table 1: The numbers of patients receiving PN and the rates of PN-related catheter infections both before and after implementation of the PN policy at HDFT in January 2007

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of patients prescribed PN</th>
<th>Number of patients prescribed PN for less than 5 days</th>
<th>Number of patients with PN-related catheter infections</th>
<th>Incidence rate of infection per 1,000 catheter days</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>27</td>
<td>10</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>2007</td>
<td>17</td>
<td>5</td>
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<td>2008</td>
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<tr>
<td>2009</td>
<td>14</td>
<td>6</td>
<td>0</td>
<td>0</td>
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</table>

Note: In addition to being presented as a poster at the UKCPA Autumn Residential Symposium 2009, this work has also been presented as a poster at the RAPEN Conference, Cardiff International Arena, 13–14 October 2009.
Evaluating the pilot introduction of “Referral to pharmacist” — a new service model to provide targeted clinical pharmacy cover to wards

Hanif I, Blackshaw C, Bednall R, Simcock V, Haley H
Department of Pharmacy, University Hospital of North Staffordshire

Clinical pharmacists work within the context of a multidisciplinary care team and there have been many publications recently highlighting the need for better medicines management and the involvement of pharmacists in the patients’ care. National standards such as medicines reconciliation require targeting new patient admissions and ensuring drug histories are reviewed as soon as possible after admission. This has refocused the pharmacy service towards newly admitted patients. Following a serious medicine related error the need for a more robust system of identifying pharmaceutical care needs that arise during inpatient stay was identified. Other allied healthcare professionals (AHPs) such as physiotherapists and occupational therapists have formal referrals systems in place for nursing staff to refer patients to them. It is the success of this formal referral process that has encouraged pharmacists to consider this new way of working in the hospital setting.

Objectives
- To introduce a referral to pharmacist process.
- To evaluate a referral to pharmacist process.

Method
Pilot stage 1 A referral form was designed for nursing staff to refer patients to the ward pharmacist. Prior to the commencement of the pilot nursing staff on the respective wards were briefed on the patients that may be referred. Patients suitable for referral included:

- Newly admitted patients
- Patients whose condition had deteriorated.
- Patients who had been prescribed narrow therapeutic drugs requiring monitoring (TDM) such as vancomycin, gentamicin, digoxin and phenytoin
- Patients with hepatic infusions or on warfarin
- Patients with any new problems such as renal or hepatic impairment that may have an impact on their medication.
- Patients who may benefit from a pharmacist medicines review.

Referral forms were made available in folders that were situated at the nursing station on each ward in the same way and location as they are for other AHPs. The folders were checked daily by the ward pharmacist. Staff were also advised to refer any urgent referrals by bleeping the ward pharmacist directly or to contact Medicines Information for advice. The referral pilot was undertaken for one week (during working hours and excluding weekends) on one surgical, one medical and one paediatric ward.

Pilot stage 2 Following feedback from stage 1 of the pilot it was identified in order to better engage the nursing staff the referral form needed a redesign which incorporated referral of patients with something which nurses identified with pharmacists e.g. ordering of non-stock drugs. The forms were placed on the drugs trolley in place of the pharmacy ordering book. This second stage redesigned form was then again piloted on the wards for two weeks. The results of this second stage pilot are discussed below.

Table 1. Results from pilot study (stage 2)

<table>
<thead>
<tr>
<th>Ward</th>
<th>Number of patients referred</th>
<th>New patients</th>
<th>Poorly patients</th>
<th>TDM*</th>
<th>Anticoagulation</th>
<th>Any other new problems</th>
<th>Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>78 Medicine</td>
<td>12</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>109 GI Surgery</td>
<td>14</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>110 Paediatrics</td>
<td>11</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>

*TDM (therapeutic drug monitoring): patients on vancomycin, gentamicin, digoxin and phenytoin

Results
Results from the first stage were very disappointing with very few or no referrals from the wards.

During the second stage period, a total of 27 patients were referred to the ward pharmacist. The source and nature of the referral is shown in Table 1.

Discussion
Simply introducing a system that mirrored that used by other AHPs failed as this was too great a change in process for nursing staff. Incorporating the referral process with drug ordering improved the results as it associated the process with pharmacy. These results however are still lower than would be expected so further education may be required for nursing staff. This study clearly identified the need for a cultural change in the working relationship between nurses and pharmacists to align them more closely with that of other AHPs. A further longer study will be commissioned which may be more successful as it will allow nursing staff to fully appreciate the concept and tailor the pharmacy service to each particular ward. Rollout of this process to other wards will require education of nursing staff. The urgency of introduction of this process has increased with the imminence of swine flu the need for contingency planning and prioritisation of service.

ACKNOWLEDGEMENTS
The authors would like to thank Caroline, Broadbent Lead surgical pharmacist at Guys and St Thomas’ NHS foundation Trust, for help with developing the referral form.

References
Prescription review on admission to hospital: A performance indicator for a ward based clinical pharmacy service

Acomb C
Leeds Teaching Hospitals

Pharmacy managers have struggled for a number of years to measure activity and performance of a ward based clinical pharmacy service. In 2007 NPSA/NICE issued guidance on medicines reconciliation and required trusts to use indicators to monitor implementation. This can be considered a technical process and does not always require significant professional judgement. We wanted to develop a performance indicator that incorporated medicines reconciliation but also reflected a higher level process undertaken by our pharmacists. In 2005 Fertleman et al showed that the presence of a pharmacist on a post take ward round improved medication management. We considered using “pharmacists on a post-take ward round” as a performance indicator but felt that this applied to acute medical patients and not necessarily to other specialities.

This paper describes the development of an indicator and our initial results.

Objectives
- Develop a performance indicator that was easy to collect but reflected some of the clinical work undertaken by our pharmacists.
- Use the performance indicator to review the consistency of our service

Method
We undertook a consultation and from the discussions it became apparent that the essence of the pharmacist on the post-take ward round was that they look at the drug history and then reviews the patient’s medication needs. Previously we had collaborated with other trusts in Yorkshire to define medication review and since our definition of a “Level 2 Medication Review on Admission” incorporates confirmation of drug history (i.e. medicines reconciliation) as well as a comprehensive medication review, this seemed an ideal parameter to measure. Our standard is that patients have a Level 2 review within 24 hours of admission.

We wanted a simple, independent, and relatively easy method of collecting data. Our pharmacy technicians visit the majority of the wards in the trust so we developed a recording form for the technicians to use. During the third week of each month, on each ward they routinely visit, they are asked to select five patients and document the date of admission and the date of the first documented Level 2 medication review undertaken by a pharmacist. These data are collated centrally, analysed and reported every month to all pharmacists and to a Trust Divisional General Manager.

Our first attempt at a data collection form failed. This first form asked the technicians to identify patients admitted on a particular day of the week (this was an attempt to ensure we had a range of days of admission). It proved too time consuming and difficult to use. We changed to asking the technicians to collect data from patients at random.

Results
Overall we found that 65% of patients in April had medication review by a pharmacist within 24 hours. In May the figure was 62%. It can be seen in Table 1 that during weekdays we achieve a high performance but patients admitted on a Friday and Saturday rarely have a Level 2 review undertaken within 24 hours.

Paediatrics was consistently the best performing speciality with 100% of reviews with 24 hours of admission for both April and May (Table 2). The pharmacists in Care of the Elderly were inconsistent with 77% in April but only 58% in May.

Discussion
Using pharmacy technicians to independently collect data from random patients each month has been successful. When analysed, these data appear to reveal the strengths and weaknesses of our clinical pharmacy service to wards. Patients admitted on a Friday or Saturday rarely have a medication review by a pharmacist with 24 hours. We need to explore how we can target these admissions.

These data for the first two months suggest an overall consistent performance. We will now use this as a baseline performance indicator from which service developments will be monitored. As more data are collected we will be able to see whether some specialities consistently perform at affixed level or whether fluctuations occur. We are limited to data collection from wards where pharmacy technicians routinely visit and in some specialities (eg paediatrics) this may be only from five patients on one ward. However for the first time we can now regularly review our performance. We are looking to develop a performance indicator related to discharge or information provided to patients.

References

Table 1. Analysis by admission day of medication review within 24 hours

<table>
<thead>
<tr>
<th>Admission day</th>
<th>April 2009 Number (%)</th>
<th>May 2009 Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday</td>
<td>31 (84%)</td>
<td>14 (47%)</td>
</tr>
<tr>
<td>Saturday</td>
<td>4 (16%)</td>
<td>7 (26%)</td>
</tr>
<tr>
<td>Friday</td>
<td>9 (26%)</td>
<td>11 (37%)</td>
</tr>
<tr>
<td>Thursday</td>
<td>19 (70%)</td>
<td>23 (82%)</td>
</tr>
<tr>
<td>Wednesday</td>
<td>25 (83%)</td>
<td>24 (89%)</td>
</tr>
<tr>
<td>Tuesday</td>
<td>34 (74%)</td>
<td>37 (74%)</td>
</tr>
<tr>
<td>Monday</td>
<td>19 (86%)</td>
<td>25 (68%)</td>
</tr>
<tr>
<td>Total</td>
<td>141 (65%)</td>
<td>141 (62%)</td>
</tr>
</tbody>
</table>

Table 2. Analysis by speciality of medication review within 24 hours of admission

<table>
<thead>
<tr>
<th>Speciality</th>
<th>April 2009 Number (%)</th>
<th>May 2009 Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute admitting medicine</td>
<td>47 (59%)</td>
<td>59 (66%)</td>
</tr>
<tr>
<td>A&amp;E assessment units</td>
<td>9 (90%)</td>
<td>2 (40%)</td>
</tr>
<tr>
<td>Elderly</td>
<td>37 (77%)</td>
<td>31 (58%)</td>
</tr>
<tr>
<td>Speciality medicine</td>
<td>19 (58%)</td>
<td>19 (56%)</td>
</tr>
<tr>
<td>Orthopaedic surgery</td>
<td>9 (69%)</td>
<td>6 (60%)</td>
</tr>
<tr>
<td>Surgery</td>
<td>15 (52%)</td>
<td>16 (57%)</td>
</tr>
<tr>
<td>Paediatrics</td>
<td>5 (100%)</td>
<td>5 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>141 (65%)</td>
<td>141 (62%)</td>
</tr>
</tbody>
</table>
Medication safety in the 21st century — new or déjà vu?

Cavell G  
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In 1993, a Pharmacy-led scheme for anonymous reporting of medication errors was set up within our trust. Until the scheme was set up there was no system in place to centralise reporting of patient safety incidents which were recorded on paper adverse incident forms. The aim of the scheme was to reduce some of the potential barriers to medication error reporting by separating reporting from line-management and disciplinary procedures and enabling independent review of reports to identify themes and trends. Data collected were reviewed by a multidisciplinary group and feedback given to staff in the form of alerts and newsletters designed to raise awareness of risks with the use of medicines and actions to be taken to prevent error. Alerts aim to raise awareness of issues with specific medicines which have been identified from reports received. Newsletters cover a broader range of topics and include education about different types of medication errors based both on local reports and reports published in the literature or national press.

In 2002, the National Patient Safety Agency (NPSA) was set up to analyse patient safety reports at a national level, identify risks and recommend actions to reduce risk, including those with medicines. This paper describes how a local incident reporting scheme can be used to highlight important medication safety issues before similar issues are raised nationally.

Objectives

- To explore the effectiveness of local reporting systems in highlighting medication safety issues
- To compare medication safety concerns raised through a local reporting system with those identified by current national schemes.

Methods

The themes of medication safety alerts produced between 1993 and 2008 in response to locally reported errors were reviewed. The dates of publication were noted. The contents of newsletters published between October 1993 and March 1996 were also reviewed. Themes of NPSA patient safety alerts issued were reviewed. Themes from the local and national reporting schemes were compared.

Results


Eight of the themes described by the NPSA had been identified locally prior to publication of an NPSA notice. (Table 1).

Discussion

The aim of our scheme was to encourage reporting of medication incidents to raise awareness of key safety issues within the trust. At the time of its inception the scheme was met with some resistance as events perceived to be adverse incidents were not widely discussed or shared. However common themes were identified early on and 10 alerts were issued within the first 18 months despite a relatively low reporting rate initially.

In 1996 storage of potassium chloride concentrated solutions was rationalised to critical care and renal units in response to reports in the literature of harm associated with inadvertent bolus administration.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Date and source of publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actions that can make anticoagulation therapy safer</td>
<td>Jun 2004, Feb 2004, Mar 2007</td>
</tr>
<tr>
<td>Risk of confusion with amphotericin formulations</td>
<td>Jun 1994, Jun 2007</td>
</tr>
<tr>
<td>Risk of omitting Hib when administering Infanrix-IPV+Hib</td>
<td>1994 (High potency vitamins), Oct 2008</td>
</tr>
</tbody>
</table>

Alerts highlighting the importance of close INR monitoring and risks with similar strengths of heparin ampoules were published in June 2004.

An oral syringe policy was developed in October 2002 following a failure mode and effects analysis of oral liquid medicine administration using parenteral syringes, the conclusion of which corresponds with the NPSA’s alert published in March 2007.

Concerns with misinterpretation of handwritten prescriptions for epidural opiates led to the development in 2001 of an epidural policy and the use of preprinted prescription stickers.

An altered prescription for liposomal amphotericin in 1994 alerted us to the risk of potential for confusion between dosing and administration of different formulations of the drug.

Oral opiates have been the theme of four alerts around confusion between morphine and oxycodone tablet formulations and problems with methadone dosing when accurate medication histories are not available.

The risks with Infanrix-IPV+Hib mirror errors seen with other products which rely on combination of ingredients during dose preparation prior to administration, such as high potency intravenous vitamins.

Many themes from the local error reporting system which have been addressed over the last 15 years are common to findings published by the NPSA or have been included in the Reducing Harm from High Risk Medicines intervention recently launched by the Patient Safety First Campaign.

Conclusion

Risks with medicines identified through local reporting systems are unlikely to be unique to the organisation in which they were reported, and provide pharmacists with the opportunity to review medicines policies, procedures and purchasing strategies to reduce the risk. The work of the NPSA in the wake of patient safety publications by the Department of Health has raised awareness of some of these medication safety issues and forced trusts to develop solutions to issues that pharmacists may have seen before but have not had systems in place to review and address. However the impact of any of these initiatives on patient safety is difficult to evaluate due to the ever changing environments in which medicines are used.

References

3 Department of Health. An organisation with a memory. London 2001  
Developing the definition of a reportable prescribing error

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The definition of a prescribing error has been published. This definition includes errors in decision making and errors in prescription writing. Prescribing accounted for 15.7% of medication related incidents reported to the National Patient Safety Agency (NPSA) between January 2005 and June 2006. Of these 27 resulted in death or severe patient harm. Although the NPSA encourages reporting and learning from incidents it is well recognised that there is underreporting which may limit learning. In hospitals pharmacists promote safe medicines use by identifying and correcting prescribing errors. However, not all prescribing errors are reported as medication safety incidents and the decision whether to report depends on the individuals involved and their perception of the severity of the error or its potential for patient harm.

Although it may not be appropriate for all prescribing errors to be reported as patient safety incidents low reporting rates may limit opportunities to improve the overall quality and safety of prescribing. This project aims to define which prescribing errors should be reported as a patient safety incident.

Objectives
To develop and validate a list of prescribing scenarios which represent reportable prescribing errors

Methodology
Prescribing errors considered to be reportable were agreed by a group of clinical pharmacists. These were then used to develop a proposed list of definitions of a reportable prescribing error.

Pharmacists working across all clinical specialties in the trust were asked to document up to five errors identified during their day to day practice which met the definition of a prescribing error.

The documented prescribing errors were reviewed by two senior clinical pharmacists who independently decided whether each error was reportable or not and whether it met or did not meet one of the proposed definitions of a reportable prescribing error.

Agreement between the two reviewers was measured using Cohen’s kappa coefficient (κ). Where the reviewers did not agree, or where the reviewers felt an error was reportable but did not fit one of the proposed definitions, the errors were discussed and where appropriate the wording of the definitions was refined or new definitions added.

The prescribing errors were then all re-reviewed according to the revised definitions and the kappa value recalculated to measure the level of agreement with the aim of achieving at least "moderate agreement".

Results
Pharmacists submitted 141 prescribing errors. In the first review 133 errors were rated by both reviewers. The reviewers agreed that 52 errors met the definition and 45 errors did not meet the proposed definitions of a reportable prescribing error. There was non agreement for 36 errors. This represented "moderate agreement" (κ = 0.46). Following the first review changes were made to three definitions and one definition was added. Eight definitions required no amendment (Table 1).

In the second review of errors against the revised definitions 137 errors were rated by both reviewers. The reviewers agreed that 59 errors were reportable and that 53 were not. There was non agreement for 25 errors. This represented "substantial agreement" (κ = 0.64)

Discussion
Lack of awareness of what to report is one reason for not reporting medication errors. This project set out to define which prescribing errors are reportable to make the decision whether to report easier. However, it is clear from the fact that the two senior clinical pharmacists rating the errors did not reach 100% agreement that the decision to report still has some degree of subjectivity despite the use of specific, agreed definitions. This may be due to differences in experience during years of clinical practice resulting in different thresholds for reporting, or different interpretations of the descriptions of the prescribing errors contributed by the clinical pharmacists which sometimes lacked detail.

A kappa score of 0.64 has been accepted as "substantial agreement" and the list of definitions used in the second rating exercise will be promoted to pharmacists as a tool to increase the rate of reporting of prescribing errors. Information from these reports will then be available to enhance prescribing training programmes to ensure prescribers are aware of the risks of prescribing.

We conclude that the project has met its aim of developing a list of reportable prescribing errors. Further work to assess its usefulness in promoting reporting of prescribing errors in clinical practice is planned.

References
3 Landis JR and Koch GG. 'The measurement of observer agreement for categorical data' Biometrics,1977; Vol. 33, p159-174

| Table 1. Definitions of prescribing errors |
|---|---|
| **Type** | **Definitions – Review 1** | **Definitions – Review 2** |
| 1 | Overprescription of a cytotoxic or immunosuppressant | Overprescription or underprescription of a cytotoxic or immunosuppressant likely to result in the patient receiving the wrong dose |
| 2 | Omission of an “essential” drug | |
| 3 | Underprescription of a drug for treatment of a “critical” condition | |
| 4 | Overprescription of a drug with a narrow therapeutic index | |
| 5 | Prescription of a contraindicated drug due to drug/drug, drug/disease or drug/food interaction | |
| 6 | Prescribing a drug or dose incorrectly or illegibly with potential for patient harm | Prescribing a drug, dose or frequency incorrectly or illegibly with potential for patient harm, or omission of essential treatment |
| 7 | Prescribing a drug or drugs without adequate monitoring | |
| 8 | Prescribing an incorrect presentation of a drug with potential for patient harm | |
| 9 | Prescribing a drug resulting in incorrect preparation and ha administration of a dose e.g. diluents, concentration or rate | |
| 10 | Inappropriate duplicate prescribing or prescribing two drugs for the same indication | Inappropriate duplicate prescribing or prescribing two drugs for the same indication with potential for patient harm |
| 11 | Any prescribing error which has resulted in actual patient harm | — |
| 12 | — | Prescribing any drug for the wrong patient |
Review of medicines management technician (MMT)-led orthopaedic clinical pharmacy service

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Pharmacy Department, Sherwood Forest Hospitals NHS Foundation Trust

The introduction of the medicines management technician (MMT) role to the ward within this Trust has provided support to the pharmacist to reduce time spent on their supply role in order to focus more on their clinical role. Under the traditional service model the pharmacist would still see all patients in addition to the MMT.

