**NAPP PHARMACEUTICALS PAIN AWARD**

**Why are we waiting? Improving pain management in the emergency department at Southampton General Hospital**

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Pain management is recognised by the College of Emergency Medicine (CEM) as a priority in the treatment of patients. Indeed, the CEM “Guideline for management of pain in adults” states that it is one of the most important components of patient care. Standards for pain management are laid down in the 2008 document, “Clinical standards for emergency departments”. Despite this, pain is often managed suboptimally.

Pain management was highlighted as a key area for improvement in the Healthcare Commission’s “Emergency department survey 2008”, a retrospective survey of the experiences of emergency department (ED) patients that involved 151 acute trusts and almost 50,000 responses. When asked “Do you think that the hospital staff did everything they could to help control your pain?” 59% of patients said “yes, definitely”, 27% replied, “yes, to some extent” but 14% of the patients said “No”. Although progress has been made, the Healthcare Commission highlights that it remains an area with room for improvement.

Within the emergency department at Southampton General Hospital, it was acknowledged that pain was not always being managed within the CEM guideline recommendations. Attempts had been made in the past to improve the situation but standardised guidelines had not been completed. In addition, there were multiple analgesic preparations available in the ED that anecdotally led to practitioners using personal preference when prescribing medicines rather than being guided by evidence or protocol.

The quality of pain management in the ED at Southampton General Hospital was audited and the results were then used to direct the development of new guidelines for the treatment of pain in the ED which was to include a more rational choice of medication.

**OBJECTIVES**

- To ascertain the extent to which practice conforms to guidelines and agreed standards laid down by the CEM with regards to: assessment of pain; analgesia given; timeliness of analgesia; and reassessment of pain
- To establish whether patients are satisfied with their pain management
- To develop new guidelines for pain management within the ED and then reaudit quality of care following their implementation

**METHOD**

A questionnaire was developed to assess how the ED was performing with respect to key areas of interest: pain assessment; scored between 0 and 10 and recorded on arrival in ED; patient-recalled values at arrival and during ED admission and then during interview; analgesia prescribed and given; time to reassessment of pain following medication administration — from notes and patient recall; qualitative patient reports — whether they felt their pain was better since admission and how well they felt it had been managed. This was piloted over one month and then adjusted based on feedback and preliminary evaluation. The questionnaire incorporated details from ED notes and patient interviews. Data for the final questionnaire were collected 9am to 5pm Monday to Friday and from 200 patients between November 2008 and February 2009.

**RESULTS**

Of the 200 patients interviewed (47% male), 193 had a pain score recorded on arrival in the ED. Twenty per cent recalled having mild pain, 24% moderate and 56% severe pain. Of those, 76 patients were interviewed in ED “mins” and 117 in “majs”. The results are summarised in Figure 1 and Table 1.

![Figure 1: Recorded versus patient-recalled pain scores on admission to ED](image)

<table>
<thead>
<tr>
<th>Analgesic administration — patient-recalled data (n=200)</th>
<th>Offered and received</th>
<th>Offered but refused</th>
<th>Not offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild pain</td>
<td>66%</td>
<td>14%</td>
<td>20%</td>
</tr>
<tr>
<td>Moderate pain</td>
<td>76%</td>
<td>65%</td>
<td>45%</td>
</tr>
<tr>
<td>Severe pain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain reassessed according to CEM guidelines (within 60min)</td>
<td>60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain reassessed according to CEM guidelines (within 30min)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient self-rated experience (n=180)</td>
<td>Poor 7%</td>
<td>Acceptable 12%</td>
<td>Good 33%</td>
</tr>
</tbody>
</table>

![Table 1: Brief collated results from patient interviews and questionnaire](image)
CONCLUSION

The full study results demonstrated that analgesia was underused in the ED — particularly for patients in severe pain and when analgesia was given too slowly or not effectively reassessed. This may demonstrate a reticence to prescribe stronger analgesia. Indeed, lack of education and inappropriate attitudes towards addiction and drug-seeking behaviour are cited as possible reasons for similar trends observed previously.

New guidelines have been developed to take account of the needs of patient groups in different areas of the ED. There is a focus on reassessment and adding medicines according to need. Colour coding is used to improve impact and ease of use in the busy environment of the ED. Bolusing IV morphine for severe pain has been introduced, with rescue plans included also. In addition, the medicines available in the ED have been rationalised (combination products removed, NSAIDs reduced to one option) and advice on discharge medication has been provided. A comprehensive staff education programme is in development to accompany the launch of the guidelines. Compliance with the new guidelines was to be audited six months after their introduction, which was expected to occur in July 2010.

REFERENCES


UKCPA EDUCATION AND TRAINING AWARD 2010

Are undergraduate pharmacy students interested in the surgical patient? Evaluation of an undergraduate module in pharmaceutical care of the surgical patient

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Historically surgical care is the poor cousin of the pharmaceutical undergraduate degree course. Due to its nature the core subjects of surgical care are taught among other specialisms such as venous thromboprophylaxis in cardiology, antibiotic prophylaxis in antimicrobial modules, postoperative nausea and vomiting in oncology and postoperative pain control in CNS and other subjects such as nil by mouth, anaesthesia, nutrition and fluid balance are rarely taught formally. In addition the skill of working as a member of the multidisciplinary team, essential to a surgical pharmacist, needs to be instilled at every opportunity. This fragmented approach does not allow the student to appreciate the complexity and the rewarding nature of pharmacists’ contributions to surgical patient care.

Brighton and Sussex University Hospitals NHS Trust (BSUH) has been providing a placement within surgery during the preregistration training year which identified anecdotally a lack in basic knowledge and skills required for the pharmaceutical care of the surgical patient. The same fundamental lack of understanding was noticed among junior staff preparing for the Joint Programmes Board postgraduate qualification using the diploma syllabus. Due to the strong links between the University of Brighton, Brighton and Sussex Medical School (BSMS) and BSUH it was proposed that providing an opportunity for fourth year students to attend a dedicated module containing formal lectures, experiential learning (ward-based clinical teaching) and tutorial work, supervised by an academic tutor and a lead pharmacist in surgery, would increase the awareness of a future role in surgery and prepare preregistration trainee pharmacists for their year in practice.

OBJECTIVES

1. Create a fourth year module in the pharmaceutical care of the surgical patient delivered by multidisciplinary specialists for medical and pharmacy students
2. Identify suitable outcome measures
3. Measure student performance against identified outcome measures
4. Evaluate student satisfaction with the module

METHOD

The academic teacher and the lead pharmacist for surgery assembled a multidisciplinary module team comprising nutritional support team consultant, clinical nurse specialist for acute pain and specialist pharmacists in antimicrobial therapy, surgery and critical appraisal. Several postgraduate surgical syllabi were consulted in the absence of a national framework for surgical care, to identify key topics that should be included in the module. The current undergraduate syllabus was scrutinised to identify which areas had already been addressed to avoid repetition and add depth. Approval was sought from the two academic institutions (University of Brighton and BSMS) for the module.

Medical and pharmacy performance assessment tools were critically appraised by the module leaders to identify the appropriate tools to assess how students apply the pharmaceutical care process to patients. Students’ performances were to be assessed with the chosen tools and outcome recorded on the university database.

At the end of the module students completed the 14 statement online questionnaire used for all final year pharmacy modules to evaluate their satisfaction with the module and assessment tools. The questionnaire had a series of statements with a four-point Likert scale, which was anchored by extreme descriptors (1 = definitely agree and 4 = definitely disagree). In addition students were asked to identify good aspects of the modules and any areas for improvement. The qualitative comments were thematically analysed.

RESULTS

The proposed module syllabus was approved by the two academic institutions. Three outcome measures for the syllabus were agreed by the module leaders. These were:

- Ability to apply principles of surgical pharmaceutical care to patients
- Presentation of a coherent patient care plan at masters level
- Ability to critically appraise clinical data in terms of efficacy and toxicity within the surgical setting

The module leaders decided that assessment tools such as case-based discussions and care plans addressed the needs of the module outcomes best mirroring workplace postgraduate assessment tools. Students were required to undertake one case-based discussion and submit one care plan. This required one four-hour hospital placement per student supervised by a surgical specialist pharmacist. In addition 90% attendance of the students was required to support the aim of multidisciplinary team exposure and ensure a holistic view of pharmaceutical care of surgical patients.

The module ran at capacity but requests exceeded the 16 student limit. The 13 pharmacy and three medical students passed the module satisfactorily, achieving a minimum of an upper second class degree score equivalent. It was noted that all medical students received a first degree score equivalent for their case based discussion.

Fifteen students (94%) completed the evaluation form. Evaluation of the 14 statement questionnaire proved agreement on all statements in support of the module. Three common themes were identified from responses:

- Appreciation of the breadth and depth of the module content
- Value of the module for future practice
- Case-based discussions were considered an appropriate assessment tool and formative assessment requested
DISCUSSION AND CONCLUSION
The module was limited to 16 students due to the hospital placement capacity, which is one of the limitations of the study. The overall pass rate was 100%. The better performance by medical students could be due to their greater familiarity with case-based discussions. Pharmacy students were new to this method of presenting to a team and debating patient cases.

The key results of the qualitative questionnaire were overwhelmingly positive. The main themes were satisfaction with the assessment tools and relevance of case-based discussions, appreciation of the opportunity of a hospital placement and the usefulness of the module for future practice.

In view of the success of this module by student outcome and evaluation it is recommended that the content be rolled out to enable access to all fourth year students considering a career in hospital and increase familiarity with assessment tools. The method used is specific to the two institutions thereby posing limitations to its generalisability. However, it is recommended that other universities should adopt a similar approach to content, teaching and assessment of pharmaceutical care of surgical patients. This service development is also applicable to the ACLIF for those practitioners involved.

REFERENCES

BAYER HAEMOSTASIS, ANTICOAGULATION AND THROMBOSIS AWARD 2010
Pharmacist-led anticoagulation safety improvement at Guy’s and St Thomas’ NHS Foundation Trust

R Chanda, BM Clark
Guy’s and St Thomas’ NHS Foundation Trust

Before national guidance in this area, Guy’s and St Thomas’ NHS Foundation Trust (GSTT) had identified anticoagulants as a cause for concern. Trust incident reports showed patient harm from anticoagulant errors and poor adherence to thromboprophylaxis. When NPSA guidance on the safety of anticoagulant therapy became available, lack of clinical guidelines and standardisation linked to poor quality control and reliability were identified as central issues. Although pharmacists have participated in the outpatient anticoagulation clinics since 1995, pharmacy contribution to inpatient anticoagulation was minimal. In 2007, the GSTT Thrombosis and Thromboprophylaxis Committee was established to strategically manage anticoagulation and thromboprophylaxis across the trust. In 2007, a group of pharmacists designed a project on inpatient anticoagulant safety. A bid to the trust charity for a pharmacist to guide the programme over a two-year period was approved and work started in January 2008.

OBJECTIVES
- To standardise the management of inpatient anticoagulation through developing and implementing a comprehensive set of trust-wide guidelines
- To reduce patient harm linked to over-anticoagulation
- To improve adherence to thromboprophylaxis guidelines to reduce hospital-acquired venous thromboembolism (VTE)
- To review the existing outpatient anticoagulation service and expand the pharmacist’s role and contribution
- To develop systems for linking inpatient and outpatient anticoagulation care

METHODS
1. A set of inpatient anticoagulation guidelines were designed, launched and implemented.
2. Existing guidelines were reviewed and updated to incorporate national guidance.
3. Warfarin administration timing was altered to improve prescribing practice.
4. Ordering and reporting systems for coagulation samples were redesigned and simplified to avoid misinterpretation of results.
5. A multiple intervention approach was used to improve adherence to medical thromboprophylaxis guidelines.
6. In response to the Commissioning for Quality and Innovation (CQUIN) target around VTE prevention, electronic VTE risk assessment tools were developed for all specialisms.
7. A computerised outpatient anticoagulation referral form was designed and implemented to improve follow-up and communication of information at the primary-secondary care interface.
8. The outpatient anticoagulation clinic protocol and patient group direction was reviewed and the clinic format reorganised.

RESULTS
Between 2008 and 2010 the following guidelines were developed, launched and implemented:

All specialisms
- Initiation of warfarin in adult patients
- Monitoring and adjustment of warfarin therapy in adult patients
- Management of over-anticoagulation in adult patients
- Adult guideline for unfractionated heparin infusions

Acute medicine
- Suspected deep-vein thrombosis investigation and management
- VTE prophylaxis in adult medical inpatients
- VTE prophylaxis in adult stroke inpatients

Surgery
- VTE prophylaxis in adult surgical inpatients
- Perioperative bridging of warfarin in adult patients undergoing elective surgery
- Reversal of warfarin for patients undergoing urgent surgical procedures

Orthopaedic surgery
- VTE prophylaxis in adult elective total hip and total knee replacements
- VTE prophylaxis in adult hip fracture surgery, elective peri-acetabular osteotomy and surgical hip dislocation

Other specialisms
- Anticoagulation bridging protocol for patients with antiphospholipid syndrome undergoing invasive procedures
- Peri-procedural anticoagulation management of patients undergoing ablation for atrial fibrillation, atrial flutter or complex atrial arrhythmias

Other achievements to date
- Development of a pocket-sized guide incorporating all above guidance; distributed to all clinical staff at induction
- Warfarin administration time changed from 6pm to 2pm. This ensures that dosing decisions are made by the team directly involved in the patient’s care at a time where advice is available from senior medical staff and ward pharmacists
- A standardised weekend handover, including a section for anticoagulation, was introduced in acute medicine
- A multiple-intervention strategy was developed for medical thromboprophylaxis, involving education, training and regular audit and feedback. Adherence rates have steadily grown with 85% adherence in 2008 and >90% adherence in 2009
- A new simplified system for ordering and reporting laboratory coagulation samples was designed with fewer options available and less potential for error and misinterpretation of results
- Development and implementation of six mandatory electronic VTE risk assessment tools, in the following clinical areas: medicine, Stroke, Surgery, orthopaedics (total knee replacement, total hip replacement
and hip fracture surgery) and obstetrics. Current adherence rate is 25% for the first quarter of 2010.

- Analysis of high INR as a proxy marker of harm linked to over-supply of blood products within and outside normal working hours was over the same time period the number of patients developing an INR > 9 had dropped from seven to one. In addition, the time period between “hospital acquired” INRs > 7 increased from 40 days pre-guideline implementation to 95 days post-guideline introduction.

- Supply of blood products within and outside normal working hours was taken over by pharmacy to ensure greater control over the use of these products. The aim was to promote rational blood product use, reduce cost and facilitate retrospective analysis of usage data.

**DISCUSSION AND CONCLUSIONS**

Pharmacists have played a pivotal role in ensuring the successful implementation of this anticoagulation safety improvement programme, through dissemination of guidelines, regular education and training sessions of medical staff and audit facilitation. Outcome data show a reduction in high inpatient INRs, significant improvement in adherence to medical thromboprophylaxis and reliability of outpatient referral. Future work includes training of junior pharmacist in outpatient anticoagulation clinics, performing root cause analyses for high INRs in the inpatient setting and developing a programme to ensure optimal implementation of VTE risk assessment, in response to the CQUIN target. Information, knowledge and lessons learned from the project have been disseminated at the request of other NHS trusts throughout the UK. The bridging and medical thromboprophylaxis guidelines have been used as examples of best practice in scientific publications. The processes and outcomes of this project have been used as an example of best practice and were submitted as part of the evidence for Care Quality Commission and the NHS Litigation Authority inspections earlier this year for which the trust received NDSL level 3 and an “excellent” CQC rating. The programme has led to a permanent sustainable post for a specialist anticoagulation pharmacist to ensure that all aspects of anticoagulant management are maintained and to guide future work. The methodology used and the lessons learned from this project have resulted in the establishment of a trust medicines safety forum with work streams targeting other high-risk medicines. This project has demonstrated that medicines safety requires effective clinical leadership, a change in culture and a broad approach to process and quality control.

**REFERENCES**


**SANOFI AVVENTIS DIABETES AWARD 2010**

**Use of failure severity and frequency to reduce insulin risk in secondary care**

**CA Walker, CA Oborne, S Burmiston, S Thomas**

Guy’s and St Thomas’ NHS Foundation Trust

High risk medicines (HRM) are more likely to cause significant patient harm, even used as intended. 1 Insulin is defined as a HRM by the National Patient Safety Agency2 and the Institute for Safe Medication Practice in America.3 In America, deficiencies in insulin use and monitoring are the most common causes of inpatient hypoglycaemia, hyperglycaemia4 and preventable harm.4 Interest in insulin safety is increasing in the UK.5,6 Our trust medicines safety forum (MSF) has defined several work groups, based on safety literature and perceived local weaknesses. We report progress with an insulin safety group.

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**OBJECTIVES**

1. To set up an insulin safety group (ISG) with expertise in diabetes and medicines safety
2. To assess medication incident reports involving insulin, for contributing factors
3. To evaluate medication incident reports involving insulin, for failure modes
4. To classify failure modes by potential for harm
5. To prioritise failures using potential for harm and frequency of occurrence
6. To suggest interventions aimed at reducing risks associated with insulin
7. To define objective measures to assess impact of interventions

**METHODS**

A multidisciplinary group was recruited on the basis of expertise and/or influence on safety changes and was approved by the MSF. Insulin incident reports were identified by searching drug name and free-text fields on the trust incident database for “insulin” or “gluc.” or “dextrose”. Reports were filtered to remove duplicates or incidents unrelated to insulin use. The ISG assessed reports for contributing factors and failure modes. Potential harm from failures was then categorised, using the Delphi consensus method,7 as potentially catastrophic, potentially serious, potentially significant or likely non-significant. To prioritise, potential harm from each failure (score 1–4) was multiplied by frequency of reports (score 1–4). Interventions were proposed by the ISG. Intervention impact measures were chosen for relevance, ease of collection and reproducibility. Baseline impact measure data have been collected and will be repeated following the introduction of each intervention.

**RESULTS**

Insulin safety group: The ISG includes a consultant diabetologist, general nurse, diabetes specialist nurse, diabetes specialist pharmacist, medicines safety pharmacist, dietician and catering staff.

Contributing factors: The most common were poor prioritisation when administering drugs, unavailable or expired stock, infusion pump limitations and lack of knowledge.

*Incident failure modes:* We reviewed 129 incidents reported over 18 months. In 20 (16%) reports, insufficient detail was provided to assess failures mode leading to the incident. From 109 reports, 30 failure modes were identified. In some reports, more than one failure was identified (total 194 failures). The most common failures were wrong drug selection and errors in intravenous insulin prescribing or administration.

Potential for harm: When the ISG assessed the potential for harm, 28 of the 194 (14%) failures were rated as potentially catastrophic and 79 (41%) as potentially serious.

**Prioritising failures:** The 10 riskiest failures are shown in Table 1.

**Interventions:** Interventions to address the riskiest failures include: (i) Clarifying doses in the trust IV insulin guideline and reformattting this guideline to improve readability; (ii) moving in-use insulin to bedside drug lockers; developing fridge magnets and locker magnets to remind staff of this change; (iii) collaborating with other organisations to petition manufacturers for packaging or drug names, where identified as error prone; (iv) drafting new guidelines for insulin use in enterally or intravenously fed patients; (v) intravenous insulin syringes to be set up adjacent to feeds, to prompt simultaneous adjustment; (vi) auditing hypoglycaemia guideline adherence and identify areas for improvement; (vii) assessing impact of new electronic
drug storage cabinets on mis-selection of fluids; (vii) developing electronic training and insulin competence pack for nursing staff; (ix) and (x) disallowing abbreviations in hand-written prescriptions and removing from pharmacy, ICU and discharge letter software.

*Measures to assess impact of interventions included:* (i) hypoglycaemia (≤3mmol/L) and (ii) hyperglycaemia (>7mmol/L) as a proportion of all laboratory blood glucose results; (iii) supply of reversal drugs to wards (glucagon injection; glucose 20% infusion; glucose powder); (iv) insulin incident reports per month with potentially serious or catastrophic failures.

**DISCUSSION AND CONCLUSION**

The rating of failures by the product of potential harm and frequency is a novel and efficient approach to prioritising risk management interventions. It may be more realistic than failure mode and effects analysis, as it uses actual, not predicted, failures. It requires many incident reports for robustness. This ISG includes clinical champions and has the support of the MSF, which is chaired by an associated medical director, giving it leverage for change. It is timely that the trust is centralising electronic peripheral glucose data, which will facilitate assessment of interventions and identification of hypo- and hyperglycaemia and thus incident reporting. Blood glucose assays performed using arterial blood gas machines will not be included, but these represent a minority of glucose assays performed. Incident report analysis has limitations in that it relies upon recognition of the incident and then detailed reporting of the incident. However this organisation has a culture of openness and no/fair-blame, which facilitates reporting. It is recognised that incidents are more apparent when related to deviation from a documented guideline and skewed by experience; therefore certain failures may increase in frequency as new guidance is introduced. Inappropriate prescribing has been successfully addressed in this trust using force-functions preventing nurses administering penicillins prescribed by brand name. This method will be adopted to prevent abbreviation of “units” in hand-written insulin prescriptions.

**REFERENCES**


**HAMELONAL PRESENTATION PRIZE**

**Are hospital-managed “red traffic light” drugs recorded in general practitioners’ clinical systems? — a potential risk!**

**AM Mundell**

Department of Pharmacy, North Bristol NHS Trust

North Bristol NHS Trust (NBT) has been involved with patient safety work since 2007. One of the main areas focused on is medicines reconciliation. This has increased further with the joint NICE/NPSA alert. It was highlighted that general practitioners (GPs) were not always aware of medication initiated by the hospital, in particular red traffic light (RTL) drugs. An initial audit was undertaken on renal patients prescribed RTL immunosuppressants or erythropoietin. The results were alarming and showed that only 34% of patients had an RTL drug recorded on their GP medication summary. It was decided to expand this audit to all areas across the trust.

**OBJECTIVE**

To determine whether RTL drugs are recorded by the GPs on a patient’s medication summary.

**METHOD**

A list of all the RTL drugs supplied to individual patients from the pharmacy department at North Bristol NHS Trust was obtained during December 2009. For the purpose of this audit antiretroviral drugs were excluded since HIV positive patients receive all their prescriptions from the hospital. Only high-risk RTL drugs were selected. These were defined as drugs that may interact with a number of medicines or pose a risk to the patient if not prescribed, eg, chemotherapy. A random sample of patients was selected according to the drug prescribed and the GP surgery. Data collection was undertaken between February and March 2010 to allow time for the GPs to have received information from the hospital. The GP surgeries were contacted by telephone by a pharmacist to determine whether the RTL drug was recorded on the patient’s medication summary.

**RESULTS**

From 1 to 31 December 2009, 719 RTL drugs were prescribed within NBT. From these, 210 drugs were selected randomly and the patients’ details and their GP surgery recorded. Seventy different GP surgeries were telephoned (Table 1). The results show that only 52 patients (25%) had their RTL drug listed on their medication summary (ranging from 0% to 100%, median 19%). A further 42 patients (20%) had the RTL drug listed in the notes. However, for 116 patients (55%) the GP had no record that they had been prescribed an RTL drug.

**DISCUSSION**

This study highlights that high-risk RTL drugs are not being recorded on the GP summary. If a patient is admitted into hospital this may result in vital medicines being omitted during the medicines reconciliation process.