Patients on orthopaedic wards can be divided into two groups; one group of patients tend to be elective surgical patients who have no significant past medical history; uncomplicated analgesic requirements as an inpatient and (if on medication prior to admission), drug history accurate and clinically appropriate, sufficient own supplies of medication and concordant with medication. There would also be a second population of patients who do not meet these criteria either with more complicated past medical histories or new onset medical problems that would require, and benefit from a greater input from the pharmacist.

The introduction of MMT support to the orthopaedic wards has provided a unique opportunity to review how the ward pharmacy service can be provided. Anecdotally it has been shown that a good working relationship between a pharmacist and MMT allows patients to be highlighted to the pharmacist to aid prioritisation. This pilot looked to take this practice of working a stage further and formalise a set of referral criteria in which the pharmacist would only see patients referred to them with all other patients being managed by the MMT.

Objective
To optimise the use of pharmacy staff resources of each grade while still maintaining a high quality clinical pharmacy service to the orthopaedic wards.

Method
The pilot was run on a single orthopaedic ward within the Trust for a 10-week period. The pilot was designed to allow the MMT to visit the ward from 8:30am and screen all patients. The designated pharmacist would then visit the ward at approximately 10:30am and review only patients referred by the MMT. In order to guide the MMT, referral criteria (appendix A) were produced stating which patients should be referred to the pharmacist and which could be managed by the MMT. The MMT was also encouraged to refer patients not triggered by any of the referral criteria but whom they felt would benefit from a review by a pharmacist.

Data collection was performed using a modified version of the departmental “Pharmacy scorecard” outlining time spent and number of activities performed for both pharmacist and MMT. Pre-pilot data was collected for two weeks prior to the implementation to give a baseline of traditional service (i.e. daily basic grade pharmacist visit plus twice weekly MMT visit).

Results
The results are set out in Table 1.

Discussion
The introduction of a MMT-led referral service has had a positive impact on the pharmacy service provided. Although the amount of time the pharmacist spends and number of patients they see has been significantly reduced, the number of overall interventions has increased. This supports the original statement that a large proportion of the patients on orthopaedic wards do not require daily input from a clinical pharmacist (medicines reconciliation on admission and ongoing medicines management issues and supply issues can be appropriately managed by a MMT). It should be noted that the MMT was not only acting as a screening tool for the pharmacist but was also making a higher number of interventions per visit than the pharmacist. This supports the extended role of the MMT in making a clinical contribution to patient care as part of the pharmacy team.

The technician screening criteria encourage the MMT to take a responsibility for prescribing and administration of routine surgical drugs in support of local and national guidelines:

- MRSA decolonisation and eradication regimens according to local infection control guidelines – supports national DOH recommendations and Saving Lives principles
- Thromboprophlaxis following surgery (NICE guidance)
- Fracture prevention (NICE and NOGG guidance)

There is also a significant role for the MMT to play in the areas of medicines reconciliation and medicines adherence. NICE and the NPSA have outlined the role that the pharmacists or MMTs should play in medicines reconciliation. The MMT is also able to support the NCCPC guidance on encouraging adherence as the pilot showed an increase in the incidence of patient counselling on the wards as a result of the introduction of the MMT.

The main drawback that was apparent from the pilot is the high time requirement from the MMT to allow appropriate referrals to be made (although this is offset to some degree by the reduced pharmacist time necessary). This has meant that the overall staffing cost of the service has increased slightly following the introduction of the pilot. From anecdotal reports the MMT-led pilot has been well received by both pharmacy staff and ward staff who see it as an improvement to how the clinical pharmacy service is provided to the ward. The pilot has also presented a unique opportunity for the teaching of prioritisation skills to junior members of staff.

Conclusion
In the opinion of the authors, this new way of working has significantly improved the clinical service provided to the ward and makes the best use of the skill-mix among different grades of pharmacy staff. If sufficient MMT time is available, a similar service should be rolled out to the other orthopaedic wards within the trust.

References
1. DOH recommendations
3. NICE guidance CG44; Venous thromboembolism; reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients undergoing surgery; April 2007
4. NICE technology appraisal guidance 160; Alendronate, etidronate, risedronate, raloxifene and strontium ranelate for the primary prevention of osteoporotic fragility fractures in postmenopausal women; October 2008
5. National Osteoporosis Guideline Group (NOGG); Guideline for the diagnosis and management of osteoporosis in postmenopausal women and men from the age of 50 years in the UK
6. NICE/NPSA; Technical patient safety solutions for medicines reconciliation on admission of adults to hospital; December 2007
7. National Collaborating Centre for Primary Care (NCCPC); Medicines Adherence: involving patients in decisions about prescribed medicines and supporting adherence; January 2009

Table 1. Results

<table>
<thead>
<tr>
<th></th>
<th>Pharmacist</th>
<th>Pharmacist</th>
<th>MMT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(pre-pilot: 2-week period)</td>
<td>(pilot: 10-week period)</td>
<td>(pilot: 10-week period)</td>
</tr>
<tr>
<td>Total interventions</td>
<td>17</td>
<td>146</td>
<td>158</td>
</tr>
<tr>
<td>Average number of interventions per visit</td>
<td>1.7</td>
<td>3.4</td>
<td>3.7</td>
</tr>
<tr>
<td>Time per intervention</td>
<td>201 minutes</td>
<td>8.6 minutes</td>
<td>55 minutes</td>
</tr>
<tr>
<td>Number of drug charts seen per intervention</td>
<td>37 charts</td>
<td>2.3 charts</td>
<td>5.2 charts</td>
</tr>
</tbody>
</table>

Pharmacist, Pharmacist MMT
A study to assess the safety and time-effectiveness of Pharmacy Technician triage on a gynaecology/surgical ward

Onatade R, Jogia S, Choudhary I
Pharmacy Department, King's College Hospital NHS Foundation Trust

Standard medicines management technician roles at this large secondary and tertiary care trust include taking drug histories, supplying clinically screened medication, discharge support and patient counselling. All technicians providing this service are at least band 5, and some are band 6 or 7. All undertake a regional competency programme.

All wards at this trust receive at least one full visit every day from a clinical pharmacist. This study was undertaken as the pharmacist and technician on one ward had instituted an informal triage system where the band 6 pharmacist would not necessarily see all the patients after day 1 of admission, sometimes relying on the band 7 technician to identify patients in need of a pharmacist's input. It was therefore decided to test the approach more rigorously for safety and efficiency.

**Objectives**

- To assess the safety and effectiveness of a pharmacy technician triage model
- To assess whether technician triage saves pharmacist time
- To assess whether or not technician triage takes more pharmacy technician time.

**Method**

The study was carried out over four weeks in February/March 2008 on weekdays. A pro-forma referral framework was developed using the literature and taking into account the types of patients normally admitted to the ward.

- **Subjects:** SJ, Band 7 Chief Pharmacy Technician, Training and Development and IC, ward pharmacist. At the time of the study, SJ had been qualified for 19 years with 3.5 years ward experience, NVQ internal verifier and Accredited Checking Technician status, plus counselling accreditation for technicians. IC was a three years registered band 6 rotational pharmacist.
- **Setting:** A 24-bed gynaecology/female surgical ward, with occasional medical outliers.
- **Design:** This was a crossover study, with two active and two inactive or standard weeks. During the active weeks, the ward was divided into two halves. IC and SJ worked on different sides. They each provided a full clinical pharmacy service to all their patients. SJ referred patients to IC either by using the framework and/or after identifying potential issues for intervention. A referral was defined as an issue identified according to the framework criteria and an intervention was an issue outside the framework but identified by SJ as needing attention. All new patients were initially referred to the pharmacist.

At the end of each visit, they discussed all patients. A control pharmacist went round all beds after IC and SJ and noted referrals and care issues which should be addressed. During the standard weeks, usual roles were undertaken. SJ saw most of the new patients first and IC reviewed all patients every day. At the end of the study, the referrals and interventions were assessed for their potential to be managed or resolved completely by a pharmacy technician.

**Results**

Table 1 indicates patient numbers and times taken. In the active weeks, the technician made 39 interventions or referrals for 78% (35/45) of patients (excluding referrals because the patients were newly admitted). One patient with a severe eye infection was entirely taken over by the pharmacist. 26/35 patients were new to the ward, and nine patients had been on the ward the week previous. Table 2 gives details of referrals and interventions. All patients who exceeded the usual length of stay of three or four days eventually had interventions. During the active weeks, the control pharmacist noted two potential interventions on SJ's half of the ward, neither included in the referral framework, which had not been previously identified. One was potentially harmful (patient over 75, prescribed a regular NSAID, reason unclear). 80% (12/15) referrals and 75% (18/24) interventions could potentially have been dealt with by a trained technician without checking with a pharmacist first.

**Discussion**

Other categories in the referral framework, but not used, were:

- Illegible scripts
- Patients on oral contraception and HRT
- Diabetic patients and patients with renal failure or markers for possible renal failure
- Patients on IVs potentially inappropriately and patients with syringe drivers
- Long stay patients (> 7 days)

Technician triage using a referral framework appeared to be time-neutral, generally safe and workable in this setting. SJs experience and familiarity with the ward and the uncomplicated nature of the patients was an important factor in the success of the triage model. However one potentially harmful issue was missed. The framework should include defined high risk drugs and situations. Blanket referrals of all new patients (if on standard protocolised treatment), those needing simple blood pressure monitoring and new orders for laxatives and analgesics are not essential. Patients with a longer than average length of stay should always be referred, even if they have no change in medication. Formal clinical training is necessary for optimum input. The framework should be customised for different specialties. Having a band 7 technician performing a service which a band 6 pharmacist can undertake may not be cost effective and the model needs more rigorous testing with less experienced technicians. However it may be appropriate to use a more experienced technician in organisations with a shortage of junior pharmacists. This service model may also be useful for technician development, recruitment and retention in any pharmacy department.

---

**Table 1. Patient numbers and times taken**

<table>
<thead>
<tr>
<th>Category of referral/intervention</th>
<th>Total patients seen by technician</th>
<th>Total patients seen by pharmacist</th>
<th>Average time taken by technician</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active weeks</td>
<td>45</td>
<td>51</td>
<td>1.5 hrs per day</td>
</tr>
<tr>
<td>Inactive weeks</td>
<td>89 (68 initially seen by technician)</td>
<td>5</td>
<td>1.5 hrs per day</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 hrs per day</td>
</tr>
</tbody>
</table>

**Table 2. Details of referrals and interventions made by the technician during active weeks**

<table>
<thead>
<tr>
<th>Category of referral/intervention</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any new drug prescribed</td>
<td>6/15</td>
</tr>
<tr>
<td>Patients with high blood pressure</td>
<td>3/15</td>
</tr>
<tr>
<td>Patients on anticoagulation</td>
<td>1/15</td>
</tr>
<tr>
<td>Antibiotic policy deviations</td>
<td>1/15</td>
</tr>
<tr>
<td>Drugs requiring therapeutic drug monitoring</td>
<td>1/15</td>
</tr>
<tr>
<td>Inaccurate drug history</td>
<td>3/15</td>
</tr>
<tr>
<td>Illegal/unsigned/incomplete prescription</td>
<td>2/24</td>
</tr>
<tr>
<td>Choice of drug</td>
<td>3/24</td>
</tr>
<tr>
<td>Need for drug</td>
<td>10/24</td>
</tr>
<tr>
<td>Dose of drug</td>
<td>2/24</td>
</tr>
<tr>
<td>Frequency/timing of drug</td>
<td>5/24</td>
</tr>
<tr>
<td>Duration of therapy</td>
<td>2/24</td>
</tr>
</tbody>
</table>
Investigation of allergy status at City Hospital, Birmingham

Hughes J*,1, Kaur A*, Marriott J*

*School of Health and Life Sciences, Aston University; †City Hospital, Birmingham.

The National Patient Safety Agency’s (NPSA) fourth report in 2007: “Safety in doses: medication safety incidents in the NHS” identifies documentation of allergy status as one of its seven key actions to improve medication safety. This recommendation followed a number of reports to the National Reporting and Learning System (NRLS), between January 2005 and January 2006, where patient safety had been compromised owing to allergy related errors. These errors constituted 3.2% of the 48,000 medication incidents reported in hospitals, but were the greatest cause (30.9%) of patient harm. 5.4% (5.9%) of the incidents resulting in severe harm or death were due to patients being given medicines to which they were known to be allergic. This highlights that in addition to poor documentation of allergy status, lack of medication knowledge or underuse of risk reduction strategies such as allergy wristbands, may lead to the prescribing and administering of contraindicated medicines.

**Objectives**

To investigate allergy status documentation in inpatients at City Hospital, Birmingham and to assess the medicine knowledge of healthcare professionals in an allergy based scenario.

**Method**

This was a two-arm study to investigate allergy status. The first arm investigated the accuracy and completeness of all allergy related documentation. Audit was carried out on eight wards within the Trust during February 2009 when all patients’ drug charts, medical notes, electronic records and anaesthetic charts (if applicable) were reviewed. All patients with documented allergies were checked for an alert on their medical notes and on the electronic system (ICM), they also had their arms examined for a red allergy alert wristband which should be on the same limb as the white patient ID bracelet. Data was recorded on a specifically designed audit sheet, and analysed using Microsoft Excel.

The second arm of the study assessed the medication knowledge base of health care professionals in an allergy based scenario. Healthcare workers from three professions (medicine, nursing and pharmacy) were surveyed by a convenience sampling method to determine their ability to recognise and identify which of 13 antibiotics would be safe or unsafe to give to a penicillin allergic patient. The antibiotics were chosen to include a range of classes in addition to examples of problematic drugs identified by the media, NPSA and Department of Health. Reasons for confusion identified were the potential for cross-sensitivity reactions, combination products and branding.

Respondents’ answers were scored using a set marking scheme written in advance by A Kaur. The study instrument contained no identifying markers and was returned in unmarked envelopes to a collection box to maintain respondent confidentiality and anonymity. No reference sources were allowed. Data was collated and analysed using Microsoft Excel.

**Results**

The records of 164 patients were reviewed, and 15% (25/164) had documented allergies. Documentation of allergy status on paper records was high; however supplementary records were underutilised (Table 1). 84% (21/25) patients with allergies were issued a red bracelet, although this is was not always on the same limb as the ID band. The questionnaire was completed by 137 health care workers (medicine n=57, nursing n= 43, pharmacy n=37). Results showed that many found it difficult to answer the questions correctly in the absence of reference sources (Figure 1) and highlighted drugs that are a particular cause for concern. Pharmacists (n=20) were identified as the professionals that had the greatest knowledge in this area with the most correct answers (Figure 1).

**Discussion**

The NPSA recommends that health care professionals must not prescribe, dispense or administer medicines to patients if their allergy status is not documented, and that there must be a greater understanding of high-risk medicines such as combination or branded products, especially in patients who have a drug allergy. Finally, we must make the most of additional resources to further reduce risk, such as electronic records and red allergy alert wristbands.

This study demonstrated strengths in the Trust’s current recording of allergy status in paper format but highlights the underuse of secondary measures such as electronic records, alerts, and the placing of a red allergy alert band on the same limb as the white ID bracelet. These measures need to be promoted on the wards and during Trust induction. Questionnaire results show that increased awareness and training is needed at ward level, with particular emphasis on combination products and the need to prescribe generically. Pharmacists’ excellent result shows their profession’s drug expertise, and confirms the importance of pharmacy involvement in helping to achieve patient medication safety at ward level.

**Reference**

An audit of medication reconciliation for patients admitted during the weekend at the Royal Sussex County Hospital

Mohamed S
Brighton and Sussex University Hospital NHS Trust

Medicines reconciliation is a process designed to ensure that a patient’s current medication is correctly documented on admission and at each stage of transfer of care. A regional policy has been set out by the East and South East England Specialist Pharmacy Services to aid in guidance for implementing medication reconciliation. The standards they set are as follows:

- 100% of second level medicines reconciliation (pharmacy consolidation) should ideally be achieved within 24–48 hrs after admission and no later than 72hrs.

NICE/NPSA have highlighted that medication reconciliation should take place within 24hrs of admission. This target however is difficult to achieve especially with the current opening hours of the pharmacy department at BSUH and the lack of delivery of clinical service to the wards during weekends.

The aim of this audit is to quantify the time period after which medication reconciliation is achieved when patients are admitted during the weekends.

Objectives
- To quantify the percentage of accurate drug histories obtained by doctors on admission compared to those obtained by the pharmacy team.
- To quantify the percentage of patients seen by the pharmacy team at 24, 48, 72 and >72 hours of admission to achieve second level medication reconciliation.
- To establish the percentage of drug histories with discrepancies.
- To determine the percentage of discrepancies communicated to the medical team and the percentage which were amended.

Method
Prospective data were collected over a period of two weekends by the audit lead. All patients who were admitted to the medical assessment unit (MASU) between midday Friday and midday Sunday were included in the audit. All other admissions to the hospital were excluded.

Drug histories in the medical notes which were obtained by doctors at the point of admission were assessed for accuracy compared to level 2 pharmacy team led drug histories. The time lapse from admission to being seen by the pharmacy team was recorded. The number of drug histories with discrepancies was also identified. Subsequently the percentage of these discrepancies which were communicated to the medical team and the percentage of which were reconciled as a result were established.

An electronic data base (Symphony), medical notes and drug charts were used to collect all the relevant data.

Results
122 patients were admitted to MASU over two weekends. 19 (15%) were discharged in less than 12hrs from admission, 13 (11%) were discharged between 12–24 hrs and 15 (12%) were discharged > 24hrs but before Monday. The remaining 75 patients were included in the audit and the results are presented in Table 1 and Table 2. The data in the column titled “unknown” of Table 1 reflects the drug charts that were not reconciled by the pharmacy team at the point of data collection therefore they could not be classified as compliant or non-compliant with the audit criteria.

Discussion
The results of this audit have demonstrated that the trust is not meeting NICE/NPSA’s target of all patients having medication reconciliation within 24 hours. 23% of patients were admitted and discharged over the two weekend period without being seen by a pharmacist. An additional 15% were admitted for less than 12 hours therefore even in the event of having a weekend ward based clinical service these patients may not have been seen. Only 5% of patients admitted over the weekend had their medicines reconciled by the pharmacy staff within 24 hours of admission.