It is imperative that both primary and secondary care are fully aware of all medicines that a patient is receiving to ensure that patient safety is not
compromised. The following actions have been undertaken to improve the process:

- The audit has been presented at a primary/secondary care interface meeting.
- A protocol has been written for one of our local primary care trusts. This is for practice-base pharmacists to ensure that when patients have had an outpatient appointment any drugs prescribed are added to their medication list. RTL drugs are highlighted as “hospital only” and cannot be prescribed by the GP.
- Our pharmacy department sends monthly reports of the RTL drugs to one of the primary care lead pharmacists who distributes this to the appropriate practice-based pharmacists for follow-up.
- Within secondary care, discharge letters are faxed within 24 hours to improve communication to GPs.
- The audit will be taken to the next medicines governance meeting and consultants will be reminded to ensure that all outpatient appointments are followed up with letters to the GP in a timely fashion.

A follow-up audit will be undertaken in a year’s time to ensure these standards have been achieved and we intend to extend this to other local PCTs.

REFERENCES

HAMELON POSTER PRIZE

Audit on VTE compliance with CQUIN target on the surgical wards

A Staples, C Walker, N Lovell, N Kumar
Leeds Teaching Hospitals

The new NICE guidance on venous thromboembolism (VTE) prophylaxis and CQUIN target criteria of >90% compliance with completion of a risk assessment and prescribing in accordance has forced the surgical teams to reassess how VTE prophylaxis is performed. The pharmacists and medical staff in the surgical directorate have collaborated as a multidisciplinary team (MDT) to ensure our area meets these targets.

New guidance from the National Institute for Health and Clinical Excellence1 specifies that an assessment of each patient’s risk factors should be performed and the most appropriate form of VTE prophylaxis prescribed. Within the trust we have two criteria to meet in order to register compliance with VTE targets:

- Completion of a VTE risk assessment form based on the NICE risk assessment tool1.
- A signature box on the drug chart confirming risk assessment has been completed and acted upon, allowing the nurse or other practitioners to identify quickly whether VTE assessment has been performed.

The purpose of the audit is to assess compliance with the VTE assessment target on a weekly basis, allowing prompt and timely feedback to areas that are failing to meet the audit standard. The audit also included an assessment of foundation year 1 doctors’ (FY1) ability to apply the VTE risk assessment tool to confirm FY1 understanding of individual patient risk factors for VTE.

OBJECTIVES

- Measure compliance of VTE risk assessment against CQUIN targets (>90% of patients risk assessed and acted upon) over the seven main surgical wards.
- Assess FY1 ability to equally apply the VTE risk assessment tool.

METHOD

Compliance with VTE risk assessment: An audit was undertaken on one day each week for six weeks. The pharmacists covering the seven surgical wards were asked to record, for every patient: (a) whether the VTE assessment form had been completed, and (b) whether the drug chart assessment box had been signed. If either (a) or (b) had not been completed, the pharmacists were asked to record: patient identifiers (full names, unit number), consultant; details of admitting doctor. Compliance was reported as a percentage and fed back weekly to the consultants. The study period was from 26 May to 30 June 2010. Ability of FY1s to apply VTE risk assessment: Four surgical FY1 doctors were asked to risk assess and prescribe appropriate VTE prophylaxis for the same 13 patients (simulation exercise). The same patients had been reviewed by a senior doctor and all VTE risk factors identified and appropriate VTE prophylaxis prescribed. The FY1 risk assessments and prescriptions were collated and compared against the senior doctor review.

RESULTS

The evidence suggests that the CQUIN target is being achieved, with over 90% of assessment forms now being completed but not always documented on the drug chart.

Of the 12 simulated assessments of the same 13 patients undertaken by the four FY1s, 48 (92%) met the full criteria and were correctly prescribed a LMWH/no prophylaxis. However in only 44 (85%) assessments patients were correctly prescribed TED stockings. There was not complete correlation between the assessments of the thirteen patients by the four FY1.

DISCUSSION

The audit demonstrates an MDT approach to doctor education with regular immediate audit feedback proving successful in achieving over 90% compliance for VTE assessment. The number of signature boxes completed did not achieve 90%. The location of the signature box on the drug chart and a lack of understanding on behalf of the junior doctors in completing this section of the chart led to poor results. A new chart and VTE guidance is under development that should address this need. The FY1 ability to apply the risk assessment demonstrates concerns over the usability of the
risk assessment form. Criteria such as “significant comorbidity” and “dehydration” led to subjective interpretation by the four FY1s in the assessment. Clarification of criteria is required to ensure accurate and repeatable assessment of VTE risk. The reproducibility of accurate risk assessment also highlights the need to reassess patients during hospital stay. Limitations in the study are small sample size for the assessment of FY1 ability to risk assess.

**REFERENCE**

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**HAMELN POSTER PRIZE**

Description and quantification of ward-based pharmacy activity

D McRobbie*, S Mercer†

*Associate chief pharmacist and †principal pharmacist, specialist medicine, Guy’s and St Thomas’ NHS Foundation Trust (GSTT), London

Although dispensing activity and drug costs are easily measured, ward-based pharmacy activity is difficult to quantify. At GSTT, pharmacy staff visit wards to facilitate supply and to ensure the safe and effective use of medicines in line with recognised NHS initiatives.1,2

**OBJECTIVES**

To quantify the activity undertaken at ward level by pharmacy staff at GSTT.

**METHOD**

A data collection form was designed and piloted in conjunction with two other teaching hospitals. Pro forms were used for the data collection to ensure consistency, and guidance notes were made available to participants. Data collection was divided into activity that occurred on admission, during the patient stay and on discharge. The time taken on the ward was recorded in minutes. Intervention data were recorded separately. Data were collected for one week (Monday to Sunday) in December 2009. Ward-based activity data were recorded in Excel. Results relate to GSTT data only.

**RESULTS**

- In total 862 hours of ward-based pharmacy activity were recorded
- 36 different ward-based pharmacy activities were described (Table 1)
- 816 medicine reconciliations were undertaken, reflecting 76% of all patients admitted during this period
- 1,236 patients’ own drugs (PODs) were evaluated for suitability of which 999 were used, equating to 63% of all medicines prescribed on admission
- In total, dispensing from the main dispensary was avoided for 4,936 items that were either dispensed on the wards as labelled packs, or were patients’ own drugs or ready at the point of discharge
- 998 clinical screens were undertaken at admission; 2,281 clinical screens of inpatient charts and 552 clinical screens of TTOs were undertaken, resulting in 2,740 contributions to clinical care.

**DISCUSSION**

The intention of this project was to describe and quantify the activity of pharmacy staff on the wards. While others have described parts of the process we are unaware of any work that described all the activities undertaken.3 These activities were peer reviewed by ward pharmacy staff across three teaching trusts and evidence of activity was collected for each of them, providing some assurance that they are widely applicable.

Activity is collected per individual and hence can be used to determine if tasks are being undertaken by the appropriate level of staff. Equally activities can be broken down by service (directorate) and data can be used to determine the appropriate staffing levels for each service.

Others have identified the time taken for ward pharmacy activity.4 The way these data were collected did not allow us to measure the times of individual activities.

We believe this data collection is useful in quantifying the activity undertaken by ward pharmacy staff. We intend to collaborate with others to benchmark activity across trusts.

**ACKNOWLEDGEMENT**

This work demonstrates the commitment to patient care of the ward-based pharmacy staff, without whom the data collection would not have been possible.

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### Table 1. Activities undertaken by ward pharmacy staff

<table>
<thead>
<tr>
<th>Activity</th>
<th>Activity undertaken at admission</th>
<th>Activities during hospital stay</th>
<th>Activities undertaken on discharge</th>
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<tr>
<td>Medicine reconciliation (MR)</td>
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</tr>
<tr>
<td>Number of individual changes to MR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of times an HCP called to confirm MR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical screen undertaken</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical screens requiring change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of changes made from the clinical screen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of times an HCP called to confirm clinical screening</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allergy status clarified/corrected</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of patients’ own drugs (PODs) assessed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of PODs used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP supply from ward (ie, labelling of pack)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checking IP supply from ward</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP supply from dispensary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2: Number of each activity undertaken by ward pharmacy staff on admission (new inpatients — ie, not previously seen by a pharmacist)**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Me</th>
<th>Su</th>
<th>Cd</th>
<th>RU</th>
<th>PD</th>
<th>Cn</th>
<th>CC</th>
<th>PP</th>
<th>Wo</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical screen and medicine reconciliation</td>
<td>244</td>
<td>223</td>
<td>84</td>
<td>80</td>
<td>80</td>
<td>7</td>
<td>30</td>
<td>25</td>
<td>43</td>
<td>816</td>
</tr>
<tr>
<td>MR checked</td>
<td>104</td>
<td>137</td>
<td>30</td>
<td>74</td>
<td>4</td>
<td>8</td>
<td>25</td>
<td>13</td>
<td>391</td>
<td></td>
</tr>
<tr>
<td>MR requiring change</td>
<td>156</td>
<td>66</td>
<td>47</td>
<td>33</td>
<td>15</td>
<td>0</td>
<td>29</td>
<td>4</td>
<td>1</td>
<td>350</td>
</tr>
<tr>
<td>Number of individual changes to MR</td>
<td>441</td>
<td>148</td>
<td>85</td>
<td>100</td>
<td>22</td>
<td>0</td>
<td>54</td>
<td>6</td>
<td>2</td>
<td>858</td>
</tr>
<tr>
<td>Number of times an HCP called to confirm MR</td>
<td>140</td>
<td>63</td>
<td>30</td>
<td>24</td>
<td>2</td>
<td>0</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>280</td>
</tr>
<tr>
<td>Clinical screen undertaken</td>
<td>407</td>
<td>180</td>
<td>77</td>
<td>145</td>
<td>0</td>
<td>28</td>
<td>20</td>
<td>54</td>
<td>988</td>
<td></td>
</tr>
<tr>
<td>Clinical screens requiring change</td>
<td>229</td>
<td>67</td>
<td>55</td>
<td>39</td>
<td>24</td>
<td>0</td>
<td>15</td>
<td>1</td>
<td>8</td>
<td>438</td>
</tr>
<tr>
<td>Number of changes made from the clinical screen</td>
<td>475</td>
<td>96</td>
<td>73</td>
<td>76</td>
<td>17</td>
<td>0</td>
<td>18</td>
<td>4</td>
<td>8</td>
<td>767</td>
</tr>
<tr>
<td>Number of times an HCP called to confirm clinical screen</td>
<td>150</td>
<td>38</td>
<td>18</td>
<td>27</td>
<td>11</td>
<td>0</td>
<td>7</td>
<td>2</td>
<td>8</td>
<td>261</td>
</tr>
<tr>
<td>Allergy status clarified/corrected</td>
<td>69</td>
<td>102</td>
<td>27</td>
<td>26</td>
<td>64</td>
<td>3</td>
<td>8</td>
<td>11</td>
<td>26</td>
<td>337</td>
</tr>
<tr>
<td>Number of patients’ own drugs and supply</td>
<td>257</td>
<td>200</td>
<td>344</td>
<td>182</td>
<td>101</td>
<td>53</td>
<td>39</td>
<td>51</td>
<td>91</td>
<td>2636</td>
</tr>
<tr>
<td>Number of PODs assessed</td>
<td>194</td>
<td>163</td>
<td>275</td>
<td>134</td>
<td>84</td>
<td>65</td>
<td>24</td>
<td>51</td>
<td>9</td>
<td>999</td>
</tr>
<tr>
<td>IP supply from ward (ie, labelling of pack)</td>
<td>221</td>
<td>5</td>
<td>6</td>
<td>131</td>
<td>59</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>477</td>
<td></td>
</tr>
<tr>
<td>Checking IP supply from ward</td>
<td>410</td>
<td>3</td>
<td>21</td>
<td>113</td>
<td>133</td>
<td>19</td>
<td>5</td>
<td>0</td>
<td>704</td>
<td></td>
</tr>
<tr>
<td>IP supply from dispensary</td>
<td>188</td>
<td>194</td>
<td>202</td>
<td>146</td>
<td>64</td>
<td>39</td>
<td>21</td>
<td>5</td>
<td>10</td>
<td>869</td>
</tr>
</tbody>
</table>

*Key: Me = Medicine; Su = Surgery; Cd = Cardiac; Re = Renal/Urinary; Pd = Paediatric; Ch = Cancer; CC = Critical care; PP = Private patient; Wo = Women's
M Bala, R Khatib, A Hall
The Leeds Teaching Hospitals NHS Trust (LTHT), Leeds

Medication errors (ME) account for around 10–20% of all adverse events and the direct cost in NHS hospitals may be £200m–£400m per year. Many ME are made during transition between healthcare settings. Between November 2003 and March 2007, the National Patient Safety Agency reported 7,070 incidents of ME involving admission and discharge. Poor communication at the interface between care settings has been shown to put patients at risk and hinder continuity of care. According to the National Institute for Health and Clinical Excellence, undertaking medicines reconciliation on admission to hospitals and when patients are transferred between different care settings reduces the risk of ME. Currently all patients admitted to our trust have their medicines reconciled on admission. In this study we introduced a new model of working where medicines are also reconciled on discharge — the “Medicines reconciliation on discharge” model. The model should prompt and assist prescribers to improve their communication of each patient’s medication changes on discharge and ensure a safer and seamless transition back to primary care.9

**OBJECTIVE**
To assess the impact of the new “Medicines reconciliation on discharge” model on the communication of medication changes on discharge advice notes (DANs).

**METHOD**
The new “Medicines reconciliation on discharge” model required pharmacists and pharmacy technicians to ensure that all patients admitted to cardiology had a verified drug history documented on a distinct green card should assist this process. Educational sessions, and working closely with other healthcare professionals to raise awareness about the importance of medicines reconciliation, can further assist this cause.

Using a specially designed data collection form, cardiology pharmacists audited DANs for patients discharged from the cardiology unit over a period of four weeks before intervention. The audit measured adherence to the standards set by the LTHT medicines code on accounting for medication changes on discharge. Those were (all should be at 100%): (1) all medicines started in hospitals should be documented on the DAN; (2) all medicines stopped in hospital should be documented on the DAN; (3) all medicines with a dose change should be documented on the DAN; (4) all medication changes should have a reason documented on the DAN.

**RESULTS**
The total number of DANs was 66 before intervention and 66 after. Table 1 shows a comparison between the data collected on the cardiology unit pre- and post-intervention.

**DISCUSSION**
The data show a large increase in the number of DANs documenting medication changes (with or without reasons given) made after the intervention was introduced (77% [51/66] in the reaudit versus 32% [21/66] in the initial audit). The interventions prompted doctors to document more changes on discharge. The identifiable green card attached to the drug chart was available in 86% [57/66] of the cases and facilitated the comparison of medicines on discharge with admission. Prescribers were asked to insert a “tick” on the sticker to remind them to compare medicines on the DAN against the verified drug history. The sticker was completed in 85% of the cases. The green card, sticker, posters and the educational session increased awareness of the importance of medicines reconciliation on discharge and fostered a culture whereby such activity is expected on discharge.

The pharmacy team ensured that all patients had their medicines reconciled on admission and documented on the green card and assessed medicines reconciliation on discharge. Pharmacists and pharmacy technicians have a major role to play in medicines reconciliation, not only on admission as recommended by NICE, but also on discharge. The pharmacy team should ensure that medicines on discharge are also reconciled during the DAN validation stage. The availability of the green card should assist this process. Educational sessions, and working closely with other healthcare professionals to raise awareness about the importance of medicines reconciliation, can further assist this cause.

The results showed poor documentation of reasons for medication changes, although there was a large improvement after the intervention (14% [9/66] versus 42% [28/66]). One possible reason for this is the poor documentation of medication changes and their reasons in the medical notes. Further studies and interventions are needed to improve this.

The “Medicines reconciliation on discharge” model prompts prescribers to reconcile medication on discharge and improves the documentation of medication changes. This in turn can reduce ME and facilitate patients’ continuity of care. Medicines reconciliation should be carried out not only on admission but also on discharge. Future electronic prescribing systems should have a built-in “medicines reconciliation” package to support this element of pharmaceutical care and ensure that reasons for changes are also accounted for.

**REFERENCES**

**Table 1: Comparison of audit and reaudit outcomes**

<table>
<thead>
<tr>
<th>Standards</th>
<th>Audit</th>
<th>Reaudit</th>
<th>P value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number (%) of DANs that met all 4 standards</td>
<td>9 (14%)</td>
<td>28 (42%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Number (%) of DANs that met first 3 standards (but NOT standard 4 — reasons for changes)</td>
<td>12 (18%)</td>
<td>23 (35%)</td>
<td>0.0045</td>
</tr>
<tr>
<td>Number (%) of DANs that met &lt; 3 standards (did not account for all the medication changes)</td>
<td>45 (68%)</td>
<td>15 (23%)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

*P value calculated using a Chi square test
Prescribing standards for outpatient prescriptions: a re-audit

H Hakda, A Tailor
Central Middlesex Hospital, North West London Hospitals NHS Trust, London

Hospital pharmacy outpatient waiting times are known to be considerably long, varying from 30 to 90 minutes.\(^1\) Contributing factors include prescribing errors or omissions and poor legibility of prescriptions, all of which delay the dispensing process. Prescribing standards are set to ensure all prescriptions contain patient details and clinical information to allow the safe, accurate and timely provision of medicines to patients. These standards set are based on legal requirements as set out in the Medicines Ethics and Practice guide (MEP) and prescribing guidelines as per local trust medicines policy.\(^2,3\) Adherence of written prescriptions with prescribing standards was a key issue identified by a previous audit which found many prescriptions lacked essential information and were poorly legible, both major factors which prolong prescription processing times.\(^1\) This re-audit focused on piloting a new prescription form designed to prompt prescribers to provide all relevant information and improve compliance with prescribing standards.

**OBJECTIVES**

- To review new outpatient prescriptions dispensed over two weeks and record the number of prescriptions where information required by prescribing standards was absent, unclear or incorrect. 100% of outpatient prescriptions should be written in accordance with prescribing standards with no exceptions (Standard 1)
- To assess the legibility of new outpatient prescriptions dispensed over two weeks. 100% of outpatient prescriptions should be written legibly with no exceptions (Standard 2)
- To record the number of prescriptions with “prescriber contacted” (PC) or “prescriber not contacted” (PNC) and the time taken to resolve any issues

**METHOD**

200 new outpatient prescription forms were distributed equally to two clinics across two hospital sites and retrospective data was collected on all new prescriptions dispensed over two weeks. Clinic staff and consultants were briefed on changes to the new prescriptions and how to use the new scripts prior to the audit. Pharmacy staff were also briefed on the audit and informed on how to complete the data collection form. The form recorded if necessary information on the new prescriptions (e.g. patient details, prescriber signature, generic drug name etc) was absent, incorrect or unclear. The form also recorded whether prescription issues were resolved by contacting the prescriber (PC) or not (PNC) and the time taken to resolve any issues. Forms were attached to every new prescription received and reviewed daily. Feedback was gathered from prescribers and pharmacy staff after the audit via feedback forms and verbal discussions.

**RESULTS**

111 prescriptions were analysed over the two-week period across both sites. 27 (24%) prescriptions were written in accordance with prescribing standards and therefore Standard 1 was not met. The remaining 84 (76%) scripts failed to comply with prescribing standards as a result of absent, incorrect or unclear information (Figure 1). 109 (98%) prescriptions were regarded as legible and therefore Standard 2 was not met.

5% of scripts required contacting the prescriber to resolve issues leading to an average 10 minute delay in processing the prescription. 15% of scripts were endorsed with PNC requiring less than five minutes to resolve any issues. Feedback regarding the new prescriptions was obtained from 50% (11 out of 22) prescribers, of which 90% agreed the new form was easier to use and prompted inclusion of all relevant information.

**DISCUSSION**

The new prescriptions demonstrated a 50% increase in the level of compliance with prescribing standards compared to the old prescriptions.\(^1\) Failure to meet standards was largely due to the absence of essential information such as clinic details (64%) and patient’s allergy status (63%). Failing to document key information such as allergy status can pose a risk to the patient’s safety and lack of clinic details can delay the dispensing
Epidural analgesia: An audit of practice

D Egan-Fowler, G Cavell
Department of Pharmacy, King’s College Hospital NHS foundation Trust

In March 2007, the National Patient Safety Agency (NPSA) issued the Patient Safety Alert number 21 (PSA 21), “Safer practice with epidural injections and infusions”. The alert recommended actions to make administering epidural infusions and injections safer. In response to this alert, King’s College Hospital updated their policy for non-obstetric epidural analgesia. The range of epidural analgesia being used at the Trust was also reviewed and ready to administer (RtA) fentanyl/bupivacaine bags or plain bupivacaine 0.125% or 0.25% was reduced as indicated by the low percentage of PC prescriptions (5%). This was mirrored by shorter prescription processing times (average of 32 minutes) compared to 45 minutes as found at one hospital site. Overall the results demonstrated the new prescriptions were easier to use, prompted inclusion of more essential information, improved legibility and helped to reduce outpatient waiting times. The following recommendations have been made to improve further compliance with prescribing standards: presenting audit results to pharmacy and outpatient teams, training on use of the new prescriptions, highlighting key information to include on prescriptions by screen savers and posters and finally to re-audit once full implementation of the new prescriptions has occurred.

REFERENCES
3 NWLH NHS Trust Guidelines: Medicines Policy, May 2009

Table 1: Compliance with audit standards for epidural analgesia infusion use

<table>
<thead>
<tr>
<th>Audit standard</th>
<th>Target compliance</th>
<th>Audit 1 (n=28)</th>
<th>Audit 2 (n=28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A dedicated (GEMSTAR) pump is being used</td>
<td>100% (n=28)</td>
<td>12 (43%)</td>
<td>28 (100%)</td>
</tr>
<tr>
<td>An RRA fentanyl 2mcg/ml (0.125%) bupivacaine bag or plain bupivacaine 0.125% (or 0.25%)</td>
<td>100% (n=28)</td>
<td>12 (43%)</td>
<td>28 (100%)</td>
</tr>
<tr>
<td>Either a pre-printed epidural prescription is being used Or the prescription is clear and legible</td>
<td>(100%)</td>
<td>25 (89%)</td>
<td>28 (100%)</td>
</tr>
<tr>
<td>The epidural infusion label states “FOR EPIDURAL USE ONLY” in large font</td>
<td>(100%)</td>
<td>13 (46%)</td>
<td>22 (78%)</td>
</tr>
<tr>
<td>The epidural bag label is yellow</td>
<td>(100%)</td>
<td>12 (43%)</td>
<td>22 (78%)</td>
</tr>
<tr>
<td>A yellow giving set is being used</td>
<td>(100%)</td>
<td>28 (100%)</td>
<td>28 (100%)</td>
</tr>
</tbody>
</table>

Following revision of the trust epidural policy the audit was repeated using the same methodology for data collection between June 2009 and September 2009 (Audit 2). A target of 30 data collection forms was set for each audit.

RESULTS
Audit 1: Thirty data collection forms were completed. Data were duplicated for two patients who transferred between study wards. Twelve (12/28, 43%) of the infusions were ready to administer infusions with an approved label, delivered using the correct epidural infusion device. Handwritten prescriptions and infusion labels were used in 3/28 (11%) and 8/28 (29%) infusions observed respectively.

Audit 2: Twenty-eight data collection forms were completed with no duplicate observations. Twenty-four (24/28, 85%) of the infusions were compliant with Trust policy. All (28/28, 100%) had an approved label and were administered using the correct epidural infusion device. Handwritten prescriptions and infusion labels were not used in Audit 2. Three infusion labels were either not pre-printed or not clearly written (3/28, 11%). (Table 1)

DISCUSSION
The results of Audit 1 confirmed concerns that the trust policy was poorly complied with with regards to selection of the epidural regimen. This resulted in a variety of different epidural regimens not supported by pre-printed prescriptions or RRA infusions and the use of syringe drivers rather than Gemstar epidural pumps for epidural administration. This increased the risk of dose preparation and route of administration errors as a result.