These results are a reflection of the lack of ward level pharmacy services during the weekend and hence none of these patients are seen until the Monday or the following working day in the case of a bank holiday. The results have also highlighted that 29% of drug charts had discrepancies and would have been overlooked had they not been reconciled by a pharmacist.

The results of this audit have highlighted the need for seven day provision of ward level clinical services in order to achieve the NICE/NPSA target of 24 hours. The main obstacle to achieving the target even with this change implemented is the ability to obtain information from GP surgeries over the weekend. A previous audit has shown that one third of cases in the RSCH included phoning GP surgeries.

In the mean time two options are available which may aid in achieving 100% target of patients receiving medication reconciliation within 24–48 hours; firstly to train doctors and nurses to obtain an accurate drug history and to document any changes made correctly. Secondly to employ an additional pharmacist and technician for MASU to work solely during the weekend for the period of time the pharmacy is open; this would be parallel to the dispensary based team. Once the change is implemented then a re-audit would be useful.

References
Audit of the incidence of drug related presentations to the emergency department

Porter H
Brighton and Sussex University Hospitals NHS Trust, Brighton

An American study estimated 28% of visits to the emergency department (ED) are drug related. In contrast a study conducted in the United Kingdom (UK) found only 3.3% attendances to the ED were drug related. The most common drug related problems were adverse drug reactions, overdose and non-compliance.

At Brighton and Sussex University Hospitals NHS Trust (BSUH) the Reason Model was used to highlight problems in identifying drug related presentations to the ED, however BSUH has no data to determine the incidence of these presentations.

The aim was to conduct a baseline audit to determine the incidence of drug related presentations to the ED at the Royal Sussex County Hospital in Brighton. The audit department at BSUH advised no standards were required because this was a baseline audit.

Objectives

- To quantify the number of drug related presentations to the ED
- To quantify the incidence of the common drug related problems that led to attendance to the ED
- To establish when the drug related problem was identified and determine whether it contributed to an increased length of stay
- To determine whether the drug related problem was managed appropriately

Method

Prospective data was collected by the ED pharmacist over 10 days from 8.30am–5pm weekdays (excluding Wednesdays due to training commitments) in all ED zones. The ED pharmacist and an ED consultant drew up a list of “trigger” presenting complaints (based on previous experience of the way drug related problems manifest) to identify potential drug related causes of attendance. The ED pharmacist reviewed the history to determine the likelihood of a drug related presentation. All those identified by the pharmacist as potentially drug related were reviewed by a doctor to exclude other causes. Only patients reviewed by the pharmacist were included in the audit.

Results

A total of 136 attendances were reviewed, of which 19% (n=26) were drug related.

Overdose was the most frequent cause of drug related presentation to the ED (Table 1). Excluding overdose the incidence of drug related attendances to the ED is 12% (n=16).

Paracetamol was the drug most commonly implicated in drug related presentations to the ED, and taken in half of all overdoses reviewed, as shown in Table 2.

46% (n=12) of drug related presentations to the ED were identified as such within four hours. 54% (n=14) were not identified until the multidisciplinary ward round following admission. When these patients were reviewed by the ED pharmacist on the ward round 79% of them (n=11) were discharged. All drug related presentations to the ED were managed appropriately, e.g. acetylecysteine administered to treat paracetamol overdose if level above treatment line at designated time.

Discussion

The results of the audit differ from the literature. It is difficult to draw direct comparisons from studies in the United States because differences in funding and cost to the individual patient may modify behaviour. A lower incidence was reported in the UK possibly due a larger and reliable study cohort.

The data suggests the ED pharmacist plays a key role in identification of drug related presentations to the ED. Therefore a drug related presentation identification tool should be developed and implemented for use by doctors in the absence of the ED pharmacist.

The data suggests failure to identify drug related presentations to the ED within four hours may result in increased length of stay. A larger study is required to determine if early identification of drug related presentations to the ED can reduce admissions and length of stay. The study could also be powered to detect trends in drug related presentations. This information could then be used to develop and implement strategies to minimise ED attendances.

Table 1. Incidence of drug related problems leading to presentation to ED

<table>
<thead>
<tr>
<th>Drug related problem</th>
<th>Number of presentations (n=26)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overdose</td>
<td>10</td>
</tr>
<tr>
<td>Monitoring error</td>
<td>6</td>
</tr>
<tr>
<td>Adverse drug reaction</td>
<td>6</td>
</tr>
<tr>
<td>Non-compliance</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2. Drugs implicated in drug related presentations

<table>
<thead>
<tr>
<th>Drug</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paracetamol</td>
<td>5</td>
</tr>
<tr>
<td>Insulin</td>
<td>3</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>2</td>
</tr>
<tr>
<td>Non-steroidal anti-inflammatory drugs (NSAIDs)</td>
<td>2</td>
</tr>
<tr>
<td>Opioids</td>
<td>2</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>2</td>
</tr>
<tr>
<td>Diuretics</td>
<td>2</td>
</tr>
<tr>
<td>Antihypertensives</td>
<td>2</td>
</tr>
<tr>
<td>Antipsychotics</td>
<td>2</td>
</tr>
<tr>
<td>Anticonvulsants</td>
<td>1</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>1</td>
</tr>
<tr>
<td>Proton pump inhibitors</td>
<td>1</td>
</tr>
<tr>
<td>Cytokine modulators</td>
<td>1</td>
</tr>
</tbody>
</table>

References


An audit to assess whether clopidogrel initiation is appropriate and if the intended duration of treatment is communicated to GPs on discharge

Davies L, Venugopal-Premachander T
University Hospital of North Staffordshire NHS Trust

Clopidogrel, a thienopyridine oral antiplatelet agent, prevents platelet aggregation by selectively and irreversibly inhibiting the binding of adenosine phosphate to its platelet receptor.1 Clopidogrel prescribing is escalating, and it is an expensive antiplatelet drug in comparison to
aspirin. The expenditure within the trust for the last financial year totaled £155,669.29. Thus it is imperative that in 100% of patients, clopidogrel initiation is in accordance with NICE guidance and the duration of treatment communicated on discharge to GPs.

The NICE guidance recommends that clopidogrel is used:

- Together with low-dose aspirin for the management of non-ST-segment-elevation acute coronary syndrome (ACS) in people who are at moderate to high risk of myocardial infarction (MI) or death, and continued for up to 12 months after the most recent acute episode. Thereafter low-dose aspirin alone should be continued.
- Together with low-dose aspirin for the management of ST-segment-elevation myocardial infarction (STEMI) in patients who were treated with this combination within the first 24 hours. Combination treatment should continue for at least four weeks. Thereafter low-dose aspirin alone should be continued.
- In addition to aspirin during and after the implantation of a stent; duration should be at least 12 months in patients receiving Drug Eluting Stents (DES).
- Alone in patients who have had an occlusive vascular event or symptomatic peripheral arterial disease and have proven aspirin hypersensitivity or a history of severe dyspepsia induced by low-dose aspirin.

### Objectives

- To assess whether initiation of clopidogrel within the trust is compliant with NICE guidance.
- To assess whether the intended duration of treatment is communicated to GPs on discharge.

### Method

A data collection sheet was designed, and distributed to all pharmacists. The pharmacists, during their ward visits over a four week period, completed the data collection sheet for any patient initiated on clopidogrel. Details recorded were: ward, hospital number, initiation date, indication and whether it was appropriate, whether percutaneous-coronary-intervention was performed (stent/angioplasty) and whether patients were on dual antiplatelet therapy. All data collected was then collated using Microsoft Excel. An assessment of whether initiation was appropriate was made for each patient, by comparing their documented indication to those advocated by NICE. Three weeks after the audit, patients’ electronic discharge letters were accessed via the information-patient-management-system and details recorded of whether or not duration was specified on discharge. This information was cross-collated.

### Results

A total of 62 patients were initiated on clopidogrel. 19 patients (30.7%) for the indication of non-ST-elevation myocardial infarction (NSTEMI), 32 patients (51.6%) for STEMI, three patients (4.8%) for ACS, two patients (3.2%) due to atrial fibrillation (AF), two patients (3.2%) were admitted electively for DES insertion, one patient (1.6%) due to left main artery disease, one patient (1.6%) due to cerebral vascular accident (CVA), one patient (1.6%) due to a positive exercise tolerance test (ETT) and one patient (1.6%) with electrocardiogram changes who underwent an angiogram and was subsequently fitted with a DES.

### Discussion

This study demonstrated that the majority of clopidogrel initiation is appropriate, in accordance with NICE guidance. However the intended duration is not communicated to GPs in a large proportion of patients. This means clopidogrel may be continued for longer than intended, putting patients at increased risk of side effects and increasing prescribing costs unnecessarily. The importance of including this information on the discharge letter should be reinforced to all doctors. Inpatient drug charts for clopidogrel should be endorsed “duration to be specified on discharge” to prompt prescribers. The electronic discharge letter could be programmed with a “pop-up-alert” to prompt prescribers to record a duration for clopidogrel.

Limitations identified are that not all wards had a daily pharmacist visit; hence patients initiated on clopidogrel on un-covered wards would not have been identified during the audit. Patients may also have been missed if they were initiated on clopidogrel after a pharmacists’ visit and discharged prior to the following visit.

This study demonstrates prescribing of clopidogrel meets NICE criteria, but there is need for improved communication to GPs identifying the intended duration of clopidogrel treatment.

### References

To establish whether there is clear documentation of indication for antibiotic therapy on the drug chart or in the medical notes.

To determine whether duration of antibiotic therapy or review date is documented in the medical notes or on the drug chart.

To identify the use of cephalosporins and quinolones without microbiology approval.

The criteria in this audit have been set by the BSUH Antimicrobial Stewardship Committee. The standard for auditing is 100% compliance to the stated objectives.

Method

Data were collected prospectively with the use of a specifically designed data collection form, which was piloted on ten patients. Data was collected weekly over a period of six weeks. Patients on antibiotics were identified by the pharmacist working on the cardiothoracic ward on antibiotics during the course of each week. The patient’s medical notes, drug chart and any relevant blood results were used to complete the data collection form.

Results

26 patients were identified, (20 males and six females), age range 48–82 years. The patients were cardiothoracic surgery patients admitted to the Royal Sussex County Hospital. There was a 39% (10/26) compliance with all the audit criteria. The results are summarised in Table 1.

Results were reviewed with the consultant microbiologist and analysed using Microsoft Excel.

Discussion

Assessing antimicrobial prescribing encompasses both the choice of the antibiotic and information provided with the prescription i.e. indication, duration or review date, allergies, microbiology approval if quinolones or cephalosporins prescribed. The results of the audit show that all the above criteria were achieved in 39% of antimicrobial prescriptions.

Documentation of a duration or review date on the antibiotic prescription was highlighted to be poor. Where this was not documented the most common indications were sternal wound infections and chest infections. These patients are reviewed on a daily basis by the cardiothoracic team and once weekly by a consultant microbiologist and in more severe infections the antibiotic course can continue for weeks. At the onset of treatment prescribers are often unsure of the required duration of treatment, this results in the omission of a duration. It is important however to highlight to prescribers that a duration or review date does not mean an automatic discontinuation of the antibiotic, but merely aids as a prompt to review the antibiotic prescription as a whole and to decide whether to continue with the same antibiotic or consider an alternative. Equally the addition of a duration or review date will avoid the continuation of unnecessary prescriptions.

Five prescriptions were classified as inappropriate for the stated indication. These included two prescriptions where indication was unknown, one prescription for timentin for an uncomplicated UTI and meropenem for a chest infection when no previous antibiotics had been prescribed or microbiology advice sought. The fifth prescription classified as inappropriate was for ciprofloxacin (a quinolone) for a patient with a hospital acquired chest infection who was allergic to penicillin; after a discussion with the prescriber the prescription was changed to clarithromycin.

Recommendations

In order to address the issues highlighted by the audit the following recommendations have been made:

- Ward pharmacist to liaise with consultants in order to ensure that all members of the clinical team have a copy of the empiric antibiotic guideline and encourage microbiology involvement in difficult/compliated cases.
- Pharmacist to encourage prescribers to document indications for antibiotics on the drug chart and in medical notes during the daily ward round.
- Encourage prescribers to state durations or review dates and emphasise that this does not limit their use of antibiotics.
- Work with lead clinicians, microbiologist and antimicrobial pharmacist to develop a guideline for the empirical management of sternal wound infections.
- Results to be presented at the cardiac clinical governance meeting.
- Re-audit in one year.

References

2. Clostridium difficile infections: How to deal with the problem, HPA/DoH guidance December 2008

A review of oxycodone usage in surgical patients

Flora RK, Eastwood J
Northwick Park and St Marks Hospitals, NorthWest London Hospitals NHS Trust

Oxycodone was introduced to the Trust formulary in 2004 and since then its usage has increased quite considerably in particularly within surgical specialties. Oxycodone is licensed for the treatment of moderate to severe pain in patients with cancer and post operative pain, and for the treatment of severe pain requiring the use of a strong opioid. The Trust’s Drugs and Therapeutics committee reviewed its inclusion to the formulary in 2004 and restricted its use to: sickle cell patients intolerant to morphine only (with reference to the Trust’s sickle cell protocol); OR as a second line therapy for use in patients intolerant to morphine and for those admitted on oxycodone. The Scottish Medicines Consortium (SMC) has advised (October 2004 and April 2006) that OxyNorm is used only in patients with cancer who have difficulty in tolerating morphine or diamorphine. This audit assessed the compliance of prescribing of Oxycodone against the Trust formulary.

Objectives

- To assess prescribing against the current formulary restrictions on surgical wards
- To identify any perceived clinical advantage of oxycodone over morphine

Table 1: Summary of results of antibiotic prescribing on the cardiothoracic unit

<table>
<thead>
<tr>
<th>Criteria</th>
<th>N=26</th>
<th>% compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choice compliant with local antimicrobial guideline/microbiology advice for stated indication</td>
<td>21/26</td>
<td>81%</td>
</tr>
<tr>
<td>Allergy status documented on drug chart</td>
<td>25/26</td>
<td>96%</td>
</tr>
<tr>
<td>Indication stated –</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- On drug chart</td>
<td>12/26</td>
<td>46%</td>
</tr>
<tr>
<td>- In medical notes</td>
<td>21/26</td>
<td>81%</td>
</tr>
<tr>
<td>Duration or review date stated –</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- On drug chart</td>
<td>10/26</td>
<td>39%</td>
</tr>
<tr>
<td>- In medical notes</td>
<td>3/26</td>
<td>12%</td>
</tr>
<tr>
<td>Quinolones or cephalosporins prescribed inappropriately1/26</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Compliance with all audit criteria</td>
<td>10/26</td>
<td>39%</td>
</tr>
</tbody>
</table>
Table 1: Results of audit as reviewed against audit standards aim 100% compliance (n=45)

<table>
<thead>
<tr>
<th>Known intolerance to trial of morphine</th>
<th>Evidence of pain team or Macmillan palliative care team input</th>
<th>Patient admitted on oxycodone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes 6 (13.3)*</td>
<td>Yes 14 (31.1%)*</td>
<td>Yes 9 (20.0%)*</td>
</tr>
<tr>
<td>No 39 (86.7%)*</td>
<td>No 31 (68.9%)*</td>
<td>No 36 (80.0%)*</td>
</tr>
</tbody>
</table>

* In one case there was proven intolerance to morphine AND there was pain team/Macmillan team input; † There were six incidences where there was pain team/Macmillan team input AND the patient had been admitted on oxycodone. A total of 29 out of 45 patients were therefore appropriately prescribed oxycodone (64%).

Method
The audit was carried out over 10 days (15–19 December 2008 and 30 January–5 February 2009) on five surgical wards (orthopaedic, colorectal, gynaecological, general and vascular) at Northwick Park Hospital. Data collection forms were designed and piloted to ensure sufficient data collected for each criterion and data was not replicated.

Aiming for 100% compliance against Audit Standards:
1. The patient prescribed oxycodone either had a known intolerance to morphine (demonstrated by trial of morphine that was subsequently stopped / or documented as a drug allergy), OR
2. There was evidence of pain team or Macmillan (palliative care) team involvement OR patient was admitted on oxycodone.

Results
Total numbers of patient charts seen were 1,468 by six pharmacists, of which 45 patients (3%) were prescribed oxycodone (in any form) on at least one occasion. Table 1 shows the audit results.

Discussion
The results of the audit demonstrate the surgical wards do not currently comply with the trust formulary guidance on oxycodone (64% compliance). However on discussion with consultants in colorectal surgery and the pain team, their experience demonstrated oxycodone is less likely to slow gastrointestinal transit as compared to other opioid analgesics and is favoured when patients complain of nausea and vomiting despite being on an antiemetic. However in literature searches, the auditors could find no evidence to support these findings. Conversely a text on symptom management in advanced cancer stated it does cause significantly less sedation and vomiting than morphine.4 There is a lack of national consensus regarding the place of oxycodone within surgical patients. There is some evidence to support its use post-operatively in combination with paracetamol5+6 (where it was shown to be equal in efficacy to morphine), but this needs to be replicated in further randomised controlled trials.

Audit limitations
- Surgical patients may not have been included in this audit if admitted onto medical wards.
- The audit was unable to assess patients’ previous use and tolerance of opioid analgesics before their present admission. For some cases the auditors were unable to access the anaesthetic administration charts.
- The audit method may not have been reliable in capturing information regarding morphine intolerance.

Audit recommendations
- Re-audit over a longer time scale and on all the wards in the hospital (medical and surgical) to enable data collection of all surgical patients
- Liaise with other hospitals within London to assess their usage and prescribing habits
- Update the current formulary recommendations in view of these findings
- Liaise with the Pain team to educate surgical teams regarding awareness and access to Formulary information via the WeBNF.
- To propose amendments to the formulary position and publicise the appropriate prescribing of oxycodone in association with the Pain team.
- Comparison audit with morphine in post-operative patients to compare efficacy and frequency of adverse events.

References

25 Valaciclovir — A Simplex Prescription?
Begum Y
Barts and The London NHS Trust

Valaciclovir is a prodrug of aciclovir. It can be used for the treatment, suppression or reduction of transmission of the herpes simplex virus (HSV). In comparison to aciclovir it produces 3–4 times increased levels of active drug.5

According to the British Association of sexual health and HIV (BASHH) and Trust guidelines aciclovir should be first line treatment for episodic treatment and suppressive therapy in human immunodeficiency virus (HIV) positive and negative patients. In HIV positive patients receiving suppressive therapy, valaciclovir 500mg twice daily and aciclovir 400mg twice daily have been found to be comparable in terms of time to recurrence.6

The Trust policy on the use of valaciclovir is that it is second line agent if aciclovir fails to control or treat symptoms.7

This audit was designed to assess whether valaciclovir is being prescribed in accordance to Trust guidelines. For the financial year 2007–2008 the expenditure on valaciclovir was £24,861 in comparison to the first line aciclovir £7,076 for the same time period.

Due to increased number of patients and limited resources the team is investigating all prescribing outside of antiretroviral therapy.