The policy was subsequently amended in discussion with anaesthetists and the Clinical Risk Management Team. The improvements seen in audit 2 following the introduction of the revised epidural policy were due to the conversion back to an epidural regimen universally accepted by anaesthetists at the trust, changes in pharmacy purchasing (to ensure appropriate infusions were available), and revision of pre-printed epidural prescriptions and labels which comply with prescription and labelling safety standards.

As 100% compliance with standards was not achieved in all criteria in Audit 2, further work is needed to promote safe epidural use in the trust. Ongoing audit should be used to measure whether standards are still being met and to identify further improvements in this high risk aspect of medicine use.

REFERENCES
Assessing the quality of pharmaceutical care: a feasibility study

R Onatade, R Shah, F Alidina, A Alimi-Odiora, E Goble, M Mitchell
Pharmacy Department, King’s College Hospital NHS Foundation Trust, London

Ensuring and measuring quality of care is very important in today’s NHS. However, there is no research on measuring the quality of pharmaceutical care that acutely ill patients in hospitals receive. Establishing criteria for assessing quality of care follows well-defined steps: identifying the criteria, testing them for feasibility and validating them.1

In the first stage of this work more than 33 themes and criteria were identified.2 The aim of this study is to test a proposed methodology of feasibility determination.

OBJECTIVES
- To derive standards of care for selected criteria
- To assess the feasibility of assessing the quality of pharmaceutical care in individual patients, using the derived standards

METHOD
This was a retrospective study, conducted on patients identified (via the electronic patient record system) as having been discharged from surgical and medical wards during one week in November 2009.

Four researchers each selected one criterion and developed specific data abstraction forms with standards of care. The criteria were – management of significant drug interactions, prescribing and management of warfarin, prescribing and management of narrow therapeutic index (NTI) drugs (carbamazepine, phenytoin, digoxin and sodium valproate) and drug dosing in renal impairment.

Standards for appropriate care were established for each criterion. Each form underwent several pilots and amendments by the lead investigators (RO and RS) to ensure accurate data collection and to limit subjective error. Eligible patients for each criterion were then identified separately by each researcher.

Methods used for identification were – checking all discharge prescriptions to identify patients prescribed the named drug, checking laboratory results to identify patients with an eGFR < 60ml/min and checking electronic drug charts to identify those prescribed significantly interacting drugs.

From the lists of identified patients, each researcher randomly selected 20 patients for review, using Microsoft Excel random number generator. It was agreed that in the time available, this number of patients was a realistic target.

The reliability of the final data collected was confirmed by RS double-checking a minimum of two patients’ records (10%) per researcher. Documented patient care and written orders were compared to the standards or recommended management. A failure to meet these meant inappropriate management. If only some of the recommended care was provided, this judged as partly appropriate. Conclusions on appropriateness were discussed and agreed by all.

Table 1: Summary of results for individual criteria

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Patients eligible for that criterion</th>
<th>Patients records reviewed</th>
<th>Patients receiving fully appropriate care</th>
<th>Patients judged to have received inappropriate care</th>
<th>Time taken per record review (approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management of NTI drugs available</td>
<td>18</td>
<td>18</td>
<td>78% (14/18)</td>
<td>22% (4/18)</td>
<td>41 minutes (no range)</td>
</tr>
<tr>
<td>Management of warfarin</td>
<td>25</td>
<td>15</td>
<td>13% (2/15)</td>
<td>13% (2/15)</td>
<td>20 minutes – 2 hours</td>
</tr>
<tr>
<td>Management of drug interactions</td>
<td>50</td>
<td>20 (14 with significant interactions)</td>
<td>43% (6/14)</td>
<td>57% (8/14)</td>
<td>10 – 60 minutes</td>
</tr>
<tr>
<td>Drug dosing in renal impairment</td>
<td>85</td>
<td>12</td>
<td>92% (11/12)</td>
<td>8% (1/12)</td>
<td>15 minutes to 2 hours</td>
</tr>
</tbody>
</table>

DISCUSSION
This method was suitable for assessing the appropriateness of pharmaceutical care for each criterion. However, clinical judgement was still required. The disadvantages of using purely explicit criteria or standards in measuring the quality of medical care have long been known, and it is generally accepted that a degree of implicit judgement from a clinician is desirable.3 The time required per patient was not excessive. However a rate-limiting step was the time taken up in obtaining paper medical notes.

This study highlights the issue of lack of documentation by pharmacists and other staff regarding medication issues. This problem was anticipated, therefore the assumption was made that no documentation meant no action. This is in line with medico-legal practice.

Problems with the retrospective method included the inability to ascertain reasons for certain actions or decisions and difficulties in obtaining information (some patient notes were not available, therefore the number of patients reviewed varied). However, prospective data collection would be more resource-intensive. There would also be a risk of biasing the findings if health professionals were aware of the study. Retrospective data collection is therefore deemed to be the most appropriate method for this type of study.

Undertaking this pilot has led to several potential uses being highlighted. It is suitable for assessing the quality of individual services (e.g. anticoagulation, diabetes), by considering groups of patients with the same criteria. It can also be used as a form of individual pharmacist assessment, by reviewing, in detail, the care given to one or two patients. Combining several criteria and applying to individual patients could enable an assessment of the overall quality of pharmaceutical care received. This gives a more holistic view of patient care, compared to assessment by reviewing patient drug charts.

REFERENCES
Pharmacy contribution to the safe and effective use of medicine on wards

D McRobbie*, CWong†
*Associate Chief Pharmacist and †Clinical Governance Pharmacist, Guy’s and St Thomas’ NHS Foundation Trust (GSTFT), London, UK

A recent report from the GMC, the EQUIP Study, showed that nearly 9% of prescriptions in a selection of UK hospitals contained an error when written.

At GSTFT, pharmacy staff visit the wards in order to facilitate the supply of medicines and play a key role in ensuring the safe and effective use of medicines.

Intervention monitoring is defined as the number of times the member of the pharmacy staff interact with other members of the clinical team or the patient to improve the efficacy of medication use or to reduce the risk of medication use.

OBJECTIVES

To measure the activity and cost-effectiveness of clinical pharmacy at ward level in GSTFT. To measure the range of clinical interventions and document the actions that pharmacists have undertaken in ensuring safe and accurate prescribing.

METHODOLOGY

In December 2009 pharmacy staff working on the wards across the Trust collected quantitative data for one week describing interventions undertaken on the ward. Proforms were used for the data collection to ensure consistency and guidance notes were made available to participants. These have been piloted previously. The results were recorded in MS Access.

RESULTS

During the week of data collection 2780 interventions were recorded.

- 85% of the interventions made were accepted, 7% were for information only and 4% were unclassified. 3% of the interventions were rejected by members of the clinical team.
- Pharmacy staff identified safety (41%) and efficacy (43%) as the most important reasons that required them to make the intervention. Concordance (7%), cost effectiveness (4%) and reduced length of stay (3%) made up the remainder.
- Adding drug, changing dose and monitoring for toxicity made up over 56% of interventions.
- 54% of all interventions were made on known high risk drugs, however, other drugs accounted for 1224 interventions.
- Of the 870 medicine reconciliations logged (as part of the NICE/NSPAs guidance) 43% needed clarifications by the pharmacy department resulting in 899 separate changes being made. In addition, 1042 clinical screens were logged with 44% of these needing clarifications by the pharmacy department resulting in 800 separate changes being made.
- The pharmacy department intervened on 450 of the 812 (55%) recorded eDLs resulting in 1371 separate interventions.

<table>
<thead>
<tr>
<th>Percentage of each consequence (from EQUIP)</th>
<th>Numbers applied to GSTFT data set</th>
<th>Cost avoidance (from University of Sheffield)</th>
<th>Potential cost avoidance at GSTFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potentially lethal</td>
<td>2%</td>
<td>£1,085–£2,120</td>
<td>£57,505–£112,360</td>
</tr>
<tr>
<td>Potentially serious</td>
<td>5%</td>
<td>£713–£1,484</td>
<td>£39,255–£200,340</td>
</tr>
<tr>
<td>Potentially significant</td>
<td>53%</td>
<td>£65–£150</td>
<td>£92,755–£213,750</td>
</tr>
<tr>
<td>Minor</td>
<td>40%</td>
<td>£0–£66</td>
<td>£0–£6,462</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>£246,515–£532,912</td>
</tr>
</tbody>
</table>

ECONOMIC ANALYSIS

The time and effort to peer review and gain inter-rated agreement on the classification of interventions was considered prohibitive. The classification of seriousness in the GMC report was used to calculate the number of each class of interventions made at GSTFT. The University of Sheffield assigned a value to interventions made during medicine reconciliation and this data was used to calculate the value of the interventions (Table 1).

Using this economic data, this would suggest that the clinical pharmacy services at GSTFT have the potential to prevent significant costs (between £246,515 and £532,912 per week) that may be incurred if the medication risks remained undetected. Previous data (2009) indicated that 862 hours of pharmacy department time are spent on the wards in any one week. The total cost of the hours spent by pharmacy staff on the ward is approximately £20,000 per week.

DISCUSSION

A significant proportion of the pharmacist’s efforts are direct and indirect interventions throughout the patient’s stay. In a teaching hospital where turnover of junior medical staff poses obvious, unavoidable difficulties, pharmacists provide an invaluable consistency of approach. The contributions made by pharmacists serve a number of functions encompassing medicines management issues, promoting patient safety and attempts to meet directorate/Trust targets.

The actions taken reflect the breadth of activity that is carried out by pharmacy staff in ensuring the safe and effective use of medicines. Despite the fact that guidelines exist for the majority of the high risk drugs, 56% of the interventions were for these classes of drugs, indicating that providing guidance alone is not sufficient to ensure safety and accuracy.

This extrapolating the data collected equates to over 140 000 interventions per year. Along with all the other activities undertaken, one intervention is made for every 20 minutes of time on the ward. Using this economic data, this would suggest that the clinical pharmacy services at GSTFT have the potential to prevent significant costs (between £246,515 and £532,912 per week) that may be incurred if the medication risks remained undetected.

Apart from the direct interventions recorded, the pharmacy department contributes significantly to the safe use of medicines in a number of other ways. Pharmacists are involved in the development, implementation and audit of medicine related guidelines, and have an increasing involvement in the formal education of undergraduate and post graduate medical staff.

Acknowledgments: This work demonstrates the commitment to patient care of the ward based pharmacy staff without whom the data collection would not have been possible.

REFERENCES

4. A systematic review of the effectiveness and cost effectiveness of interventions aimed at preventing medication error (medicines reconciliation) at hospital admission. The University of Sheffield, School of Health and Related Research (SCHR), 2007
A comparison of two methods for recording and analysing clinical pharmacy contributions

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*Pharmacy Department, King’s College Hospital NHS Trust; †Department of Pharmacy, King’s College London

Once a year, pharmacy staff at this teaching hospital trust record all their patient-specific clinical contributions. A clinical contribution is defined as any action that directly results in, or is intended to result in, a change to patient management or therapy. The results of detailed analyses inform business cases, service review and safety initiatives. Some staff also keep copies of their contribution reports in their portfolios. This report describes two different methods of recording and assessing clinical pharmacy contributions and compares and contrasts their features and the type of information produced.

OBJECTIVES

■ To compare and contrast the results of two methods of collecting clinical pharmacy contribution data
■ To describe the pros and cons of the two methods
■ To describe the similarities and differences between, and the potential utility of, the types of information produced by the two methods

METHODS

In 2007 and 2008, the first method (method I) was employed. This entailed pharmacy staff recording all clinical contributions made during a selected week in June of each year. In 2008, daily occupied bed data (OBD) for the week was additionally collected. In July 2009, a different method (method II) was used. For this method, only contributions made for patients newly admitted during an index week in July were recorded. Recording contributions for these patients continued during the next week or until discharge (whichever was the sooner). Date of admission and the number of patients newly admitted daily on each ward were also recorded. To enable future direct comparison with previous years, contributions from wards using the newly-introduced Electronic Prescribing and Medicines Administration (EPMA) system and those from junior pharmacists were documented using method I and therefore excluded from this analysis.

A pharmacist checked all forms for completion and consistency. The data for 2007 and 2008 were combined and analysed together. 2009 data was documented using method I and therefore excluded from this analysis.

RESULTS

Method I: During the 2 weeks, 2767 contributions were recorded. The ratio of Inpatient:TTA = 83:17. King’s has approximately 950 beds, therefore over the 2 weeks, 2.8 contributions (2767/950) were made per bed (average 1.4 contributions/bed/week). 1064 individually identified patients had 2197 contributions (contributions which did not note hospital numbers were excluded) = mean of 2.06 contributions (2197/1064) per patient in whom a contribution was made (mode, median = 1, range = 1 to 23). As not all contributions could be linked to a patient, this figure of 2.06 is a minimum. Overall acceptance rate was 98%. 46% of contributions led to a prescription being cancelled (with or without a new prescription), 23% led to a new prescription being added with no other change.

Method II: 609 contributions were included. All patients’ hospital numbers were recorded. Ratio of inpatient:TTA = 84:16. There were 580 new admissions in the index week, giving 1.05 recorded contributions per newly admitted patient (609/580). 314 of the 580 newly admitted patients had at least one clinical contribution, i.e. 1.94 contributions per patient in whom a contribution was made (range 1 to 10). 58% of all contributions occurred in the first 36 hours of the patient stay, 29% on the 3rd and 4th days and 13% on subsequent days. Overall acceptance rate was 97%. 44% of all contributions led to a prescription being cancelled, 35% led to a new prescription with no other change.

Tables 1 and 2 show comparative results using the different methods.

DISCUSSION

Similar findings from the two methods include the ratio of inpatient to TTA prescriptions, contribution types, and the specialties in which pharmacy staff were most likely to make contributions. The wards excluded from analysis in 2009 are unlikely to have substantially affected the rankings as they were generally either wards with relatively low admission rates or less complex with historically lower contribution rates.

Each method provides useful information. Method I measures total clinical activity. Data collection is straightforward and can be for as little as 1 day. More detailed information on clinical pharmacy contributions to individual patients’ care throughout their stay is available using Method II. It shows where input is greatest during a patient’s stay and demonstrates how important it is to review patients early in their stay. Method II can be used to model the impact that changes in throughput or to bed configuration may have on the service. E.g. shorter lengths of stay will lead to increases in clinical pharmacy input, even if bed numbers remain static. Some data such as numbers of contributions/bed/week, contributions per OBD and contributions per new admission can be used as baseline figures, for benchmarking and demonstrating trends within and between hospital trusts.

Each method has limitations. Raw figures obtained using method I must be normalised with bed numbers or OBDs. With method II, it can be difficult to ensure that all newly admitted patients are identified, therefore under-reporting is more likely. Also, data collection must take place over a period of time, which is more resource-intensive. To obtain a complete picture of the full patient stay, e.g. whether there is a peak in contributions during longer stays or at discharge, discharge dates are needed. These can be collected retrospectively.

Future work includes combining the best features of both methods. One option is to record all clinical contributions over at least two weeks, with dates of admission and discharge. This will be time-consuming, therefore shorter, more frequent monitoring will be piloted. Another planned development is the inclusion of clinical significance ratings.

<table>
<thead>
<tr>
<th>Table 1: Types of contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top contribution types 2007/08 %</td>
</tr>
<tr>
<td>Need for drug</td>
</tr>
<tr>
<td>Med history/TTA/rewrite discrepancy or omission</td>
</tr>
<tr>
<td>Choice of dose</td>
</tr>
<tr>
<td>Choice of drug</td>
</tr>
<tr>
<td>Duration of therapy</td>
</tr>
<tr>
<td>Frequency/Timing</td>
</tr>
<tr>
<td>Administration-route/rate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: Comparison of contribution rates per specialty, using different denominators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of contributions per bed per</td>
</tr>
<tr>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Critical care</td>
</tr>
<tr>
<td>Cardiac</td>
</tr>
<tr>
<td>Liver</td>
</tr>
<tr>
<td>Haematology</td>
</tr>
<tr>
<td>General medicine</td>
</tr>
<tr>
<td>Paediatrics</td>
</tr>
<tr>
<td>Surgery</td>
</tr>
</tbody>
</table>

United Kingdom Clinical Pharmacy Association autumn symposium 2010

Supplement 2 April 2011 Clinical Pharmacist
Interruptions are common during inpatient medication administration

CA Oborne*, E Stewart†, J Ward*

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Medication administration errors (MAEs) occur frequently, ranging from 7% to 45% of doses administered by nurses.1,2 They may cause patient harm and increase the cost of care.1 One factor contributing to MAEs is interruption.1,3 An interruption is “an activity that stops the subject from performing an immediate task”.1 Switching attention from one task to another has a negative impact on memory, as the mind needs to complete the interrupting task and then regain the context of the interrupted task.

Biron reported 6.7 interruptions per hour during medication administration, the majority of which were made by nurses,2 and a recent study found half of administrations were interrupted.3 This Australian study found interruptions were associated with increased risk of procedural error and clinical error and this error risk increased with increasing number of interruptions.3 Incident investigation in the study hospital has also identified that interruptions contribute to MAEs.

OBJECTIVES
1. To quantify interruptions during medication administration
2. To identify who or what interrupts staff administering medication
3. To assess the reasons for interruptions

METHOD
The audit standard was defined as no interruptions during medication administration. An administration session was administration of one or more medications to a single patient. An administration session was defined as starting when the nurse opened the drug chart to see doses due. An interruption was any break in continuity or an interval in preparation, e.g. a phone ringing is a distraction but not an interruption. If the person administering medicines answers the phone, then interruption has occurred. Data were collected by direct unobtrusive observation of nurses administering medication to inpatients, across five medical and surgical wards. The data collector was trained and data were collected using a pre-empted objective tool. The duration of each administration session and each interruption was timed and categorised: continued, interruption of three minutes or less, more than three minutes. The audit was described to nurses as a standard trust audit, to avoid influencing practice. Data were quantitatively analysed using Microsoft Excel.

RESULTS
A total of 49 medication administration sessions were observed, between 9am and 7pm. Mean administration time was 5.3 minutes, range 2–15 minutes. The majority of sessions took place by the bedside drug locker (69%), other sessions included medication preparation on an open bench (21%) or in the drug room (10%). Most (40/49, 82%) administration sessions were interrupted and many were interrupted more than once: mean 1.5 interruptions per session. A total of 75 interruptions were recorded over a total of 4.3 hours of administration sessions, mean 17.4 interruptions per hour.

Patients most commonly interrupted medication administration (Figure 1). Common reasons for interruptions were: verbal interruption by other staff members or patients with clinical query or request for assistance (45%) and equipment (including medicines) missing from the bedside or point of medication preparation (23%). Less common reasons were teaching to a student nurse (3%), fetch a clinical guideline (1%) or organising a translator (1%). However, 16% interruptions were coded as chatting and 10% were non-clinical questions about tea breaks, shifts, bed status, bed moves or about another nurse.

Interruptions made by patients included questions about their medication, their length of stay, their condition, requesting assistance (getting in and out of bed, going to the bathroom, opening drink bottles, washing themselves), general chatting, complaints and comments. Interruptions due to equipment included looking for medication, re-ordering medication, retrieving medication from refrigerator, looking for CD keys, exiting the bay to put item in the bin, looking for giving sets. Clinical interruptions made by other staff included: talking about patients, asking questions about patients’ medication, doctors and physiotherapists requiring assistance, doctors looking for drug charts, enquires regarding treatment plan or wanting to deliver treatment.

For 43% interruptions, it did not delay the nurse who continued with medication administration, but for 46% the nurse was distracted and accepted the interruption but for three minutes or less. For 11% interruptions the nurse was interrupted for more than three minutes.

We did not aim to record MAEs, as the observer did not always see the drug chart, but after multiple interruptions from one patient (refill water jug, a new pillow, bed fixed), the patient noticed that one tablet was missing and the nurse realised she had omitted a ferrous sulphate tablet.

DISCUSSION
We found a similar or higher rate and count of interruptions than in previous reports.1,3 The face-to-face nature of most interruptions also mirrors past work.2,3 The rate of interruption suggests a lack of understanding of the importance of medication administration and the effects of interruption. Other investigators have suggested that staff view medication administration as a mundane function and even take pride in ability to multitask while administering medication.1 Our findings do not refute this suggestion.

Modern acute hospitals are busy environments, with high patient acuity and rapid patient turn-over. However, as interruptions increase MAEs,2 with potential for patient harm,1,3 steps should be taken to reduce interruptions. These data will inform local strategies aimed at reducing interruptions and consequently MAEs. In particular, avoidable interruptions such as chatting or equipment (including medication) non-availability may be easily addressed. Coloured tabards worn while preparing and administering medicines will be tested, as a visible warning not to interrupt. Red rubber gloves during administration are also being considered.

REFERENCES
1 Kliger J. Giving medication administration the respect it is due. Arch Intern Med 2010; 170:690-692.
### Perceptions of third year pharmacy students on the use of assessed case based discussions

**M Shergill, A Conway**

School of Pharmacy and Biomolecular Sciences, University of Brighton

In 2008 a new clinical assessment tool, Case Based Discussions (CBD), was introduced into then third year of the undergraduate Master in Pharmacy (MPharm) degree programmes to assess and teach specific processes of clinical pharmaceutical skills during their week hospital placement. Prior to their introduction in the pharmacy undergraduate field, CBDs are widely used in the medical degree curriculum dental vocational training programme and diploma in general pharmacy practice. After completing a thorough and complete literature search on CBDs, showed a lack of evidence to support their use, effectiveness or reliability as an assessment tool. All literature available only depicts their current application and methodology.

This research aims to investigate the perception of third year pharmacy students on the use of CBDs.

#### OBJECTIVES

1. To identify if third year pharmacy students are prepared to participate in CBDs
2. To ascertain their views on the assessment process of a CBD
3. To determine if they are provided feedback regarding their assessed CBD
4. To identify any necessary changes on the use of CBD within the MPharm.

#### METHOD

An ethnographic and a quantitative method in the form of a Likert style questionnaire were implemented. Ethical approval from Brighton Ethical Committee was given.

The Likert questionnaire was designed into several sections and each section was comprised of attitudinal statements (1= strongly agree, 2= agree, 3 = neutral, 4= disagree 5= strongly disagree). Sections included preparation for the task of completing a CBD, feedback provided post the CBD and opinions of the students on assessed CBD.

Demographic data was also collected from participants in the study and was incorporated into the Likert questionnaire as one of its components. The questionnaire was piloted on third year pharmacy students and amendments made.

The participants that were involved in the study were third year pharmacy students from the University of Brighton, that were required to participate in a case based discussion during their week long mandatory hospital placement (n=65). Questionnaires were distributed to participants post a routine scheduled lecture. Non-attendance was followed by emails to arrange a suitable time for completion of the questionnaire.

All data obtained was entered into Microsoft excel spreadsheet for analysis.

#### RESULTS

Prior to the assessment, 75.4% (49) of students stated they received adequate preparation time however only 40% (26) of students found selecting a patient's case to be relatively easy. During the assessment, 83.1% (54) of students stated that their pharmaceutical problem solving skills were tested, 84.6% (55) stated that they were required to justify treatment recommendations, and 78.5% (51) were satisfied with the overall manner in which their assessment was carried out. Regarding their feedback, 92.3% (60) of students stated feedback was given within an hour of their assessment, 78.5% (51) were given feedback individually where as 53.8% (35) received their feedback in a group session, and 78.5% (51) found the feedback session to be helpful. Overall, 78.5% (51) of students stated they would prefer to do more case based discussions in the future as shown in Table 1.