Objectives
- To assess valaciclovir prescribing in HIV patients against Trust policy for the Treatment of HSV
- To assess how often valaciclovir prescriptions is being reviewed by the prescriber
- To ensure prescribing of valaciclovir is according to BASHH and Trust Guidelines

Method
The audit was conducted over a one-month period (28 November to 28 December 2008). Data was collected for all patients who were prescribed valaciclovir as outpatients for the previous six months (August 2008 to January 2009), using previous prescription records and any new valaciclovir outpatient prescriptions coming into pharmacy.

Each patient’s case notes including HIV manager (trust’s database for HIV patients) were reviewed and the piloted data collection tool was completed using the records. Patients details recorded included; CD4,
Prescribers are made aware of the large percentage of patients not being initiated on aciclovir as first line for HSV.

- Antivirals need to be reviewed regularly at least three monthly for suppressive therapy.
- Prescribers need to document the number of recurrences; as this was poorly documented thus the reasoning for suppressive therapy was unclear in some cases.
- Guidelines need to be updated to include aciclovir 800mg three times a day for suppressive therapy as per BASHH.
- The guidelines need to include review more clearly as it currently states two weeks after initiation.
- The medical team need to be educated on these findings.
- Re-audit in six months.

The limitations for this audit include the duration that this audit was carried out for. Also if Extending the audit to include inpatients would also provide interesting data.

References

26 Improving prescribing of vancomycin in a paediatric intensive care unit

Hill C*, Dunsmure L†
*Preregistration Pharmacist and †Advanced Clinical Pharmacist, Leeds Teaching Hospitals
Winner of Hameln poster prize. See p5.

27 Compliance with prescribing guidelines on patient discharge prescriptions (TTOs) for Controlled Drugs

Bhatia N, Still E
Pharmacy Department, Royal Sussex County Hospital, Brighton and Sussex University Hospitals NHS Trust

Shortcomings in systems for regulating controlled drugs (CDs) were identified in the Fourth Report of the Shipman Inquiry, resulting in changes in the regulations around CD regulations. NHS Trusts are required to show compliance with these through the process of auditing. Brighton and Sussex University Hospitals NHS Trust (BSUH) complies with NHS Litigation Authority Level 2 Risk Management Standards for Acute Trusts. These standards involve managing risk as described by approved documentation.

Objectives
- To collect information on the accuracy of prescribing CDs on discharge prescriptions at the two major sites of the BSUH NHS Trust for the period of one month.
- To analyse the information to determine:
  - Any fields, if any, which are consistently incorrect
  - Any specific locations where the accuracy of prescribing controlled drugs is particularly inadequate
- To make recommendations to improve compliance with the prescribing guidelines to 100%
**Table 1. The percentage of prescriptions screened on the ward or in the dispensary at two sites in the BSUH NHS Trust**

<table>
<thead>
<tr>
<th>Standard</th>
<th>Total number of TTOs assessed</th>
<th>Percentage screened in the dispensary</th>
<th>Percentage screened on the ward</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSCH</td>
<td>33</td>
<td>15.2</td>
<td>84.8</td>
</tr>
<tr>
<td>PRH</td>
<td>23</td>
<td>91.3</td>
<td>8.7</td>
</tr>
</tbody>
</table>

**Table 2. Adherence to standards for prescribing CD on TTOs at BSUH NHS Trust**

<table>
<thead>
<tr>
<th>Standard</th>
<th>RSCH (n=33)</th>
<th>PRH (n=23)</th>
<th>BSUH (n=56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient's name</td>
<td>88</td>
<td>48</td>
<td>68</td>
</tr>
<tr>
<td>Patient's address</td>
<td>96</td>
<td>39</td>
<td>67.5</td>
</tr>
<tr>
<td>Name of drug</td>
<td>97</td>
<td>96</td>
<td>96.5</td>
</tr>
<tr>
<td>Strength of drug</td>
<td>94</td>
<td>87</td>
<td>90.5</td>
</tr>
<tr>
<td>Dosage form</td>
<td>79</td>
<td>37</td>
<td>58</td>
</tr>
<tr>
<td>Dose to be given</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Frequency</td>
<td>91</td>
<td>100</td>
<td>95.5</td>
</tr>
<tr>
<td>Total quantity to be supplied</td>
<td>85</td>
<td>39</td>
<td>62</td>
</tr>
<tr>
<td>Date of prescription</td>
<td>97</td>
<td>91</td>
<td>94</td>
</tr>
<tr>
<td>Signature of prescriber</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Prescriber's name</td>
<td>100</td>
<td>70</td>
<td>85</td>
</tr>
</tbody>
</table>

**Method**

The audit proposal was submitted to and approved by the South East Medicines Management Education and Development department. Data collection form was designed and piloted over a period of one week in the dispensary at the Princess Royal Hospital, Haywards Heath. Data was collected for one month. Pharmacists filled out a data collection form for each TTO which had a CD prescribed on it, in the dispensary and on the wards.

The data collected was then analysed and evaluated. Microsoft Excel was used to carry out basic statistical analysis and manipulation of the data.

**Results**

The results are set out in Table 1 and Table 2.

**Discussion**

Results for the audit showed that 58% of the prescriptions assessed at RSCH were accurate and 17% of the prescriptions assessed at PRH were accurate. Possible reasons for this are:

- Comments on the data collection form suggested that pharmacists at the RSCH were often on the ward when the TTOs had been written and therefore were able to advise the doctor as he or she was writing the prescription. Results from the audit also showed that 85% of the TTOs assessed at RSCH were screened on the ward while only 22% were screened on the ward at PRH (Refer to Table 1).
- As more controlled drugs are prescribed at RSCH the doctors are accustomed to writing these prescriptions.
- Comments on the data collection form also highlighted that there was no space for indicating the date of the prescription on TTOs, only date of discharge and the TTO form for Hurstwood Park does not have a allocated space for the prescribers name separate from the prescribers signature.

Recommendaions made based on the results were:

1. Educating doctors on the requirements when prescribing controlled drugs
2. Encourage doctors to refer to trust guidelines and BNF guidelines for prescribing
3. Producing a checklist and distributing it within doctors

Failing to accurately record and/or act on patients’ allergy status can have fatal consequences. Despite this, patients are prescribed drugs to which they are known to be allergic to. On admission to the intensive care unit (ICU) immediate treatment is vital, but it is still imperative that allergy status is promptly documented. Trust policy states that a drug should not be prescribed, administered or dispensed if allergy status is incomplete; a description of the reaction must also be recorded.

St Thomas’ ICU currently uses “Intellivue Clinical Information Portfolio” (ICIP), a paperless system for recording all information in the patient pathway. Documentation and prescribing can be attributed to a named individual at a specific time. Allergy status is located in the admission clerking form which is completed for every patient at ICU admission.

Allergy status is also documented on the trust pathology reporting system (EPR), which contains discharge summaries. This is not cross-linked to ICIP for allergy status.

The audit’s aim was to measure allergy documentation throughout the ICU patient pathway.

**Objectives**

1. To audit patients with documented allergy on ICIP, including allergen reaction
2. To audit patients prescribed drugs on ICIP to which they are known to be allergic
3. To audit patients with allergy status stated on ICIP prior to drug prescription
4. To audit allergy status concordance between EPR and ICIP
5. To audit if allergy status on ward drug chart prior to ICU identical to allergy status on ICIP
6. To audit if allergy status at discharge from ICU identical to allergy status on ward drug chart

**Method**

ICU patient episodes were obtained for a one-month period (October 2008); patients must have completed a full ICU pathway i.e. be admitted and discharged (including deceased) within this month. Time and date of allergy status documentation and drug prescribing was noted. If a known allergen was prescribed the multidisciplinary notes were reviewed to determine if a documented risk-benefit evaluation had occurred. Allergy status prior to the ICU admission and after discharge was noted from the ward drug chart and EPR.

**Results**

A total of 58 patient episodes were included for 57 patients (two episodes for the same patient). 16/57 (28.1%) patients had documented allergy to...
Table 1. Initial allergy status on ICIP within 24 hours of admission

<table>
<thead>
<tr>
<th>Allergy status</th>
<th>Number of patient episodes (n=58)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No known drug allergies (NKDA)</td>
<td>35 (60.3%)</td>
</tr>
<tr>
<td>Penicillins/cephalosporins only</td>
<td>2 (3.4%)</td>
</tr>
<tr>
<td>Multiple drugs including penicillins/cephalosporins</td>
<td>4 (6.9%)</td>
</tr>
<tr>
<td>Non-beta-lactam antimicrobials</td>
<td>3 (5.2%)</td>
</tr>
<tr>
<td>Non-antimicrobial drug allergy</td>
<td>6 (10.3%)</td>
</tr>
<tr>
<td>Non-drug allergens</td>
<td>2 (3.4%)</td>
</tr>
<tr>
<td>Unable to confirm</td>
<td>4 (6.9%)</td>
</tr>
<tr>
<td>Allergy status not completed</td>
<td>2 (3.4%)</td>
</tr>
</tbody>
</table>

Table 2: Accuracy of ICIP allergy status

<table>
<thead>
<tr>
<th>ICIP Allergy</th>
<th>EPR Allergy on drug chart prior to ICU admission (n=32)</th>
<th>Allergy documented on drug chart after ICU discharge (n=37)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concur with source</td>
<td>22 (66.8%)</td>
<td>38 (77.6%)</td>
</tr>
<tr>
<td>ICIP missing allergies</td>
<td>5 (15.6%)</td>
<td>5 (10.2%)</td>
</tr>
<tr>
<td>ICIP additional allergies</td>
<td>8 (25.0%)</td>
<td>9 (18.4%)</td>
</tr>
</tbody>
</table>

A drug or allergen on ICIP (Table 1); the nature of the reaction was documented in 7/17 (41.2%) episodes.

One of the 57 patients (1.8%) was prescribed and administered a drug (cefuroxime) to which there was a documented allergy of “rash” with penicillins/cephalosporins. No adverse reaction occurred.

Allergy status was not documented on ICIP prior to prescription of drugs (excluding fluids) in 30/58 (51.7%) episodes, 12 patients did not have allergy status confirmed prior to prescription of a new antimicrobial. It is not possible to say if a drug was administered after prescribing prior to allergy status confirmation due to delays in documentation.

An allergy status was available for 32/58 (55.2%) patient episodes on EPR (Table 2). Drug charts were reviewed for 49/58 patient episodes prior to ICU admission and 37/46 after ICU discharge. A total 46 patients survived their ICU stay and were discharged to a ward in the trust.

Discussion

A total 16/57 (28.1%) patients stated a known allergy, which is above the figure quoted in the literature of 10–20%. Less than half of the patients admitted to the ICU had an allergy status documented prior to prescribing of a drug, and for those with a known allergy, less than half had reaction to the allergen documented. This is not in agreement with Trust policy, and puts patients at risk. Incomplete documentation of a reaction to an allergen means it is difficult to make a risk-benefit decision on drug use, limiting choice of vital medication. Poor correlation was also seen between allergy status on patients’ drug charts, EPR and ICIP. The inaccurate transfer of allergies highlights an area where practice must be improved.

To target this, the findings were reported to the multidisciplinary team at the monthly ICU audit meeting. It was agreed to make allergy status compulsory within the ICIP system prior to completion of patient clerking. ICIP prescribing tutorials with a critical care pharmacist will now be included in the doctor’s induction. To address the poor allergy documentation at transfer, the audit was presented to the junior doctors’ seminar. Future work will include presenting to the wider multidisciplinary team.

The audit had a number of limitations; it is acknowledged that an allergy may have been confirmed verbally prior to prescribing, and also that it was not possible to confirm an accurate allergy status with a sedated patient on ICU. It is therefore imperative that allergy is accurately transferred between locations and systems.

This clinical audit clearly demonstrates that current practice does not ensure accurate and full allergy status is documented, transferred and acted upon. The audit will be repeated following implementation of changes highlighted above.

References

2. Guy’s and St Thomas’ NHS Foundation Trust. Recording of allergic hypersensitivity reactions. 2008

Re-audit of the incidence and significance of outpatient prescribing errors at King’s College Hospital NHS Foundation Trust

Brinklow N, Alani A, Aldidina F
Pharmacy Department, King’s College Hospital, London.

A prescribing error has been defined as a “prescribing decision or prescription writing process, which results in an unintentional significant reduction in the probability of treatment being timely and effective, or an increase in the risk of patient harm.” Prescribing accounted for 15.7% of medication related incidents reported to the National Patient Safety Agency (NPSA) between January 2005 and June 2006. A baseline audit of Outpatient prescribing errors was undertaken in November 2006. The audit demonstrated an Outpatient prescribing error rate of 8.6 per 100 prescriptions.

This audit was repeated in June 2008 in order to measure any changes in prescribing errors and/or severity of these errors when compared to the baseline audit undertaken in 2006. The definition of prescribing error used was the same in both audits. A larger new-style paper prescription was introduced as a result of the 2006 audit in order to help improve prescription legibility. There were no other changes to practice that may have influenced the results.

Objectives

To measure and document types of prescribing errors and omissions identified by pharmacists on hospital outpatient prescriptions; to assess the potential for the error to result in patient harm; to record any changes between the baseline audit and this audit and to propose actions to reduce the incidence of errors in the future.

Method

A data collection form was designed based upon the previous audit. Prescribing errors were identified by the outpatient pharmacists over a period of five days. All outpatient prescriptions, with the exception of FP10, private prescriptions and clinical trial prescriptions were included. The BNF guidelines on prescription writing and the King’s College Hospital formulary guidelines were used as audit standards. Any prescription that did not meet these standards was considered to contain an error. Finally, a panel was set up consisting of two pharmacists, a doctor and a nurse. Panelists were asked to assess severity of potential harm to the patient as a result of the prescribing error using an analogue scale of 0–10; where 0 implied prospectively no harm would have been caused and 10 indicating an outcome of possible fatality. Mean scores were generated and were used as an index of severity. Mean scores above eight were considered to be serious, mean scores between 5.1 and 8 were considered to be of moderate severity, mean scores of between 3.1 and 5 were considered mild. Errors with mean scores of three or less were considered to be harmless.
### Table 1. Types of outpatient errors identified

<table>
<thead>
<tr>
<th>Type of error</th>
<th>Number of errors in 2006</th>
<th>Number of errors in 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplete prescription</td>
<td>34 (49%)</td>
<td>35 (38%)</td>
</tr>
<tr>
<td>Prescription illegible</td>
<td>16 (23%)</td>
<td>4 (4%)</td>
</tr>
<tr>
<td>Dose incorrect</td>
<td>13 (19%)</td>
<td>25 (27%)</td>
</tr>
<tr>
<td>Wrong drug name</td>
<td>4 (6%)</td>
<td>5 (5%)</td>
</tr>
<tr>
<td>Drug name abbreviated</td>
<td>2 (3%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>Wrong strength</td>
<td>–</td>
<td>6 (8%)</td>
</tr>
<tr>
<td>Others</td>
<td>–</td>
<td>15 (16%)</td>
</tr>
<tr>
<td>Total number of errors identified</td>
<td>69</td>
<td>92</td>
</tr>
</tbody>
</table>

### Table 2. Potential clinical severity of the errors identified

<table>
<thead>
<tr>
<th>Mean score</th>
<th>Potential degree of harm</th>
<th>Number of errors in 2006</th>
<th>Number of errors in 2008*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–3</td>
<td>Harmless</td>
<td>49</td>
<td>48</td>
</tr>
<tr>
<td>3.1–5</td>
<td>Mild</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>5.1–8</td>
<td>Moderate</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.1–10</td>
<td>Severe</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

* four prescriptions containing eight errors were excluded due to incomplete data received from panel.

### Results

Of 650 prescriptions, 67 [10.3%] prescriptions were found to contain 92 errors, of which 69 were classified as prescribing errors under the definition used for this study and the remaining 23 errors were outside the scope of this definition.

Overall an increase was observed in the outpatient prescribing error rate from 8.6 per 100 prescriptions in 2006 to 10 errors per 100 prescriptions in 2008. Most of the errors detected [38%] were due to incomplete prescriptions and compared to 2006, this figure had decreased. A reduction in the percentage of errors attributed to illegible writing from 24% to 4% and an increase in the percentage of errors attributed to incorrect doses from 19% to 27% was observed. The re-audit highlighted a number of new errors when compared with the 2006 audit and they were classified under the heading “Others”. These included incorrect controlled drug prescriptions and errors due to non-compliance with hospital protocols. However, because they fell outside the scope of “prescribing error” they were not rated. There was little change in the categorisation of error type between 2006 and 2008 when using a mean score potential to cause harm.

### Discussion

The results of the re-audit demonstrated that although there was a small increase in the total number of prescribing errors from 2006 to 2008, this was not felt to be significant. A reduction in errors due to illegibility was noted and this may have in part been due to the new larger prescriptions that had been introduced to help improve legibility. When the clinical significance of the errors was analysed by a panel there was found to be little difference between the 2006 and 2008 data-set with most prescribing errors being rated as having a mild to no potential to cause harm. Do we then perhaps spend too long screening low-risk outpatient prescriptions? Although this was outside of the scope of this audit, it is perhaps worthwhile considering so that scarce staff resources can be targeted in the most effective way by perhaps screening only high-risk outpatient prescriptions.

### References

3. Olle C, Madill T, Cavell G. The incidence and significance of hospital outpatient prescribing errors. King’s College Hospital, London

### An audit into the prescription and supply of the Seretide inhaler in adult patients with asthma or COPD at the University Hospital of North Staffordshire

**Marson VJ, Bednall R, Hellicar RA**

Pharmacy Department, University Hospital of North Staffordshire

In asthma a combination long-acting bronchodilator and corticosteroid inhaler may be used at Step 3 of the British Thoracic Society (BTS) guidance.¹ The National Institute for Health and Clinical Excellence (NICE) recommends the least costly device that is suitable for the individual is chosen.² In chronic obstructive pulmonary disease (COPD) NICE states that a combination inhaler may be considered for patients with moderate airflow obstruction (FEV1 <50% predicted), who have shown improvement on long-acting bronchodilator(s) alone, and who have had two or more exacerbations in a year needing treatment with antibiotics or oral corticosteroids.³

Seretide is the combination inhaler of choice at the University Hospital of North Staffordshire. All strengths of Seretide Accuhaler and Evohaler are licensed in asthma, whereas only the Seretide 500 Accuhaler is licensed in COPD. To try to ensure it is prescribed in accordance with NICE and BTS guidance, the Trust formulary states that a combination inhaler should only be prescribed on recommendation of a respiratory consultant, registrar or staff grade. The total expenditure on Seretide inhalers for this Trust was £138,269 from April 2008 to March 2009. This audit was undertaken to ensure that national and local guidelines are followed and appropriate Seretide devices are prescribed and supplied so that costs can be justified.