### DISCUSSION

The results have shown that third year pharmacy students are satisfied with the overall use of assessed CBDs as well as the manner in which they were conducted.

Third year pharmacy students have regarded the preparation they have been receiving as being adequate. This can be attributed to:

- Clear objectives been given
- Adequate time to prepare
- Adequate preparation time for the assessment
- Adequate time to present their CBD
- Access to a variety of resources tools
- Having an actively involved placement tutor
- Validity of the assessment being maintained

Third year pharmacy students were satisfied with the overall process of their CBD assessment. This can be attributed to:

- Adequate preparation time for the assessment
- Sufficient time to present their CBD
- Validity of the assessment being maintained

Third year pharmacy students are provided feedback after their CBD assessed. This can be attributed to:

- Feedback being given within an hour of the assessment
- Time allocated for the feedback session of sufficient length
- Students were provided with the opportunity to address any issues they may have had
- The feedback provided helped the students to identify areas for improvement

**Table 1. Opinions of third year pharmacy students on assessed CBDs (n=65)**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree or Agree</th>
<th>Neither agree nor disagree</th>
<th>Strongly disagree or Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doing a case based discussion helped me make clinical pharmacy decisions</td>
<td>59 (90.8%)</td>
<td>6 (9.2%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Doing a case based discussion helped me use my pharmacy knowledge to manage</td>
<td>60 (92.3%)</td>
<td>4 (6.2%)</td>
<td>1 (1.5%)</td>
</tr>
<tr>
<td>Doing a case based discussion helped me to prioritise and plan my work</td>
<td>54 (83.1%)</td>
<td>9 (13.8%)</td>
<td>2 (3.1%)</td>
</tr>
<tr>
<td>Doing a case based discussion helped me to improve my ability to compile information on a patient</td>
<td>58 (89.2%)</td>
<td>5 (7.7%)</td>
<td>2 (3.1%)</td>
</tr>
<tr>
<td>I would prefer to do more case based discussions in the future</td>
<td>51 (78.5%)</td>
<td>8 (12.3%)</td>
<td>6 (9.2%)</td>
</tr>
</tbody>
</table>

Limitations of the work included:

1. Questions were based on the information provided in the student handbook. It is possible that there were other issues regarding the use of CBDs that were not addressed. Incorporating a focus group could have identified such issues.
2. Students in the study completed CBD between October and February. Data collection occurred in February. Students completing CBD earlier in the academic year could have forgotten important aspects by this point thus omitted from the questionnaire.

Recommendation to the use of CBD in the third year of the MPharm programme would be to incorporate additional CBDs in the fourth year, to standardise the manner in which students select a patient's case as well as the manner in which students selected their patient's case, as well as the process in which feedback was given. Due to these variables the reliability of case based discussions as an assessment tool has been greatly reduced.
AUDIT

Staff attitudes to the provision of smoking cessation advice to patients at an acute NHS trust

K Houghton*, G Nickless†
*Liverpool John Moores University (LJMU); †Wirral University Teaching Hospitals NHS Foundation Trust/LJMU

The Health Development Agency (HDA) recommends that PCTs continue to develop the specialist smoking cessation services to serve their populations, offering both individual and group counselling. It also states that all services maintain and develop the skills of all staff through a programme of training and continued professional development.

In 2004 a postal survey of 544 UK GPs was undertaken to assess their views on referring patients to NHS smoking cessation services. A 63% response rate was achieved with 98% of these GPs stating that they recorded smoking status during consultations with new patients. However, only 49% had received training from local specialist smoking cessation services.†

Whilst this study provides useful information about GPs’ views on their training there is a lack of published research providing information about how other healthcare professionals (e.g. pharmacists and nurses) feel about the training provided.

OBJECTIVES

■ To determine the proportion of medical, nursing and pharmacy staff who have received training on brief intervention counselling – ideally this should be 100%

■ To assess how confident staff feel at offering patients advice on smoking cessation

■ To identify reasons preventing staff offering smoking cessation advice to more patients

■ To identify when staff feel the best time is to offer such advice to patients

METHOD

A questionnaire encompassing both open and closed questions was developed to explore the objectives described above. A Likert scale was used to assess confidence in providing advice on smoking cessation to help quantify responses to this question. The questionnaire was circulated by e-mail to all medical and nursing staff working at the trust; pharmacy staff were provided with paper copies. Paper copies were also handed out to ward staff by a pharmacy undergraduate student conducting the audit in a bid to increase the sample size.

RESULTS

Overall 68 questionnaires were returned completed — 22 by doctors, 28 by pharmacists and 18 by nurses. Approximately one third (n=21) of respondents stated that they had received formal training on smoking cessation; 15 were pharmacists (who received it within the trust) and six were nurses (who undertook the training as a student nurse). None of the doctors had received any such training, prompting one to comment that “all hospital staff involved in the clinical side should be given formal training in smoking cessation periodically”. This correlates with only 23 staff rating their confidence in advising patients on smoking cessation as 4 or 5 (i.e. most confident) on the Likert scale.

Responses given in the additional comments section highlighted that a lack of documentation of smoking status on admission may also prevent staff offering advice to more patients. One response stated that “lack of information as to which patients are smokers as this is not always apparent – I do not want to seem too intense, repeating others”. When asked when they felt it was most appropriate to offer advice on smoking cessation to patients, there was no consensus among staff. Although 44% felt that it should be on admission, an additional six different answers were given.

DISCUSSION

An audit conducted at the trust when this questionnaire was circulated highlighted that smoking status is recorded for only two thirds of patients on admission and that no action is taken for approximately half of those identified as current smokers. Although the main limitation of this audit is the relatively small sample size, the information obtained regarding lack of staff training and no consensus on when the best time is to discuss smoking cessation with a patient highlights how the trust can improve the service it provides to patients who smoke. Training currently offered by the trust on smoking cessation is limited to a generic health promotion session, some aspects of which (e.g. sexual health) may not be relevant to all staff groups, thus influencing uptake. A specific smoking cessation training package is currently being developed by pharmacy and nursing staff – the uptake of the package by staff can be measured and staff that have not undertaken the training can be identified. Clearer guidance on when to advise patients and standardising documentation are other areas which could help to ensure that more patients advised on smoking cessation.

REFERENCES


Smoking cessation advice for patients admitted to an acute NHS trust

K Houghton*, G Nickless†
*Liverpool John Moores University (LJMU); †Wirral University Teaching Hospitals NHS Foundation Trust/LJMU

Smoking related illnesses cause approximately 120,000 deaths in the UK each year.1 Although adult smoking rates are declining, in 2007, 24% of adults smoked, with a higher incidence seen in lower socioeconomic groups. The White Paper, “Smoking Kills”, noted the treatment of smoking related diseases costs the NHS approximately £1.7bn per year.2 When smoking cessation services were incorporated into the NHS in 2001, 66% of smokers expressed a desire to quit smoking.† National Institute for Health and
Clinical Excellence (NICE) 2008 guidelines state that all patients who smoke should be advised to quit, and if appropriate be referred to local NHS smoking cessation services. Hospitals in the North West of England are participating in the Advancing Quality (AQ) programme, which aims to improve patient care for community-acquired pneumonia, heart failure and myocardial infarction. Offering smoking cessation advice is one of the performance indicators.

**OBJECTIVES**
- Identify the percentage of patients who have their smoking status documented on admission to hospital
- Identify the percentage of current smokers who are offered smoking cessation assistance
- Identify the percentage of patients who decline assistance for giving up smoking

**METHOD**
During a three-week period, all adult wards at Arrowe Park Hospital (except critical care and maternity) were visited daily (Monday–Friday) by an undergraduate pharmacy student to review new admissions, which were identified using the Trust’s electronic prescribing system (PCIS). Each patient’s case notes was inspected once only to see if their smoking status had been recorded. The advice/assistance offered to current smokers or ex-smokers of less than one year was determined by reviewing actions documented in the case notes and daily lists generated by PCIS for smoking cessation referrals made and NRT prescriptions.

**RESULTS**
During the study period (in January/February 2010), 455 patients were recruited, 167 (37%) of whom did not have their smoking status documented. The findings for the remaining patients were: current smoker = 91 (20%), ex-smoker < 1 year = 5 (1%), ex-smoker > 1 year = 73 (16%), never smoked = 10 (2%), non-smoker = 109 (24%).

A summary of the assistance offered to patients identified as current smokers is set out in Table 1. Of the 19 referrals made to smoking cessation services 11 were by nursing staff (all on surgical wards), 1 by a doctor and 7 by pharmacists (all on medical wards). For 32 patients who were prescribed NRT or had a referral made to smoking cessation services there was no apparent action (91 (20%)), advice offered, but patient declined 15% and no apparent action 44%.

**DISCUSSION**
Approximately one third of patients did not have their smoking status documented within the first few days of admission, however, due to time restraints it was not possible to follow up these patients to see if it was recorded at a later date. Whilst this may have been subsequently completed before discharge, it may not if ward staff assume that it has been done on admission. A greater proportion of patients on surgical wards did not have smoking status documented on admission compared to those on medical wards. It may be more difficult to determine a patient’s smoking history during an emergency admission than an elective admission. The surgical wards also use a standard clerking in sheet which includes a section for smoking status and whether a patient wished to be referred to smoking cessation services — a similar document is currently being developed for use in medicine.

Almost half of the patients identified as current smokers appear to not have been offered advice on smoking cessation. Since discrepancies exist between actions taken (e.g. NRT prescribed) and case note documentation, more patients may have been offered advice but refused. Failure to document actions could also result in duplication of work and patients feeling harassed if they are repeatedly questioned about their smoking status.

Ward pharmacists are ideally placed to offer advice and assistance on smoking cessation and pharmacist prescribers could help to ensure that patients have easier access to NRT on admission. Combining behavioural support and pharmacological therapy yields the highest quit rates, however the majority of patients in this study only had one of these implemented. Some of the NRT prescriptions were possibly for managing withdrawal symptoms in patients who did not wish to quit but couldn’t smoke whilst in hospital.

**REFERENCES**

**Reducing clinical risk: an audit of allergy status completion within a district general hospital, NHS Lanarkshire**

**D Ferrie**, S Stevens†, S McCormick†
†Department of Pharmacy, 1Department of Clinical Risk Management, Monklands Hospital, Airdrie

Allergy status documentation is vital. If not documented it can lead to patient harm or even death. Up to 15% of patients have a hospital stay prolonged as a result of allergic drug reactions. Local NHS Lanarkshire (NHSL) clinical incident data shows a number of clinically significant incidents where incomplete documentation of allergy status has led to re-admission or prolonged treatment periods, some requiring administration of adrenaline or transfer to onsite high dependency care facilities. In addition to immediate impacts, there are also serious potential litigation implications for prescribers and other healthcare professionals. During 2009 the NHS Litigation Authority paid out £769m in claims related to clinical negligence. Drug allergy incidents contributed to these claims. Given the current financial climate, minimisation of such costs by improving the quality and safety of patient care provided is particularly pertinent. Due to increasing concern that non-completion of allergy status on patient prescription documents had become standard practice in NHSL, an audit was conducted at Monklands Hospital.

**OBJECTIVE**
To determine compliance of allergy status documentation on inpatient cardexes, discharge prescriptions and outpatient prescriptions i.e. key prescribing points during a patient’s healthcare journey through Monklands Hospital.

**STANDARD**
100% of patient prescriptions should have their allergy status documented in accordance with Department of Health recommendations and Scottish Intercollegiate Guidelines Network (SIGN) guidance.