### Objectives

This audit was undertaken to assess whether:

- 100% of prescriptions of Seretide were for a licensed indication
- 100% of newly initiated hospital Seretide prescriptions were recommended by a respiratory consultant, registrar or staff grade to try to ensure NICE and BTS guidance was followed
- 100% of supplies by pharmacy were for valid reasons; i.e. new or re-supply due to the patient’s own having run out

### Method

Data was collected from all adult inpatients prescribed Seretide during March 2009 who were seen on the wards by a ward pharmacist or technician. Details recorded included:

- Indication for the Seretide inhaler
- If for a licensed indication
- If newly prescribed on admission
- If new, who initiated treatment

It was also noted when and why a supply was made. Data was gathered from the patient, medical notes and drug charts. It was analysed by one pharmacist using Microsoft Excel.

### Results

A significant number of these prescriptions for Seretide were for an unlicensed indication (Table 1). For five patients (7.4%) it was not possible to establish the indication. Only nine Seretide prescriptions (13.4%) were new on admission. Of these, four (44%) were initiated on
recommendation of a respiratory consultant, registrar or staff grade and two (22.2%) were initiated by the respiratory nurses. One prescription was not initiated by the respiratory team, and for the other two prescriptions it is unknown who was the prescriber.

Pharmacy supplied 32 patients (47.8%) with a Seretide during their admission in March. Reasons were determined in 23 of these patients, 11 of these (47.8%) were because the prescription was new, or because the patient’s own Seretide had run out during this admission. All other supplies were due to patients not bringing their inhalers into hospital or inhalers lost during admission.

Discussion
This audit showed that a large number of Seretide inhalers in the Trust are used off license, the majority (34.3%) due to COPD patients not being prescribed the licensed dose of the Seretide 500 Accuhaler. This has significant cost implications if such patients are being prescribed the equivalent Seretide 250 Evohaler which is 50% more expensive. Action should be to discuss with the head of the respiratory directorate the best means of ensuring that the Accuhaler is prescribed where possible for new prescriptions in COPD. The “supported early discharge” team should also be involved in reviewing an Evohaler to Accuhaler switch for existing patients.

Encouragingly there was respiratory team involvement in two thirds of the Seretide prescriptions newly initiated in hospital, although it is unknown whether those initiated by the respiratory nurses were with input from the senior respiratory doctors as per the guidelines. Action should be to reinforce that the respiratory nurses must prescribe inhalers in accordance with the product license, Trust and NICE guidelines. At initiation of therapy pharmacy should determine if the prescription is appropriate.

The help of the primary/secondary care interface pharmacist should also be enlisted in conducting a similar audit in primary care to establish whether the prescribing of general practitioners is in line with the joint formulary.

A significant number of Seretide inhalers were supplied during this audit, a large number of which were inappropriate. The implementation of one-stop dispensing in this Trust this year should encourage the public and ambulance crews to bring patients’ own Seretide inhalers into hospital and will also involve a review of the processes for transferring medication between wards. This should reduce the number of inhalers lost or left at home, and resupplied.

This audit was only small, but there are a number of action points to take from it as mentioned above. Both prescribing and supply must be tightened to manage the high costs involved, and we must re-audit in one year against the action points.

References
4. In house information, Medicines Management Team, University Hospital of North Staffordshire.
The number of haemorrhagic events was 64 (18%) of which 16 (46%) were considered serious (defined as life-threatening bleeding, intracranial haemorrhage, transfusion of packed red blood cells three units/day for two consecutive days or if the consultant deemed the bleed to be severe). Of the serious cases, 13 (81%) died in ICU. Three patients were discharged from hospital and outcome is pending for one patient.

Application for funding from Primary Care Trusts was approved in all cases.

Discussion
This clinical audit has identified excellent adherence to NICE guidelines for the use of DAA in GSTFT. The 28-day mortality in patients with severe sepsis treated with DAA is higher when compared with clinical trial data available which is to be expected. Of note, the rate of serious haemorrhagic events was higher than in the PROWESS study but lower than a national audit of UK practice (6.2%) which assures our practice in view of the treatment of higher risk patients out with a clinical trial setting. The high rate of administration errors was noted in an interim analysis and simplified guidance for preparation of DAA was produced in order to reduce errors. Interestingly, mortality was no higher in patients with documented contraindications compared with those without contraindications although numbers in this group were small.

The development of a simple, highly effective scoring system has assured best clinical practice and ensured continued funding of a high cost agent in the most critically ill patients. It has provided a model for the introduction of other high cost drugs and has been used as GSTFT-wide model for assessment of high cost therapies.

References
3. NICE Technology Appraisal Guidance 84. Drotrecogin alfa (activated) for severe sepsis. September 04.

Table 1: Patient outcome categorised by organ dysfunction at time of initiation of DAA

<table>
<thead>
<tr>
<th>Number of organs in failure</th>
<th>Number of patients</th>
<th>Died in ICU (%)</th>
<th>Died in Hospital (%)</th>
<th>Discharged home (%)</th>
<th>Further info awaited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Five</td>
<td>52</td>
<td>30 (58%)</td>
<td>1 (2%)</td>
<td>21 (40%)</td>
<td>0</td>
</tr>
<tr>
<td>Four</td>
<td>116</td>
<td>50 (43%)</td>
<td>8 (7%)</td>
<td>51 (44%)</td>
<td>7 (6%)</td>
</tr>
<tr>
<td>Three</td>
<td>103</td>
<td>42 (41%)</td>
<td>7 (7%)</td>
<td>49 (47%)</td>
<td>5 (5%)</td>
</tr>
<tr>
<td>Two</td>
<td>65</td>
<td>16 (25%)</td>
<td>6 (9%)</td>
<td>43 (66%)</td>
<td>0</td>
</tr>
<tr>
<td>One</td>
<td>12</td>
<td>5 (42%)</td>
<td>1 (8%)</td>
<td>6 (50%)</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>348</td>
<td>143 (41%)</td>
<td>23 (7%)</td>
<td>170 (49%)</td>
<td>12 (3%)</td>
</tr>
</tbody>
</table>

An audit on safer practice with epidural injections and infusions in Southampton University Hospitals Trust

Newland-Jones P*, Trim J1, Fox A*

*Pharmacy Department and 1Acute Pain Team, Southampton University Hospitals NHS Trust

Epidural analgesia is the provision of pain relief by continuous administration of pharmacological agents into the epidural space via an indwelling catheter. Although very effective as a choice of pain relief when used postoperatively, there are many risks associated with this route of administration. Between 1 January 2005 and 31 May 2006 there were 346 serious incidents reported involving epidural injections and infusions across the UK. One of the major hazards is the risk of accidental administration of local anaesthetics intravenously that were intended for epidural use. This can cause local anaesthetic toxicity, which is associated with a high risk of mortality. From 2000 to 2006, six patients died from such an error, prompting a national patient safety alert relating to safer practice with epidural injections and infusions.

Objectives
This audit aimed to investigate if the standards of safer practice, set out in the NPSA patient safety alert, were being followed at Southampton University Hospitals Trust. The objectives were:

- To confirm whether or not epidurals other than pre-mixed infusions are used in SUHT.
- To confirm that SUHT conform to standards set out by the NPSA.
- To identify areas within SUHT which do not comply to the NPSA standards.
- To offer recommendations for improvement in those areas that do not comply.

Standards
1. Clearly label infusion bags and syringes for epidural therapy with “For Epidural Use Only” in large font with judicious use of colour (100%).
2. Store epidural infusions in separate cupboards or refrigerators from intravenous and other types of infusions (100%).
3. Label all epidural administration sets with “EPIDURAL” when in use (100%).
4. Use clearly identified epidural infusion devices exclusively for epidural therapy or, if not, the device should be marked clearly and unambiguously that it is “For Epidural Use Only” when it is being used for that purpose (100%).
5. Ensure all staff in contact with epidurals have received training (100%).

Method
A list of all the wards that had stocked epidural infusion bags over the last 12 months was generated. A data collection form was designed to record all relevant information required for this audit. Liaison with the acute pain team allowed for staff training records to be audited over the six month period after implementation of a new training course. Data from all relevant wards was collected over two five day periods (15–20/09/08) and (09–14/02/09) to allow for a full audit cycle to be undertaken and results were then analysed.

Results
Standard 1 The trust was 100% compliant.
Standard 2 The results for Standard 2 are set out in Table 1
Standard 3 The percentage of sets meeting the standards was 66.67% (16/24).
Standard 4 The trust was 100% compliant.
Standard 5 At the end of the six-month period approximately 350 staff were identified as needing to attend the training course however only 132 had been booked onto the course and only 26 had completed it.

Discussion
The results show that in two of the five standards the trust was 100% compliant. The trust had, following previous direction from a multidisciplinary working group, moved to purchasing epidurals from external suppliers that were labelled in yellow with “For epidural use only”. The trust has also moved to storing only three epidural combinations, plain bupivacaine 0.125%, bupivacaine 0.15%/fentanyl 2mcg/ml and bupivacaine 0.1% /fentanyl 2mcg/ml thus greatly reducing the risk of mixing and dilution errors. The trust had also secured funding...
for 36 designated epidural pumps that were colour coded with a yellow bar across the top and bottom and only allow for connection of compatible epidural giving sets. With regard to standard two and the possible consequences of storing epidurals incorrectly, changes to storage location were made immediately, even as a temporary measure in some cases until a permanent solution could be decided upon. The result for standard three, relating to epidural giving sets is possibly overly critical in light of the safety features of the giving sets, such as specific compatibility with designated epidural pumps. Even with these safety features in mind the trust did not comply with the NPSA standards. The audit of staff training records has shown a very poor uptake of the updated training programme. With the training not deemed yet as mandatory, staff are having to complete the course in their own time, out of work, as managers are unable to release staff during working hours. Where the trust did not meet standards, recommendations were made and re-audit will take place monthly. Highlighting the need for mandatory staff training will be an ongoing priority.

Reference

33 An audit of Helicobacter pylori eradication
Plater S
Frimley Park Hospital NHS Trust, Camberley

Helicobacter pylori infection is associated with over 90% of duodenal ulcers and 80% of gastric ulcers and can be detected using agar based-biopsy urease tests (CLO). The prevalence of H pylori is estimated to be around 20% in the UK. Meta analyses have shown that treatment of the infection using a combination of antibiotics and acid-suppressing drugs facilitates ulcer healing and reduces relapses. Eradication also prevents recurrent bleeding from peptic ulcers.

Studies have shown that eradication rates of over 90% can be achieved with one week of triple therapy consisting of a proton pump inhibitor (PPI) and two antibiotics. The MACH-1 study showed the most effective regimen consisted of a PPI, clarithromycin and either amoxicillin or metronidazole. Studies have shown that different PPIs are equivalent but that double dosing of the PPI leads to more effective treatment than single dosing. Higher eradication rates could potentially be achieved by increasing the course length to two weeks however this increases adverse effects and poor compliance is likely to offset any potential gain. A recent meta-analysis has also shown that courses longer than seven days have failed to improve response rates.

Frimley Park Hospital (FPH) guidelines reflect these results and recommend seven days triple therapy as follows:

First line (A): omeprazole 20mg bd plus amoxicillin 1g bd plus clarithromycin 500mg bd
First line (C): omeprazole 20mg bd plus amoxicillin 500mg tds plus metronidazole 400mg tds
First line in penicillin allergic patients (B): omeprazole 20mg bd plus metronidazole 400mg bd plus clarithromycin 500mg bd

Discussion
Successful treatment of H pylori infection helps to heal ulcers and reduces relapses. This audit has demonstrated poor compliance to the hospital guidelines for triple therapy prescribing. Although 23 out of 24 CLO positive patients were prescribed triple therapy, it was found that a substantial number received an inappropriate regimen. An incorrect PPI dose and prescribing regimen B in non-penicillin allergic patients were the main reasons for non-compliance. This audit has highlighted that triple therapy prescribing needs to be improved. A re-education

Table 1: Percentage of wards and items meeting Standard 2

<table>
<thead>
<tr>
<th>Standard 2</th>
<th>Percentage of wards meeting standards</th>
<th>Percentage of items meeting standards</th>
<th>Percentage of non-CD epidurals meeting standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period 1</td>
<td>13/17 (76.4%)</td>
<td>111/187 (59.3%)</td>
<td>23/99 (23.2%)</td>
</tr>
<tr>
<td>Period 2</td>
<td>16/18 (88.8%)</td>
<td>132/170 (77.6%)</td>
<td>50/88 (56.8%)</td>
</tr>
</tbody>
</table>

Objectives
To determine:
- Whether all patients with a positive CLO test are prescribed triple therapy for eradication of H pylori
- Whether 100% of patients are correctly prescribed triple therapy
- The percentage of patients prescribed each regimen
- Reasons for non-compliance to the recommended regimens
- Whether pharmacist intervention was required to ensure patients received the correct treatment

Methods
A retrospective audit was performed. Patients with a positive CLO test between 23/05/08 and 04/02/09 were identified using endoscopy records. Using the patient’s case notes and the pharmacy JAC system the triple therapy regimen prescribed was identified. Pharmacist intervention was defined as an incorrect prescription where a pharmacist had provided a written communication and the error had been amended accordingly.

Results
122 patients were identified as having a positive CLO test. Of these patients, 80% were excluded from the study, as it was not possible to identify the triple therapy regimen prescribed.

24 patients were audited (Table 1), 23 of these were prescribed H pylori eradication. 48% were correctly prescribed a triple therapy regimen as per FPH/BNF guidelines. Table 2 shows the reasons for non-compliance to the triple therapy regimens.

15 patients were prescribed regimen A, six were prescribed regimen B, one was prescribed regimen C and one was prescribed quadruple therapy consisting of omeprazole, triptiraxam dicirratothiomuthate, metronidazole and tetracycline. Pharmacist intervention to ensure the correct triple therapy regimen was identifiable in two patients.

Table 1. Patient demographics

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male 67% (n=16): Female 33% (n=8)</td>
</tr>
<tr>
<td>Average age (age range)</td>
<td>57 years (25–91)</td>
</tr>
<tr>
<td>Consultant</td>
<td>Surgical 58% (n=14): Medical gastroenterology 34% (n=8): Medical (other) 8% (n=2)</td>
</tr>
<tr>
<td>Penicillin allergic</td>
<td>Yes 17% (n=4): No 83% (n=20)</td>
</tr>
</tbody>
</table>

Table 2. Patients incorrectly prescribed triple therapy

<table>
<thead>
<tr>
<th>Reasons for non compliance to the regimen</th>
<th>Percentage (number) of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect PPI dose</td>
<td>50% (n=6)</td>
</tr>
<tr>
<td>Prescribed regimen B but not penicillin allergic</td>
<td>25% (n=3)</td>
</tr>
<tr>
<td>Inappropriate amoxicillin dose</td>
<td>17% (n=2)</td>
</tr>
<tr>
<td>Inappropriate metronidazole dose</td>
<td>8% (n=1)</td>
</tr>
<tr>
<td>Course length &gt; 7days</td>
<td>8% (n=1)</td>
</tr>
<tr>
<td>Course length &lt; 7days</td>
<td>8% (n=1)</td>
</tr>
<tr>
<td>Prescribed two PPIs</td>
<td>8% (n=1)</td>
</tr>
</tbody>
</table>
programme for prescribers, promotion of the hospital guidelines, increasing pharmacist intervention and re-audit in one year’s time will help to improve prescribing.

References
2 British National Formulary , BNF 55.

Audit of the impact of a revised insulin prescription chart on insulin prescribing quality

Yerbury P, Chambers KA
King’s College Hospital Foundation Trust, London

Insulin associated errors have resulted in severe patient harm and even fatality.1 Insulin is a high risk drug so particular effort is needed to improve medication safety.1 In September 2006 an audit of the quality of inpatient insulin prescribing against 13 standards was undertaken at King’s College Hospital. The results were extremely poor (adherence ranged from 0%–72%) indicating inadequate conformance to the standards. One of the suggestions to further improve the quality of insulin prescribing and administration was to redevelop the insulin prescription chart.

At King’s College Hospital, regular and supplemental insulin are prescribed on a separate insulin chart. Capillary blood glucose tests (CBGT) are also recorded on this chart. Errors in insulin prescribing and administration have resulted locally from poor adherence to the chart. By modifying the insulin prescription chart to include more detailed explanatory sections e.g. “How to be a safe insulin prescriber”, “Management of Hypoglycaemia and Hyperglycaemia” and by comparing the quality of insulin prescribing against the same 13 standards audited previously, one can assess whether adherence to the revised chart has improved as well as determine if the quality of insulin prescribing has increased and if necessary, recommend if further modifications are needed.

Objectives
● To assess compliance to insulin prescribing standards against the revised insulin chart.
● To compare these results with those previously audited thereby assessing the impact of the new insulin chart.

Method
Three wards (Cardiac and Diabetic Foot) where insulin is commonly prescribed were chosen to be the base wards for the purposes of the audit. Nurses, doctors and pharmacists that cover these wards were briefed on the appearance of the new chart and how it differed from the previous chart. 50 charts were distributed between the selected wards and a referral system, via the ward pharmacists, was used to collate the information about those patients who had been initiated on the new chart. Non-diabetic patients using the chart for monitoring of random CBGT’s only (ie, on oral corticosteroids) were excluded. At the point of discharge the drug chart (for purposes of glucagon prescribing) and the insulin chart were assessed and compared to the 13 standards. Data collection took place over one month.

<table>
<thead>
<tr>
<th>Standard</th>
<th>% Compliance</th>
<th>Aim Improved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Full patient demographics specified</td>
<td>32</td>
<td>37</td>
</tr>
<tr>
<td>2. Desired target capillary blood glucose test (CBGT) stated</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>3. Name and strength of insulin is correctly specified</td>
<td>68</td>
<td>73</td>
</tr>
<tr>
<td>4. Prescribed insulin is specified in the correct column according to its length of action (short, intermediate, long)</td>
<td>72</td>
<td>83</td>
</tr>
<tr>
<td>5. The word “units” or an abbreviation i.e. IU or U has been used</td>
<td>36</td>
<td>0</td>
</tr>
<tr>
<td>6. The device type used for administration has been specified</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>7. Supplementary insulin doses prescribed</td>
<td>8</td>
<td>48</td>
</tr>
<tr>
<td>8. Glucagon prescribed for “rescue” therapy on the PRN section of the main drug chart</td>
<td>14</td>
<td>46</td>
</tr>
<tr>
<td>9. Missed doses of insulin due to prescriptions not being prescribed in a timely manner</td>
<td>46</td>
<td>6</td>
</tr>
<tr>
<td>10. Where CBGT readings have been &gt;10mmol/L on two or more occasions on the previous day, insulin regime is adjusted</td>
<td>28</td>
<td>39</td>
</tr>
<tr>
<td>11. Where CBGT readings have been &lt;3.5mmol/L on two or more occasions on the previous day, insulin regime is adjusted</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>12. Insulin given either by nurse or self-injection despite no prescriber signature, therefore illegal administration</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>13. Adherence to legal documentation by prescriber and giver</td>
<td>56</td>
<td>77</td>
</tr>
</tbody>
</table>

Results
Data was collected for 50 patients (see Table 1). Standards 5 and 11 were the only ones to achieve the standard fully. Standard 11 increased from 0% to 100% but the population of patients was 0 and 2 respectively so this improvement is not as significant as appears. No prescriptions contained the word “units” or an abbreviated form. 11 (21%) patients had a desired CBGT target range stated. 38 (73%) prescriptions correctly specified the name and strength of insulin. 43 (83%) charts had insulin prescribed in the correct length of action column. One chart of the 50 stated the device type used for administration of insulin. Three (6%) patients missed doses of insulin due to prescriptions not being prescribed in a timely manner. Greater than 20% improvement was seen in six of the 13 standards. A worse outcome was solely demonstrated in Standard 12 regarding illegal insulin administration, this issue has been highlighted with clinical governance. Currently work on developing an insulin self administration policy in suitable patients is in progress.

Discussion
The results show that the introduction of the new insulin chart has provided a positive impact on adherence to the majority of standards. 12 of the 13 standards showed some degree of improvement (adherence range 2%–100%). Only 19 (37%) charts had patient demographics specified; this could be because they had to be stated on all pages of the chart not just on the outer cover 12 (39%) insulin regimes were adjusted when CBGT were > 10mmol/L on two or more occasions. This is lower than desired but may be explained by greater CBGT target ranges in the elderly. A focus group consisting of doctors, nurses and pharmacists who had used this new chart was undertaken to determine their opinions, and of how to further improve prescribing standards. Minor adjustments to the chart were proposed and it was felt that with intensive education of all healthcare professionals upon induction to the Trust, adherence to insulin prescribing standards could be further improved.

Poor prescribing of insulin, secondary to insufficient knowledge about diabetes and its management, is problematic and can lead to further patient complications and increased length of stay. Overall the new chart has improved the quality of insulin prescribing. The focus
An analysis of prevented and unprevented dispensing incidents

Patel N*, James KL*, Easmin S†, Brinklow N*, Whittlesea CMC*

*Pharmaceutical Sciences Research Division, King’s College London; †Pharmacy Department, King’s College Hospital NHS Foundation Trust

The medicines use process comprises of three key stages; prescribing, dispensing and administration. All of these stages are prone to errors. Dispensing incidents can be classified into two categories; prevented and unprevented dispensing incidents. Previous research in UK hospitals has reported an unprevented incident rate of 16 per 100,000 items dispensed. Prevented dispensing incidents occur at a rate of 0.94 to 2.1%. A recent review has identified the incidence types and causes of dispensing errors.

**Objectives**

This study was undertaken to determine the incident rates for prevented and unprevented dispensing incidents at a NHS Foundation Trust, and to identify the common drugs and dosage forms involved.

**Method**

The study was conducted at the pharmacy department of a 950-bed NHS Foundation Trust. The pharmacy supplies medicines from a single automated dispensary (ARK ROVA Speedcase). Medicines not dispensed from the automated dispensing system (ADS) are refrigerated items, many topical formulations and liquids. Controlled drugs (CD) are stored in a CD cupboard. An unprevented incident is one detected and reported after the medication left pharmacy, which could or did lead to patient harm. The audit standard is that 100% of dispensing incidents should be identified during the dispensing process. Prevented dispensing incidents were defined as errors identified at the final dispensing check before the medication left pharmacy. The audit standard is that this incident rate should be comparable to other UK hospitals (<2%). Retrospective, quantitative analysis was undertaken of reported unprevented dispensing incidents (December 2007–November 2008). Prospective recording of prevented dispensing incidents was conducted for a three-week period (3–21 November 2008), Monday to Friday only. Incidents were collected during dispensary opening hours (9am–6pm). Prior to data collection staff were informed of the audit and instructed on form completion. Posters were displayed to encourage reporting. Data collection forms were attached to all outpatient prescriptions, and available at terminals for inpatient prescriptions. Dispensing issue data was obtained from the pharmacy computer system (ASCRIBE). Unprevented and prevented dispensing incident rates were calculated using a standard formula. Quantitative data were analysed using SPSS. Chi-squared test was used to compare data and statistical significance was set at p 0.05.

**Results**

Retrospective analysis identified 66 unprevented reported dispensing incidents. The overall unprevented incident rate was 19 incidents per 100,000 items dispensed. The most common unprevented incident was dispensing the wrong drug (n=16,26.2%). A significantly larger number of unprevented dispensing incidents occurred with inpatient prescriptions (n=49,80.3%, P<0.0005). Forty different drugs were involved in unprevented dispensing incidents. The most common were prednisolone (n=8,8.2%), rifampicin (n=3,6.1%), amoxicillin (n=3,6.1%) and dipyriramole (n=3,6.1%). During the study 247 prevented dispensing incidents were reported. The overall prevented incident rate was 1.47%. The most common prevented incident type was wrong directions on the label (n=92,37.2%). Prevented incidents occurred significantly more often with inpatient prescriptions (n=110,44.3%, incident rate 1.47%, P<0.0005), comprised inpatient transcription sheets and inpatient charts. Inpatient transcription sheets (n=94,85.5%) were associated more incidents than inpatient charts (n=16,14.5%). In comparison, discharge prescriptions had the lowest incident rate (n=67, incident rate 1.09%). Of the 135 different drugs associated with prevented dispensing incidents, the most common involved paracetamol (n=8,3.8%), enoxaparin (n=7,3.3%) and prednisolone (n=6,2.5%). However amisulpiride (n=2) had the highest incident rate 6667 per 10,000. Other drugs with high incident rates were zinc sulphate (n=2, incident rate 2500 per 10,000) and norethisterone (n=3,2000 per 10,000). The most common dosage forms involved with prevented dispensing incidents were tablets (n=80,40.4%) and capsules (n=21,10.6%). However the incident rate of nasal (n=1,3.8%) and topical preparations (n=17,3.2%) were found to be highest. More prevented dispensing incidents (n=160,64.8%) occurred with manually dispensed compared to ADS items. For drugs dispensed by the ADS, the most common error was wrong directions on the label (n=49). Wrong directions on the label (n=43) and dispensing the wrong quantity (n=34) were the most common incidents with manually dispensed medicines.

**Discussion**

The unprevented incident rate was higher than previous research. The prevented dispensing incident rate was lower than one study (2.70%) but higher than two other studies (0.94% and 0.4%). However prevented incident data was only collected for three weeks. The most common prevented incident was printing the wrong directions on the label. The most common unprevented incident was dispensing the wrong drug, comparable to previous studies. Prednisolone was the most common drug associated with unprevented dispensing incidents, which is consistent with previous research. Calculation of prevented dispensing incident rates can be used to alert dispensary staff to drugs which although dispensed rarely, are often dispensed incorrectly. This was identified in a previous study where insulin was most commonly involved with incidents but nifedipine which was rarely issued, had the highest incident rate. Further data collection and analysis could be undertaken to alert staff to error prone drugs.

**References**

Compliance with gentamicin guidelines on the paediatric and neonatal wards at Lewisham Hospital

Gaze S
Lewisham Hospital, London

Gentamicin is active against some Gram-positive and many Gram-negative organisms. It has a narrow therapeutic index and can become toxic if it is allowed to accumulate. Therapeutic drug monitoring is recommended to ensure that the drug is eliminated from the body before the next dose if given.

Lewisham Hospital staff use a “Green Sticker” for recording plasma levels of gentamicin on drug charts. Details to be completed include: time level taken, gentamicin level and action to be taken. At Lewisham, there are a number of guidelines currently in use for gentamicin prescriptions in paediatric and neonatal medical and surgical patients. Each guideline provides different dosing instructions and monitoring advice.

Objectives
To determine the proportion of patients

- Receiving the recommended dose of gentamicin (based on the most appropriate guideline)
- Having 1st blood levels of gentamicin measured and recorded at the correct date/time
- Having Green Stickers completed in full

Method
A data collection form was designed and used by the paediatric pharmacist to capture data on all gentamicin prescribing and monitoring activity on the neonatal and paediatric wards at Lewisham Hospital over a four week period. Data collected included: age, weight, dose, gentamicin levels, time when levels were taken and details completed on the Green Sticker.

Results
50 patients were identified as having received gentamicin on the neonatal and paediatric wards during the study period. Table 1 represents the number of patients who received the correct dose of gentamicin and had their levels measured at the correct time: 4/50 (8%) of patients received an inappropriate dose of gentamicin during the study period. These patients were surgical patients who received 7mg/kg daily (as per BNF-C recommendations) instead of 6mg/kg daily (as per local paediatric formulary guideline).

During the study period, if all levels had been taken and documented appropriately, there should have been a total of 90 green stickers attached and completed in full on the patients’ drug charts. 59/90 (65%) green stickers were attached to the patients’ drug charts. There were 31 gentamicin levels measured and available to view on the computer that were not recorded on the drug charts.

Of the 59 stickers that were attached to drug charts, there were 101 errors in terms of missing information – this equates to 1.7 errors per sticker. Table 2 demonstrates how the errors appeared: 8/59 (14%) of green stickers were completed in full.

Discussion
There is confusion over whether 6mg/kg once daily or 7mg/kg once daily is indicated for general medical and surgical paediatric patients. Since 7mg/kg gentamicin is a safe and effective dose in infants and children, it may be worth prescribing this dose for all patients in this age group (unless they have specific conditions such as cystic fibrosis, endocarditis or renal impairment), providing that gentamicin levels are checked before the second dose is due.

Table 1. Number of patients who received correct dose of gentamicin and had levels checked at correct time

<table>
<thead>
<tr>
<th>Ward</th>
<th>Number of patients</th>
<th>Correct dose</th>
<th>1st Level measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonatal Intensive Care Unit</td>
<td>35</td>
<td>35 (100%)</td>
<td>33 (94%)</td>
</tr>
<tr>
<td>Children’s Surgical Ward</td>
<td>10</td>
<td>6 (60%)</td>
<td>8 (80%)</td>
</tr>
<tr>
<td>Children’s Medical Ward</td>
<td>4</td>
<td>4 (100%)</td>
<td>3 (75%)</td>
</tr>
<tr>
<td>Paediatric Intensive Care Unit</td>
<td>1</td>
<td>1 (100%)</td>
<td>1 (100%)</td>
</tr>
</tbody>
</table>

Table 2. Missing details on green sticker

<table>
<thead>
<tr>
<th>Missing details</th>
<th>Number of errors</th>
<th>Percentage of errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of drug</td>
<td>41</td>
<td>41%</td>
</tr>
<tr>
<td>Time level due</td>
<td>22</td>
<td>22%</td>
</tr>
<tr>
<td>Time level taken</td>
<td>18</td>
<td>18%</td>
</tr>
<tr>
<td>Level</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Action</td>
<td>8</td>
<td>8%</td>
</tr>
<tr>
<td>Signed/dated</td>
<td>10</td>
<td>10%</td>
</tr>
</tbody>
</table>

There is also confusion among nursing and medical staff regarding when the first trough level of gentamicin should be checked, because each guideline suggests measuring the level at different times. It may be worth checking gentamicin levels for every patient before the second dose is due, to ensure that the drug is being eliminated appropriately and to ensure consistency. This audit demonstrated that completion of the green stickers is poor. Further education is needed to inform doctors of the importance of completing the green sticker both when the gentamicin level is being taken, and when the level is received from the laboratory. Only when the sticker is fully completed can the result be analysed appropriately and action taken.

Recommendations
- New gentamicin sticker for neonates and paediatrics, providing information on appropriate dosing of gentamicin and when to check 1st gentamicin level
- Master gentamicin guideline, incorporating several different indications for gentamicin, and detailing appropriate dosing and monitoring information for each indication
- 7mg/kg once daily dosing for infants and children (unless contraindicated)
- Checking all gentamicin trough levels before the second dose is due
- Further education for medical and nursing staff on using the Green Sticker appropriately

Limitations
- Data collection form was not piloted
- Only one pharmacist involved in data collection and analysis of results

References:
1 Sleight E. Gentamicin Use in NICU. July 2008. Via Trust intranet.
An audit of warfarin management at Southampton University Hospitals NHS Trust

Jordan MC
Southampton University Hospitals NHS Trust

Warfarin is a vitamin K antagonist with anticoagulant properties. Due to the potential risk of bleeding associated with warfarin therapy, it is vital that patients are well educated about their drug treatment. Southampton University Hospitals NHS Trust (SUHT) has introduced a new Adult Oral Anticoagulation Guideline in response to an NPSA recommendation (1). This audit aims to quantify adherence to these guidelines.

Objectives
The audit involved the design and testing of a data collection tool, which allowed for the collection of information regarding: indication for warfarin, target INR, interacting drugs prescribed, loading regime, INR control and information given to the patient.

The National Patient Safety Agency (NPSA) patient safety alert 18 audit standards were used as a basis for the SUHT audit. The standards used were:

1. Providing information to the patient before anticoagulant therapy is commenced, prior to hospital discharge and when necessary throughout the course of treatment.
2. That safe practice is promoted when prescribers are co-prescribing one or more clinically significant interacting medicines for patients already on oral anticoagulants.
3. Percentage of patients following the loading protocol (Aim 100%).
4. Percentage of patients developing INR >5 (Aim 0%).
5. Percentage of patients developing INR >8 (Aim 0%).
6. Percentage of patients in therapeutic range at discharge (Aim 100%).
7. Percentage of patients with unknown diagnosis, target INR or stop date (Aim 0%).
8. Percentage of patients with inappropriate INR for diagnosis (Aim 0%).

Method
The data collection tool was piloted prior to the collection of data for auditing. Following the pilot, a number of changes were made to improve the clarity of the data collection tool and to improve its ease of use. Using the paper data collection tools, an electronic spreadsheet was designed.

The six preregistration pharmacists at SUHT collected data between 13 October and 7 November. Patients on warfarin were identified by obtaining details of INR tests done in the hospital in addition to asking ward nurses. All relevant information was documented on the data collection sheet from warfarin charts and drug charts.

Results
The results are set out in Table 1.

Discussion
Overall, the SUHT Adult Oral Anticoagulation Guideline is being poorly followed. Some possibly reasons for this and limitations for the audit include:

- Prescribers have been unaware of the new guidelines, and/or the new warfarin chart.
- The audit must be rigid in terms of its standards, but it does not allow for clinical judgement. In some cases healthcare professionals may have consciously deviated from the guidelines for clinically valid reasons but failed to document this.
- Conversely, the list of drugs interacting with warfarin in the SUHT guideline is a greatly condensed list. Therefore, in practice, the filling in of the interacting drugs section of the warfarin chart is complied even less often than the audit suggests.

Table 1. Audit results

<table>
<thead>
<tr>
<th>Standard</th>
<th>Pass</th>
<th>Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing information to the patient before anticoagulant therapy is commenced, prior to hospital discharge and when necessary throughout the course of treatment</td>
<td>—</td>
<td>Two patients out of 45 (4%) had the information checklist on the warfarin chart signed for as given.</td>
</tr>
<tr>
<td>That safe practice is promoted when prescribers are co-prescribing one or more clinically significant interacting medicines for patients already on oral anticoagulants</td>
<td>—</td>
<td>Of the 45 patients in the audit, 16 (36%) were prescribed drugs listed as interacting with warfarin on the SUHT guidelines. Of these 16 patients, only 6 patients (33%) had the interacting drugs section filled in on the warfarin chart.</td>
</tr>
<tr>
<td>Percentage of patients following the loading protocol (Aim 100%)</td>
<td>—</td>
<td>80% (17/21) of patients were loaded according to the loading protocol on day 1, 73% (15/21) on day 2 and 43% (9/21) on day 3.</td>
</tr>
<tr>
<td>Percentage of patients developing INR &gt;5 (Aim 0%)</td>
<td>—</td>
<td>204 INRs were recorded and included in the audit. 2% (3/204) of these recorded INRs were over 5 (between 5 and 8).</td>
</tr>
<tr>
<td>Percentage of patients developing INR &gt;8 (Aim 0%)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Percentage of patients in therapeutic range at discharge (Aim 100%)</td>
<td>—</td>
<td>47% of patients (21/45) had their INR within therapeutic range at the time of discharge</td>
</tr>
<tr>
<td>Percentage of patients with unknown diagnosis, target INR or stop date</td>
<td>—</td>
<td>Fail: 11% (5/45) of patients did not have an indication for warfarin filled in on their warfarin chart.</td>
</tr>
<tr>
<td>Percentage of patients with inappropriate INR for diagnosis</td>
<td>—</td>
<td>Fail: 7% (4/45) of patients did not have a target INR filled in on the warfarin chart.</td>
</tr>
<tr>
<td></td>
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<td>Fail: 36% (16/45) of patients were not on long term warfarin treatment. Of these 16 patients, only 12% (2/16) had the duration of treatment section filled in and the remaining 88% (14/16) did not.</td>
</tr>
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Reference
Oxycodone prescribing in Hull and East Yorkshire Hospitals NHS Trust

Rymer S-J*, Paul K†
*Preregistration Pharmacist, †Principal Pharmacist, Renal Services, Hull and East Yorkshire Hospitals NHS Trust

Hull and East Yorkshire Hospitals (HEY) adult pain management guidelines state that oxycodone should be reserved for patients unable to tolerate morphine.1 HEY chronic pain management guidelines for Chronic Kidney Disease (CKD) patients, suggest oxycodone as the opioid of choice in renal impairment.2 Therefore HEY policy stipulates that Oxycodone should only be initiated for patients with a documented intolerance to morphine or decreased renal function, after consultation by the treatment team. Primary care guidelines in Hull, stipulate that oxycodone only be prescribed in patients who have intolerance to morphine, who have renal impairment or in patients who have experienced inadequate response to morphine.3 Concerns have been raised within the Trust and by both Hull and East Riding PCTs regarding the prescribing of oxycodone – levels of prescribing of this drug have been gradually increasing over the last few years (Figure 1). Suspicions have arisen that inappropriate oxycodone prescribing in primary care results from inappropriate initiation in secondary care and subsequent discharge prescribing.

Objectives
To assess whether or not prescribing of oxycodone within Hull and East Yorkshire Hospitals NHS Trust is compliant with local primary and secondary care guidelines.

Method
All HEY pharmacy issues of oxycodone made between September and November 2008 were analysed in order to determine the areas of highest use within the Trust. The areas identified as having highest use were orthopaedic and neurosurgery wards. As a result, three wards at Hull Royal Infirmary were identified as the most appropriate for audit. Prescribing of oxycodone was audited against local standards (local pain guidelines and the renal analgesia guidelines). All patients who were prescribed oxycodone as an inpatient on these wards during the data collection period (January 2009 to March 2009) were included. A data collection form was completed for each patient in order to determine whether or not the prescribing of oxycodone complied with the standards set. Prescribing was deemed to be compliant if one of the two following conditions were met: (1) established intolerance to morphine; (2) renal impairment.

Results
Ward A (neurosurgery) complied with standard one in 10% of patients prescribed oxycodone, with wards B and C (orthopaedic surgery) complying in 0% of cases. Ward A complied with standard two in 0% of patients prescribed oxycodone while ward B complied in 18% and ward C in 0% of cases respectively.

Overall, standard one was met in only 2.5% of patients prescribed oxycodone, while only 10% of patients prescribed oxycodone met standard two. 16 patients (40%) prescribed oxycodone did not actually receive any doses. Only three patients included in the audit were discharged on oxycodone. All were deemed to be appropriate prescripions.

Discussion
In general the prescribing of oxycodone within the Trust did not comply with local guidelines. The poor compliance with both the adult pain management and pain management in CKD guidelines could suggest a lack of an awareness of them on the part of prescribers. Overall, only five patients (12.5%) prescribed oxycodone met either standard.

In 40% of cases, patients who were prescribed oxycodone did not receive any doses. In these cases, the patients’ pain was controlled with the use of other analgesics such as regular paracetamol, co-codamol and tramadol. It can be inferred therefore, that patients are often prescribed oxycodone p.r.n. (when required) for postoperative pain. This prescribing is in accordance with the licensing of the product but not Trust guidelines.

Concerns have been raised locally within primary care about increased oxycodone prescribing (figure 1). According to primary care guidelines in Hull, oxycodone should only be prescribed in patients who have intolerance to morphine, who have renal impairment or in those patients who have experienced inadequate response to morphine. The audit demonstrates that the majority of Trust prescribing does not accord with primary care guidelines, however since very few patients were discharged on oxycodone (and all those discharged on the drug were prescribed it appropriately) it would appear that inappropriate primary care use is not necessarily as a result of initiation in secondary care.

Conclusion
The prescribing of oxycodone in general on the wards audited did not meet Trust or primary care prescribing guidelines. Discharge prescribing of oxycodone within the Trust was appropriate.

Table 1. Compliance with prescribing standards

<table>
<thead>
<tr>
<th>Ward</th>
<th>Compliance with prescribing standards</th>
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<tbody>
<tr>
<td>Ward A (neurosurgery) n=10</td>
<td>Standard 1: 1 (10%), Standard 2: 0 (0%)</td>
</tr>
<tr>
<td>Ward B (orthopaedic surgery) n=23</td>
<td>Standard 1: 0 (0%), Standard 2: 4 (18%)</td>
</tr>
<tr>
<td>Ward C (orthopaedic surgery) n=7</td>
<td>Standard 1: 0 (0%), Standard 2: 0 (0%)</td>
</tr>
<tr>
<td>Average</td>
<td>Standard 1: 2.5%, Standard 2: 10%</td>
</tr>
</tbody>
</table>

References
1 Hull and East Yorkshire Hospitals NHS Trust; Guidelines for Acute and Perioperative Pain Relief in Adults Patients (2007)
Adherence of Norfolk and Norwich University Hospital to the Trust’s Guidelines on Antibiotic Prophylaxis in Adults undergoing Orthopaedic Surgery

Chui P
Pharmacy, Norfolk and Norwich University Hospital

Clostridium difficile is still an existing problem within hospitals, especially among the elderly. Antibiotic use, specifically broad spectrum antibiotics, is one of the main causes behind this disease. Whether it is the prolonged use of one antibiotic or use of more than one antibiotic in combination or even brief exposure to a single dose for surgical prophylaxis can lead to Clostridium difficile.

In spite of strict infection control measures and careful management of antibiotic use at the Norfolk and Norwich hospital, the infection prevention control annual report of 2006–2007 showed an increase of new Clostridium difficile cases, especially among the Medicines for elderly and orthopaedics. Therefore in January 2008 new guidelines for antibiotic use at the Norfolk and Norwich hospital, the infection prevention control annual report of 2006–2007 showed an increase of new Clostridium difficile cases, especially among the Medicines for elderly and orthopaedics. Therefore in January 2008 new guidelines for antibiotic prophylaxis in orthopaedic surgery were implemented in the trust.

Objective
To identify the level of adherence to the Trust guidelines on management of antibiotic prophylaxis in adults undergoing orthopaedic surgery on elective joints and emergency fracture neck of femur.

Method
A data collection form was designed to include date of data collection, patient details, ward, date and type of surgery, MRSA risk and prophylactic antibiotic details (name, dose, number of doses and time given). Drug charts and anesthetic charts form the main source for data collection.

Data collection was conducted on four orthopaedic wards (Denton, Earsham, Gateley and Kimberley) on weekdays over a two week span, whereby ten patients on each ward was assessed, giving a total sample size of forty. Convenience sampling was adopted due to time limitations.

Inclusion criteria included those undergoing orthopaedic surgery on elective joints and emergency fracture neck of femur. Exclusion criteria were individuals undergoing orthopaedic surgery on open fractures and any outliers who were not orthopaedic patients.

Results
90% of patients were prescribed the correct antibiotic, 67.5% of patients were prescribed the correct dose and number of doses, and 87.5% of patients received their dose at the correct time (pre-op or/and post op). This gives an overall adherence of 81.7% to the Trust guidelines.

Discussion
The overall adherence to the Trust guidelines on this topic has shown to be promising 81.7%. The resulting 18.3% of non-adherence may be due to lack of awareness of the guidelines existence or location, possibly the case for new members of staff joining the trust, or simply misreading the guidelines may be a reason for the errors described in the results section. Non-adherence could also be due to doctors or anesthetists adopting their traditional prescribing they are used to doing, forgetting or avoiding new guidelines implemented.

Adherence to the guidelines could be improved via increasing awareness of the existence and location of the guidelines, possibly through induction sessions, which would prove beneficial for new doctors or anesthetists joining the Trust. The guidelines could be printed out as posters to be displayed around theaters, reminding anesthetists or doctors exactly what should be prescribed as prophylaxis. Reinforced training of nurses on such guidelines could also be an option, whereby they would be able to identify incorrect dosing of antibiotics on the ward and point out abnormalities to relevant staff.

Another audit should be undertaken at a later date to continue monitoring adherence to the Trust guidelines.

References

An audit of hypnotic prescribing in Berkshire Healthcare Foundation Trust

Mitchell K
Royal Berkshire and Prospect Park Hospitals

Insomnia is a common health complaint affecting up to 30% of the population. Chronic insomnia has serious health consequences adversely affecting a person’s quality of life. The main pharmacological treatments include the z-hypnotics (zopiclone, zolpidem and zaleplon). Research has shown there to be no clinically significant difference between these drugs and therefore NICE guidance (TA77) was introduced in 2004 to inform their prescribing. This was incorporated into local Trust guidelines.

Objective
The present audit was undertaken to assess the compliance of prescribers to these guidelines across the Trust.

Method
Any inpatient prescribed a hypnotic drug on their drug chart within the Trust at the time of audit was included. A data collection tool was created and the data was collected over a period of eight weeks. 11 inpatient units were included in the audit.

Results
A total of 58 patients were included in the audit. For standard 1, 6% of patients had been switched from hypnotic one to another, therefore 94% complied with this standard. For standard 2, that the drug with the lowest purchase cost should be prescribed (zopiclone), 83% of patients complied. The final standard, that hypnotics should be prescribed for a maximum of four weeks, was complied with in only 3% of patients.

Discussion
Overall the Trust fared exceptionally well on two of the standards assessed (1 and 2) – not switching between hypnotics and the prescribing of the lowest purchase cost hypnotic (zopiclone). The Trust failed almost universally on prescribing the hypnotic for a minimum of four weeks. There is clearly an important need for effective treatment of insomnia in psychiatric patients but this is an area which remains under researched. Treatment of insomnia should primarily be with cognitive behavioral therapy along with the prudent use of hypnotic agents. The evidence available suggests there is no benefit derived from the chronic use of hypnotics. However, very little of the current literature available specifically examines the treatment of insomnia in patients with severe psychiatric disorders. There is a suggestion that insomnia is not simply a typical symptom of a psychiatric disorder but may actually be a...
An audit of compliance with the procedure for unlicensed medicines at the Royal United Hospital (RUH), Bath

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Pharmacy Department, Royal United Hospital, Bath

Medicines with a marketing authorisation in the United Kingdom (UK) are placed under stringent controls to assess their quality, efficacy and safety. The term “unlicensed medicine” applies to medicines which do not have a UK Marketing Authorisation. It can also be applied to licensed medicines when used outside the terms of their marketing authorisation (referred to as “off label”). The use of unlicensed medicines in hospitals poses potential risks to patients and staff, as liability could pass to the prescriber or the pharmacist in the event of harm. At the RUH, a standard operating procedure (SOP) and a policy for the use of unlicensed medicines exists to reduce this risk.

Objectives
The aim of this audit was to determine the extent to which the policy for the use of unlicensed medicines is adhered to. The objectives were to quantify the proportion of unlicensed medicines that have undergone a risk assessment, to quantify the proportion of unlicensed medicines that have the relevant paperwork and to ascertain whether records documenting the prescriber’s awareness of the unlicensed nature of the medicine have been kept.

Method
The following audit standards were set, with a target of 100% compliance:

1. A risk assessment form must be completed for each unlicensed medicine
2. For all unlicensed medicines classified as “higher risk,” the prescriber should be informed of the unlicensed status of the medicine
3. Approval from the Drug Policy Group (DPG) must be sought prior to commencement of treatment
4. For all unlicensed medicines where a Batch Certificate of Analysis or Certificate of Conformity is produced, a copy should be obtained and filed in the Pharmacy Department
5. For all unlicensed medicines where an English language Patient Information Leaflet is produced, a copy should be obtained and filed in the Pharmacy Department
6. For all unlicensed medicines where a Summary of Product Characteristics is produced, a copy should be obtained and filed in the Pharmacy Department

A sample of 42 “unlicensed” as opposed to “off-label” medicines was selected. Data collection involved checking the locations at which this paperwork is filed and, when necessary, telephoning the relevant manufacturers or suppliers.

Results
The only medicines to have completed a risk assessment and DPG approval were those that had undergone a global assessment at the time of writing the policy. Evidence of the prescriber being informed of the unlicensed nature of the medicine was available for 10/42 (23.8%) of the sample and certificates of analysis were only available for 6/42 (14.3%). In contrast, the results for English language patient information leaflets and summary of product characteristics were more promising, at 81.8% and 72.2% respectively, when calculated as a percentage of those for which this information is actually produced.

Discussion
The only unlicensed medicines to have completed risk assessments were those that had been globally risk assessed when the policy was written. None of the six medicines in the sample that had been introduced since the time of policy writing had undergone this assessment, suggesting a lack of awareness for the need of a formal risk assessment. The audit showed how the majority of certificates of analysis are only issued on request. This highlights the importance of ensuring staff are aware of the need to request a certificate during the ordering process. The documents involved in this audit were located in several areas and it would be advisable to centralise their storage to aid the dispensing process.

Overall, the results suggest an uncertainty for the procedures to follow with regards to unlicensed medicines. Future plans are to draft forms to prompt requests for the necessary information when ordering unlicensed medicines, centralise the location at which documents relating to unlicensed medicines are held and modify SOPs to include details of the information needed and where these should be stored.

References
of nitrites and leucocytes in urine samples, negative results indicate absence of UTI. Urinalysis stickers are used to report the results of tests in the patient's medical notes and to indicate one has been done.

**Aims and objectives**

1. To establish if urine dipstick test are used according to SaTH antibiotic guidelines.
2. To establish that only patients testing positive for nitrites and/or leucocytes are started on UTI treatment.

**Audit standards**

1. 100% of non-catheterised patients with a suspected UTI must have a urine dipstick test before starting treatment.
2. 0% of patients with a negative urine dipstick test for nitrites and/or leucocytes should be started on UTI treatment.

**Methods**

All non-catheterised patients initiated on Trimethoprim or Nitrofurantoin (First-line agents for empirical UTI treatment) during March 2009 were audited. These patients were highlighted using the audit function on the escr ipt pharmacy computer system retrospectively. Each patient’s medical and nursing notes were screened for evidence of a urine dipstick test, results of the test if one was conducted, and the urinalysis sticker. A specifically designed audit tool was employed for the purpose of data collection. Cathereterised patients, and patients taking Trimethoprim or Nitrofurantoin pre-admission or long-term were excluded from the audit.

**Results**

A total of 149 patients were started on Nitrofurantoin or Trimethoprim in March 2009. After applying the exclusion criteria 73 patients were audited. A total of 40 (54%) of patients started on Nitrofurantoin or Trimethoprim had a urine dipstick test performed before starting treatment. 72% of these patients tested positive for leucocytes and/or nitrites indicating a UTI requiring antibiotic treatment. Therefore 28% of patients who had a test were dipstick negative but were still started on antibiotics. Furthermore, only 27% of patients who had a urine dipstick test conducted had a urinalysis sticker with the results of the test documented in their medical notes.

**Discussion and conclusion**

The results of this audit have highlighted many areas which can be improved by better implementation of these guidelines. Problems encountered and observations made at the data collection stage included discrepancies in result recording. All medical and diagnostic tests carried out for any patient are required from a medicolegal perspective to be clearly recorded in the patient’s medical notes; this applies to the urine dipstick test too, regardless of its positive or negative result. In many cases results were recorded in the nursing notes only, making them inaccessible to other healthcare professionals. Insufficient information from the results recorded: In some cases where a urine dipstick test had been requested for a UTI, the results for protein and blood presence in the sample were recorded with no mention of nitrites and leucocytes. Although presence of protein and blood in the urine are valuable for diagnosis of a UTI, nitrite and leucocyte esterase results are more specific and predictive, and therefore more useful. Variability of urinalysis stickers: The availability of urinalysis stickers was also varied. Some wards had no supply of the stickers, with nursing staff who had never seen the stickers before.

Vital improvements needed include staff retraining and education, better availability of resources and the distribution of a simple algorithm/protocol for performing and recording urine dipstick results. One of my recommendations for the improvement of result recording includes the development and use of a urine dipstick algorithm/protocol which will clearly show how to conduct a urine dipstick test and the process for recording the results including what information is needed and where the results should be displayed in the notes. This algorithm/protocol would be displayed in all ward areas where tests would normally be carried out. Such an algorithm/protocol would provide information for all staff, as well as a convenient place to refer back to if unsure.

This audit has highlighted that at present the SaTH NHS trust is below standard for the use of urine dipstick tests before starting Antibiotic treatment of lower UTIs. The many benefits of urine dipsticks in screening for UTI support their inclusion in the SaTH antibiotic guidelines. These proposed improvements should improve the current practice and ensure better adherence to the requirements of the antibiotic guidelines.

**References**

Audit of phenytoin plasma levels in paediatric bone marrow transplant patients

Lambert HA
Department of Pharmacy, St Mary’s Hospital, Imperial College Healthcare NHS Trust, London

Phenytoin is used as prophylaxis to prevent the associated risk of seizures during the use of high dose busulfan conditioning therapy in paediatric bone marrow transplant (BMT) patients. During the course of practise it had been noted by the BMT consultant and lead pharmacist that phenytoin plasma levels occasionally displayed subtherapeutic levels.

The retrospective audit aimed to assess the achievement of therapeutic total plasma phenytoin levels and adherence to the local BMT guidelines on prophylactic phenytoin use in paediatric BMT patients. The BMT group consisted of patients with sickle-cell disease (SCD) and thalassaemia whom had undergone the procedure between January 2006 and July 2008.

Objectives
The objectives were to examine the frequency of phenytoin level monitoring, whether the monitoring followed the protocol, the achievement of therapeutic phenytoin levels and whether seizures occurred during the treatment period.

The retrospective audit aimed to examine the achievement of therapeutic total plasma phenytoin levels and adherence to the local BMT guidelines on prophylactic phenytoin use in paediatric BMT patients. The BMT group consisted of patients with sickle-cell disease (SCD) and thalassaemia whom had undergone the procedure between January 2006 and July 2008.

Results
The audit involved 14 patients. Velcade prescribing did not conform to NICE audit criteria 1, 3 and 4. All the patients had their response to Velcade measured after a maximum of four cycles. Treatment was continued in three patients even though they did not show a positive response after the fourth cycle. Reimbursement form was submitted for seven non-responders and the company reimbursed the cost for these seven non-responders. The audit identified two non-responders who were initially not claimed for within the 60 day period.

Discussion
The difficulty tracking patients and the initially not claiming of refunds for two non-responders highlighted the complexity in tracking and running risk sharing schemes. In particular difficulties experienced by NHS with set time periods, e.g. 60 days, after which money cannot be routinely refunded. (Note funding for the two patients identified has been pursued with the company.) If similar difficulties are being experienced across the country there is the potential that the NHS is not fully benefiting financially from the VRS scheme and there is a reduction in the actual cost effectiveness of the drug. Trusts are recommended to regularly audit the uptake and administration of all risk share schemes.

There is an administrative burden and extra work load implication involved in running these schemes. Velcade prescribing should comply with NICE Technology Appraisal 129. Risk-sharing schemes should be easy to implement and have NHS input during their development. Further work should be done on the analysis of staff time impact and the audit should be launched out to all NHS hospitals taking part in risk sharing schemes.

References
2 TA129 bortezomib for relapsed multiple myeloma issue date: October 2007
3 Williamson S; do risk share schemes cause more problems than they solve, The British Journal of Clinical Pharmacy, 2008, 1, 54.
4 Wind K; Risk Sharing Scheme- Improving patients access to new drugs, Hospital Pharmacist 2008,16:114

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4 Wind K; Risk Sharing Scheme- Improving patients access to new drugs, Hospital Pharmacist 2008,16:114
guidelines did not meet the standards. A review of the timescale between the initiation of phenytoin and that of busulfan would appear to be required because therapeutic phenytoin levels were not achieved during the seizure-risk period and this may be attributable to the pharmacokinetics of phenytoin. Steady state phenytoin levels are reported by the manufacturers to be reached seven to 10 days after initiating phenytoin. As such phenytoin dosing should not ordinarily be alters until steady state levels have been achieved. This means that the phenytoin administered in BMT patients could not in theory have sufficient time to achieve therapeutic levels. The present practice of administering phenytoin two to three days prior to the use of busulfan would appear to be an insufficient period to reach the level which would supply protection from the seizure-risk associated to high-dose busulfan use.

Recommendations are that for thalassaemia patients only phenytoin is initiated at least 10 days prior to the first dose of busulfan therapy. This is in order to allow for the assessment of both the effects and the total plasma levels of phenytoin prior to dose adjustment or exposure to seizure-risk. Subsequent busulfan therapy should be initiated after 10 days of phenytoin therapy have taken place.

For both patient groups it is recommended that phenytoin levels should be checked at the following intervals: on days 7 and 10 of initiating phenytoin therapy; that when levels are therapeutic monitor inpatients every seven days to pre-empt phenytoin level fluctuation; monitored outpatients according to individual circumstance; to re-audit following implementation of the recommendations.

Objectives
The following aims were studied to gain an insight into how to improve medication incident reporting

1. To increase staff understanding of risk management through training
2. To establish staffs perception of the reporting culture that exists
3. To encourage the reporting of incidents
4. Develop processes to improve systems
5. To promote shared learning

Method
A literature search was carried out to establish medication incident reporting schemes and medication incident forms that existed in other Hospitals throughout the UK. Some of these provided a sense of how other organisations address the issue of Medication Incident reporting. The project was split into the following sections;

- Collection of baseline data (January to December 2008)
- Questionnaire distributed to all Pharmacy staff. This was to assess Pharmacy staffs understanding of medication incident reporting, opinions to why pharmacy staff do not report and views to how reporting could be improved.
- Redesign of Pharmacy Medication Incident form. In January 2009, the forms were placed in marked trays in the dispensary and aseptics for the period 15/01/09–27/03/09 inclusive.
- Training regarding Medication Incidents. A presentation which consisted of three one hourly sessions was delivered to the pharmacy staff. This presentation was delivered to 48 members of staff, including 19 pharmacists and four ATOs at the beginning of January 2009. The presentation included;
  - The objectives and aims of the project
  - Background to Medication Incidents including facts and figures
  - The importance of medication incident reporting
  - What form to complete? – Pharmacy Form or Trust Form
  - Conclusion and questions
  - Study period of results
  - Focus Group. A focus group was conducted on 2nd April 2009. This allowed members of the pharmacy staff to voice their opinions regarding the new medication incident reporting form and any changes they felt could be implemented.

Results
The questionnaires which were distributed to the pharmacy staff were to obtain their opinion of medication incident reporting and consisted of open and closed answer questions. The results from the closed answer questions show even though 70% of staff knew how to complete the old medication incident form, only 33% reported the incident. Fourteen percent of staff also felt enough is being done to highlight the importance of medication incident reporting. Incident reporting increased following staff training with a total of 67 Medication Incident forms completed (15/01/09–27/03/09) compared to 16 forms for the period January–December 2008. All incidents were recorded as near misses. The most common incident was due to selecting the incorrect strength. The focus group agreed that it is beneficial sharing medication incidents with other staff members as the incident can be of a learning process for themselves. The focus group was informed that the ACT group discusses incidents at their meetings and if changes are made regarding the dispensary this is highlighted in the dispensary newsletter. This led to the point that a Pharmacy Incident Newsletter may be of benefit to highlight new incidents that are reoccurring and trends in incidents. It was also agreed in the focus group that the person responsible for making a medication incident should complete the

References
1 The electronic medicines compendium, Summaries of product characteristics (SPC) for busulvaex (busulfan), last updated 20/8/2008.
2 The electronic medicines compendium, SPC for Epanutin (phenytoin) 30mg/5ml oral suspension, last updated 1/10/2008.

A study to investigate medication incident reporting within Altnagelvin Hospital Pharmacy

Mc Kenna C, Connolly D
Western Health and Social Care Trust, Altnagelvin Hospital, Northern Ireland

Most medications are used safely but errors may occur at any stage through the medication process. Published research estimates that nine per cent of hospital admissions were preventable and sixty three per cent were possibly preventable. The driving force to improve patient safety started in 2000 with the Chief Medical Officer’s report “An Organisation with a Memory”. This confirmed that, as in most health care scenarios, there had been little systematic learning from adverse events and service failures in the NHS. In response, the Department of Health published “Building a safer NHS for patients”, which followed with the Audit Commission’s report, “A Spoonful of Sugar – medicines management in NHS hospitals” which devised four strategic challenges facing hospital, one of these was managing risk. A number of studies have been undertaken by Hospital Pharmacies throughout the UK in an effort to try to reduce Medication Incidents. Beso et al. conducted an observational study of dispensing error identified at the final checking stage. Results showed dispensing errors occur in about two per cent of all dispensed items. The Western Health and Social Care Trust (WHSC) Medicines Governance Pharmacist noticed that incidents do occasionally happen within the pharmacy department, these incidents are normally detected at the final checking stage, the mistake is corrected and the item then sent to the ward. However these incidents are seldom recorded and there were questions raised as to whether systems could be changed to proactively prevent the same incident from recurring in the future.

Results
The questionnaires which were distributed to the pharmacy staff were to obtain their opinion of medication incident reporting and consisted of open and closed answer questions. The results from the closed answer questions show even though 70% of staff knew how to complete the old medication incident form, only 33% reported the incident. Fourteen percent of staff also felt enough is being done to highlight the importance of medication incident reporting. Incident reporting increased following staff training with a total of 67 Medication Incident forms completed (15/01/09–27/03/09) compared to 16 forms for the period January–December 2008. All incidents were recorded as near misses. The most common incident was due to selecting the incorrect strength. The focus group agreed that it is beneficial sharing medication incidents with other staff members as the incident can be of a learning process for themselves. The focus group was informed that the ACT group discusses incidents at their meetings and if changes are made regarding the dispensary this is highlighted in the dispensary newsletter. This led to the point that a Pharmacy Incident Newsletter may be of benefit to highlight new incidents that are reoccurring and trends in incidents. It was also agreed in the focus group that the person responsible for making a medication incident should complete the
Use of IVIg at North Manchester General Hospital

Vernon EA
Pharmacy Department, Salford Royal NHS Trust

Intravenous immunoglobulin (IVIg) is used in the treatment of numerous conditions to either replace or moderate immune function. The evidence base for such treatments varies, however in the past there has been no limitations on who could receive IVIg. In recent years there has been a global shortage of IVIg due to restrictions on use of donated blood products coupled with steadily increasing demand. To ensure that this does not impact on those in greatest need, the Department of Health (DoH) has published guidelines for prescribers as part of its Demand Management Plan.¹ These guidelines, along with a national database to monitor prescribing, came into force on the 1st September 2008.

From extensive evidence based reviews, indications for which patients may receive IVIg have been divided into colour codes to determine who should have priority:

- Red indications – automatic approval
- Blue indications – trust appointed panel approval required
- Grey indications – trust panel and PCT approval required
- Black indications – automatic rejection

There are also recommendations for duration of therapy, split into short or long term; often the colour codes for the same indication differ depending upon duration of treatment.

At North Manchester General Hospital (NMGH), new policies came into force on 1st September 2008, with prescribers required to submit request forms for any patient needing IVIg, detailing indication for use, intended duration and any prior interventions used. Pharmacy should not supply IVIg without this completed request form. In line with the DoH recommendations, a panel has been appointed, who have implemented new procedures and meet periodically to discuss patients receiving IVIg treatment on a case by case basis.

**Objectives**

NMGH introduced new prescribing and dispensing policies from 1st September 2008 as directed by the Demand Management Plan. My project aims to see whether these policies and the guidelines are being followed, and if we have reduced our usage of IVIg since this date as a result.

**Methods**

Patient costing reports were obtained to identify patients who had received IVIg during the initial six month period, and data held in pharmacy (request forms and IVIg batch information logs) were used to determine which patients were currently registered to receive IVIg, their indication for use, colour code, and how much IVIg had been supplied. Indications and panel decisions were compared against the guidelines to examine our compliance. Volume of IVIg used in the period 01.03.08 – 31.08.08 and that issued between 01.09.08 – 28.02.09 were also examined for broad comparison of use before and after the guidelines were implemented.

**Results**

A total number of 32 patients received IVIg in the period 01.03.08 – 28.02.09. 26 of these received treatment in the six months before the September 2008. 17 requests for IVIg were received after September 2008; 10 “red”, 6 “blue” and one grey. Two patients received IVIg with no request form submitted. Only one patient was rejected by the panel. All but one patient was assigned an appropriate colour category on the request form.

27% fewer patients received IVIg in the six months after September 2008 compared with the previous six months, and there was a 47% reduction in volume (g) of IVIg supplied by pharmacy.

**Discussion**

From the preliminary statistics published April 2009, NMGH was performing very well, particularly in areas such as alternative treatments and panel assessment of colour codes, including red codes. Possible areas for future work are consistency of database entry, as this will be subject to DoH audit, and planning for the relaxation of limitations on use of IVIg as measles post exposure prophylaxis.

**Conclusions**

NMGH is adhering well to the DoH guidelines, probably due to the fact that most prescribing is done by specialist panel members. Overall fewer patients are receiving IVIg since the guidance was issued, and prescribers

**References**

are exploring alternative treatments before turning to IVIg. Although strict rationing is not in place at present, NMGH is well prepared to impose tighter controls on these products should the need arise.

The main recommendations arising from this project are:

1. Ensuring consistent data entry is a priority, as the Department of Health will audit this and withhold funding from poorly performing trusts. Pharmacy procedures also require updating.
2. Examination whether patients are being reviewed at 12 months in line with Good Clinical Practice, and whether the database is updated accordingly; in particular looking at whether evidence of clinical benefit of IVIg in long term blue patients is recorded.
3. Re-audit to include the above and thorough comparisons with national statistics.

References:

Table 1: Summary of baseline data

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of patients</th>
<th>Number of compliance aids</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 2006</td>
<td>108</td>
<td>40</td>
<td>37.0%</td>
</tr>
<tr>
<td>February 2007</td>
<td>117</td>
<td>46</td>
<td>39.3%</td>
</tr>
<tr>
<td>February 2008</td>
<td>125</td>
<td>49</td>
<td>39.2%</td>
</tr>
<tr>
<td>February 2009</td>
<td>142</td>
<td>66</td>
<td>46.5%</td>
</tr>
</tbody>
</table>

- 100% of patients receive an adherence needs assessment by a healthcare professional.
- 100% of patients have their need for adherence support reviewed regularly.
- 100% of compliance aids initiated are as an intervention to overcome a practical problem associated with non adherence where a specific need has been identified.

Method

For inclusion in the audit patients met the following criteria: registered with the Clozapine Clinic; named on the clinic list for 2006, 2007, 2008 or 2009; regularly receiving/received clozapine on an outpatient basis and full dataset available. Patients were only excluded if classed as an inpatient at the point of data collection. Data was collected and recorded by the preregistration pharmacist between 17/02/09 and 20/02/09. All data was derived from patient’s outpatient prescriptions; THCC satellite case notes and the RiO electronic records system.

Results

An initial review of the data from 2006 to 2009 showed an increasing year on year trend in the percentage of Clozapine outpatients using compliance aids. This is represented in Table 1.

After establishing the number of MCAs currently in use, the RiO system was used to satisfy the secondary audit objective. Results showed that 0% of patient notes presented any evidence of compliance or adherence needs assessment and 23% of patient notes documented any history of non-compliance.

Discussion and conclusions

The most significant finding was that the number of compliance aids from the clozapine clinic had increased by 10% in the previous three years with the largest increase in the previous 12 months. A considerable amount of dispensary time and therefore cost is associated with filling MCAs, of which the clozapine clinic as a whole are the biggest users. There was no documented evidence of compliance or adherence needs assessment or review prior to starting or stopping the dispensing of patients’ medicines in MCAs. This meant current policies were not in line with NICE guidance and subsequently none of the audit standards were met. However the study was limited by the level of access to patient notes and the lack of prescriber input which were both beyond the scope of the study. Other considerations include the absence of specific recommendations for mental health patients in current NICE guidance.

The audit prompted the following recommendations; firstly that the hospital policy on compliance aids should be reviewed both in light of NICE guidance and to incorporate specific recommendations for clozapine patients; secondly that the Clozapine Clinic should keep a database of all clients using compliance aids which would facilitate the recording of 6–12 monthly adherence needs assessments for all patients, preferably using a specially designed data collection tool with input from pharmacy. The service should be re-audited at 12–24 months. The bearing of the audit results on dispensary workload also fuels a recommendation to extend the audit to other services which are high users of compliance aids.

References
2 Jones K, Sullivan M, Time Study: Compliance Aids Versus Boxed Dispensing, Mile End Hospital Pharmacy, in-house audit, 2007
An audit of compliance to the 2006 NPSA safety alert for oral methotrexate in dermatology and rheumatology at the Princess of Wales Hospital

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In 2006 the National Patient Safety Agency (NPSA) updated and reissued their safety alert for oral methotrexate following 165 patient safety incidents.1 Of these incidents, 84% (139) occurred in a general or acute hospital setting.2 The revised alert identified two points for immediate action for all NHS organisations. One point highlighted the need for local assessments of compliance to the NPSA guidelines.

Objectives
The aim of this audit was to assess the compliance of the dermatology and rheumatology clinics to the prescribing guidance in the NPSA’s safety alert for oral methotrexate.1 In particular, the objectives were to establish if the clinics were giving patients methotrexate monitoring books, updating the monitoring books accordingly, regularly discussing the dose and frequency of the treatment and writing prescriptions according to the guidance in the NPSA’s safety alert.1

Method
Over a period of four weeks, data was collected for the audit using a form designed by the auditor following a pilot study. Audit forms were distributed in the dispensary and consisted of three sections. The first two sections of the form contained questions to ascertain the patient’s awareness of their treatment. These sections were completed while the pharmacist was counselling the patient. The pharmacist then attached a copy of the prescription to the audit form so that the final section could be completed by the auditor at the end of the day. The final section of the audit form was designed to collect information about the prescription. The data on the audit forms were entered into a Microsoft Excel database and further analysed.

Only outpatients presenting prescriptions for oral methotrexate from the dermatology and rheumatology clinics at the Princess of Wales Hospital during the study period were eligible for inclusion in the audit.

Results
Out of the 63 patients included in the audit, 86% (54) of patients were given a methotrexate monitoring booklet (MMB) from the clinics, but only 50% (22) of the issued books had the correct dose and 59% (26) had the date of the patient’s next blood test. The majority of patients knew their dose (53), the frequency of their dose (56) and the date of their next blood test (55) as shown in Table 1. Of the nine patients not given a booklet, three (33%) of them did not know what dose to take. Most of the prescriptions written by the clinics were legible, had clear directions, stated the dose and did not use “as directed”. However, doctors were poor at stating the drug strength, drug form and day of the weekly dose as detailed in Table 2.

Discussion
This audit has shown that the both the dermatology and rheumatology clinics at the Princess of Wales Hospital are not fully complying with the NPSA’s prescribing guidelines for oral methotrexate. It is evident that vast improvement is needed in updating patients’ monitoring booklets. Staff in both clinics also need to ensure every patient is issued with a booklet. Prescription writing also needs to be improved by each clinic, as deviation from the NPSA’s guidance can potentially lead to dispensing errors and subsequently, patient harm.

In light of the results of this study it is recommended that a checklist outlining the NPSA’s guidance for prescribing oral

methotrexate is designed and made available to both clinics. This checklist should be introduced alongside a teaching session on the NPSA’s prescribing guidelines and delivered to all staff from both clinics. A re-audit is also recommended after six months to determine if the changes implemented have significantly improved the outcome.

References

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An audit of oral/enteral syringe use against National Patient Safety Alert 19

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The measurement of oral liquid medicines in intravenous syringes and subsequent wrong administration via the parenteral route within hospitals in the United Kingdom has led to incidents of reported deaths, harm and near misses.1,2 The National Patient Safety Agency (NPSA) issued a safety alert in March 2007 advising the National Health Service and the independent sector to design, supply and use oral/enteral syringes.1 These syringes have been designed to be incompatible with intravenous equipment and the colours of the oral/enteral syringe plungers or barrels also provide easy identification and a visual reminder that the medicine must be administered via the oral or enteral route. Following the NPSA alert, Northampton General Hospital (NGH) began using the purple oral/enteral syringes in clinical areas and purchased enteral administration and extension sets that were specifically compatible with only enteral syringes.1 The Trust also produced a written protocol for the use of oral/enteral syringes.

Objectives
The aim of this audit was to establish the availability and appropriate use of oral/enteral syringes when supplying, measuring and administering
oral liquid medicines at Northampton General Hospital. Criteria and standards to be audited against:

- 100% of all clinical and dispensary areas that may need to supply, measure and administer oral liquid medicines in a syringe have stocks of oral/enteral syringes.
- 100% of nurses should be preparing and administering oral liquid medicines in accordance with the protocol for the use of oral/enteral syringes in the Trust and the NPSA recommendations.

Method

Twenty-six wards and the pharmacy dispensary were identified as areas which may need to supply, measure and administer oral liquid medicines in a syringe. A pilot study was carried out initially and the amended data collection forms were then used to gather the final data over a two-week period in December 2008. A survey form was used to record the availability of oral/enteral syringes on the identified wards and dispensary. Data illustrating the ordering history of the oral/enteral syringes from each ward were also obtained. To ascertain nursing staff’s adherence to the Trust’s oral/enteral syringe use policy, open and closed-ended questions were asked by the author to a minimum of two nurses from each ward. Responses were recorded on questionnaires and the data collected was subsequently analysed using Microsoft Excel.

Results

Oral/enteral syringes were available on all 26 wards. The pharmacy dispensary only stocked clear oral syringes which were not compatible with intravenous equipment however did not conform to NPSA recommendations of being visually distinguishable or being labelled as oral syringes. 18 wards (69%) had small oral/enteral syringe sizes (2ml to 10ml) stocked on the ward. Of the eight wards which did not have the smaller syringes in stock, six had these written in their stock book and the ordering history data confirmed that oral/enteral syringes had been previously ordered on these wards. 22 wards (85%) had large oral/enteral syringes in stock which were primarily being used for enteral administration of medicines.

Of the 65 nurses who completed the questionnaire, 40 nurses (62%) were aware that a protocol existed for oral/enteral syringes use. Most of the nurses who were not aware of the protocol were informed of purple syringes being used in the Trust for administration of medicines via the enteral route. 45 nurses (69%) were using the appropriate oral syringes to measure oral liquid medicines. Nurses across 12 wards were identified as still using intravenous syringes to measure oral morph solution and administering the medicine to the patient in these syringes. Responses from nurses indicated that insufficient ordering of oral/enteral syringes was leading to unsafe practices. 55 nurses (85%) correctly answered that they would use the oral/enteral syringes to prepare and administer medicines via the enteral route.

Discussion

This audit demonstrated that inadequate ordering and topping up of purple oral/enteral syringes was resulting in non-adherence to Trust policy. The smaller syringe sizes were not widely available in all clinical areas and consequently intravenous syringes were being used to measure and administer oral liquid medicines. Although there is a general awareness of the use of purple oral/enteral syringes by the nursing staff, there is notably less than 100% adherence to NPSA recommendations.

Recommendations and action taken following the audit has led to one of the audits standards being met with all appropriate clinical and dispensary areas currently stocking oral/enteral syringes. Greater awareness of Trust policy regarding oral/enteral syringes has also been incorporated into nursing training sessions and posters have been displayed in prominent locations in all clinical and dispensary areas. Further recommendations include reviewing the standard operating procedures for the “Future process for the medicine round”, emphasising the use of purple syringes for oral liquid medicines, regular monitoring of the availability of oral syringes and re-auditing.

References

1 National Patient Safety Agency. Promoting safer measurement and administration of liquid medicines via oral and other enteral routes. NPSA Alert 19, March 2007

Audit: Amiodarone monitoring for adverse effects

Jheeta S
Leeds Teaching Hospitals NHS Trust

Winner of Pfizer preregistration prize. See pS6.