**METHODS**
Retrospective analyses of discharge and outpatient prescription allergy completion rates for December 2009 were collated using a specifically designed data collection proforma. Two medical and two surgical wards provided a snapshot of inpatient allergy status completion.
An audit of ultra-broad-spectrum agent prescribing

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Recent data from critical care units in North America has highlighted the importance of early appropriate antibiotic therapy for patients in septic shock to reduce mortality and authors have called for timely administration of ultra-broad-spectrum (UBS) agents such as piperacillin/tazobactam or meropenem.¹

Recent trends in antibiotic use at Southampton University Hospitals Trust (SUHIT) suggest that prescribing of UBS antibiotics and antifungals is increasing not only on critical care but also on medical, surgical and oncology wards. It is likely that the majority of the patients prescribed UBS agents are not in shock so there is potentially inappropriate use of UBS drugs. As these drugs are used as our last line of defence against organisms that are resistant to more narrow-spectrum agents, their usage must be monitored to ensure appropriate prescribing.

OBJECTIVES
To follow up all patients prescribed ultra-broad-spectrum (UBS) agents on medical, surgical and oncology wards to evaluate appropriateness of UBS use.

The results of the audit will be measured against the standard that 100% of patients prescribed ultra-broad-spectrum (UBS) agents will have a documented justification in their medical notes, either:

- Recommendation by named microbiologist
- Evidence of a current or recent multi-resistant pathogen isolated from a clinical specimen
- Septic shock (documented failure to respond to fluid resuscitation)

METHOD
Patients were selected following a search on the pharmacy dispensing system (JAC). A list of patients prescribed the chosen UBS antibiotics and antifungals for the audit was obtained. The chosen agents being audited were: imipenem, piperacillin and tazobactam, tigecycline, caspofungin, voriconazole, amphotericin (i/v), etrapenem, meropenem, cefotaxime, ceftriaxone, cefazidime, cefixime.

The lists obtained were then divided up among the 10 FY1 and FY2 doctors who had volunteered to take part in the audit. Each doctor assessed the patient’s notes and filled in the designated data collection form.

The data collected consisted of the patient’s age, consultant, documented drug allergies, gender, the UBS drug(s) prescribed, the grade of prescribing doctor and the reason for the UBS agent being prescribed. Ten reasons were listed that were felt to be the most common justifications for prescribing, these consisted of:

- Microbiological culture and sensitivity (MC&GS) results (recent or historic) where no narrow-spectrum alternatives were appropriate.
- The neutropaenic sepsis protocol for the trust, which recommends using Tazocin (tazobactam/piperacillin) first-line.
- Septic shock guideline for the trust — again Tazocin is used.
- Another Trust guideline where the use of a UBS agent is recommended (e.g. for a complex abdominal infection).
- Expert advice from a microbiologist/infectious diseases physician.
- Failure of a narrow spectrum agent. (Failure was defined as 48 hours of treatment with a worsening clinical response).

REFERENCES
The choice of PPI is in accordance with the proposed guideline 
Recent broad spectrum antibiotic exposure. 
The PPI has been prescribed at the dose recommended in the proposed 
Recent or frequent contact with healthcare environment. 
The PPI prescription is necessary 

Data was also collected on whether the use of the UBS agent was justified in the patient's medical notes.

RESULTS
In total 40 patients were audited over a period of three months. The specialties covered were medicine and elderly care, surgery, cardiology and cancer care. Intensive care, high dependency units and paediatrics were not included. 

The results are shown in Table 1. The most common justification given for prescribing ultrabroad spectrum agents was the expert advice of a consultant microbiologist and secondly MGSS results which showed resistance to narrower spectrum alternatives.

In 50% of cases a justification was documented in the notes however in most cases a valid reason could be found even if it was not documented specifically. For only 4 (10%) out of the 4 patients audited could no justifiable reason for the prescribing of a UBS agent be found.

DISCUSSION
Ultra-broad spectrum prescribing at SUHT is largely carried out on the advice of a microbiologist or following MGSS results, this is in line with the audit standards. Only 10% of patients audited had no justifiable reason for receiving an ultra-broad spectrum agent, therefore prescribing of these drugs by ward doctors is largely appropriate.
We are now conducting monthly audits of antimicrobial agent prescribing on wards. The visiting ward Pharmacist selects five inpatients who are receiving treatment for sepsis each month and documents the drugs prescribed and the relevant diagnosis. The data collected from this should help us to identify problem areas to tackle, in order to bring 100% of our antimicrobial prescribing into line.

OBJECTIVES
The objectives were to:
1. Write trust guidelines on the prophylactic prescribing of PPIs
2. Use the findings of the audited guideline standards to determine whether the current prescribing of proton pump inhibitors as prophylaxis against GI events in patients taking either a NSAID (non-steroidal anti-inflammatory drug) or aspirin at the Trust is in accordance with this guideline

The audit standard was 100% compliance with the 'Guidelines for the Prescribing of Proton Pump Inhibitors (PPIs) for Prophylaxis of GI events in Adults taking NSAIDs and/or Aspirin'. Compliance with the proposed guideline overall was assessed using the following points:

METHOD
Guidelines were written with a surgical pharmacist and a consultant gastroenterologist. A pilot audit was carried out for two weeks at The Royal Sussex County Hospital (RSCH). The audit was carried out over a four-week period throughout December at the RSCH and The Princess Royal Hospital (PRH).

Data was collected from 69 patients prescribed aspirin and/or a NSAID on cardiology and orthopaedic wards across the two sites using information on the drug charts/in the patient's notes. Data was analysed using Microsoft Excel 2007.

RESULTS
1. Choice of PPI: Across the two sites 95% (n=54) of patients received either the first or second line PPI (Lansoprazole or omeprazole). (RSCH n=31, PRH n=23). Pantoprazole and rabeprazole were prescribed in only a small number of cases at each site and esomeprazole was not prescribed at all. Lansoprazole was prescribed more frequently at RSCH (74%) than at PRH (52%) and omeprazole was more frequently prescribed at site PRH (39%) than at site RSCH (21%).

2. Prescription of PPI with a documented indication: 38% (n=69) of patients were prescribed a PPI with a documented indication and 13% (n=69) of patients were not prescribed a PPI when it was indicated. There was greater PPI prescription without a documented indication at PRH (52%) than at site RSCH (39%).

3. Prescribing at the recommended dose: 45% (n=69) of patients prescribed a PPI received the recommended dose. The instances of PPI prescription at the recommended dose were very similar at both sites.

4. Documentation of duration: 2% (n=69) had the course duration specified.

DISCUSSION
There was non-compliance with the proposed guideline with not one individual patient meeting all of the audit standards. There was poor documentation of the indication for PPI prescription; hence documentation of indication forms a significant part of the auditors’ recommendations despite not being an initial objective. In the absence of a documented indication appropriateness cannot be assessed; it is therefore essential that this issue is addressed prior to re-audit. A large proportion of patients were prescribed a PPI when there was not an indication in accordance with the proposed guidelines and some patients were not prescribed a PPI when one was indicated. However, it is worth noting that the issue may be lack of documentation as opposed to absence of an indication. Many patients were

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An audit of prophylactic proton pump inhibitor prescribing

A Herbert*, K Walters*, A St Clair-Jones*, S Cairns†
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Clostridium difficile (C diff) is the most common cause of hospital acquired diarrhoea in developed countries, with the incidence of C diff associated diarrhoea (CDAD) on the increase. Literature suggests there is a link between the use of proton pump inhibitors and CDAD and The Health Protection Agency guidance for the prevention and management of C diff recommends that proton pump inhibitors (PPIs) should only be used when there is a clear clinical indication.

<table>
<thead>
<tr>
<th>Table 1: Reason for UBS agent prescribing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason</td>
</tr>
<tr>
<td>------------------------------------------</td>
</tr>
<tr>
<td>1. MC&amp;S results</td>
</tr>
<tr>
<td>2. Neutropenic sepsis protocol</td>
</tr>
<tr>
<td>3. Septic shock guideline</td>
</tr>
<tr>
<td>4. Other SUHT guideline (e.g. abdominal infection)</td>
</tr>
<tr>
<td>5. Expert advice</td>
</tr>
<tr>
<td>6. Failure of narrow spectrum agent</td>
</tr>
<tr>
<td>7. Contra-indication to guideline agent</td>
</tr>
<tr>
<td>8. Recent antibiotic exposure</td>
</tr>
<tr>
<td>9. Recent or frequent contact with healthcare environment</td>
</tr>
<tr>
<td>10. Immunocompromised patient</td>
</tr>
<tr>
<td>11. No justification</td>
</tr>
</tbody>
</table>

Contraindication to guideline narrow spectrum antibiotic e.g. allergy.
Recent broad spectrum antibiotic exposure.
Recent or frequent contact with healthcare environment.
Immunocompromised patient.

REFERENCES
prescribed a high dose PPI without a documented indication, potentially leading to an unnecessary increased risk of acquiring CDAD. Only one patient had the duration of PPI treatment stated on their drug chart. The guideline encourages review and step-down of all PPIs on admission and discharge; this should encourage the use of PPIs for a specified period of time and not indefinitely. This will lead to fewer inappropriately prescribed PPIs; decreasing the incidence of PPI induced CDAD and decreasing costs in primary and secondary care.

Limitations of the audit were lack of prescriber awareness of guidelines prior to audit; use of a draft guideline; fewer patients on a NSAID being included than initially anticipated and new in vitro evidence that some PPIs may decrease the efficacy of clopidogrel5, which may need to be taken into account if more evidence/guidance comes to light in the future.

In conclusion, the audit highlighted the major areas to tackle in terms of education and priorities for what aspects of the guideline to focus on implementing. It is a useful baseline reference for re-audit. The auditors recommend prescriber education on the prophylactic prescribing of PPIs and that there be a standard way of prescribing PPIs; with duration and indication of the PPI is documented on the drug chart, notes and discharge summary. There should be clearer communication between secondary and primary care via the discharge summary. It is recommended that there is a re-audit of adherence to the newly approved guidelines.

REFERENCES

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3. Yearsley KA, Gilby LI, Ramadas AV et al., Proton Pump Inhibitor Therapy is a Risk Factor for C difficile Associated Diarrhoea, Alimentary Pharmacology and Pharmacokinetics, 2006, 24:613-619
4. Health Protection Agency, Clostridium difficile infection: how to deal with the problem – a board to ward approach, a report to the Department of Health from the Steering Group on Healthcare associated Infection, February 2008
5. PPIs with clopidogrel may increase recurrent MI risk. The Pharmaceutical Journal, 7th Feb 2009, Vol. 282 No. 7538 Page 126

An audit of current prescribing of thromboprophylaxis for elective hip and knee replacement surgery patients in Buckinghamshire Hospitals NHS Trust

XY Ling, S Khalid
Buckinghamshire Hospitals NHS Trust

Hip and knee replacement surgery patients are widely recognised as high risk groups of patients to develop venous thromboembolism (VTE).1 However, the significance of VTE as the leading cause of preventable death in hospitals and the substantial healthcare burden associated with its morbidities are under-recognised.2 This is because, despite studies having demonstrated favourable benefit-to-risk ratio of pharmacological prophylaxis in these patients,3,4 the bleeding risk associated with pharmacological prophylaxis still remains the main safety concern for orthopaedic surgeons in general.5

There are two major types of thromboprophylaxis which can be offered to hip and knee replacement patients, namely mechanical prophylaxis and pharmacological prophylaxis. Mechanical prophylaxis such as anti-embolism stockings, intermittent pneumatic compression devices (IPC) and foot pumps work by reducing venous stasis while pharmacological prophylaxis, for instance low molecular weight heparin (LMWH), works primarily in preventing the formation of thrombi in venous circulation.

Although there are two Trust guidelines available for the management of hip and knee replacement surgery patients with respect to thromboprophylaxis, the details on the classification of patients’ risk factors and the timing of post-operative LMWH administration were not outlined in these guidelines. Hence, the prescribing of appropriate pharmacological prophylaxis lies mostly in the hand of the prescribers. This highlighted the need to review current prescribing of thromboprophylaxis for these patients. In addition, an updated NICE guideline for venous thromboembolism is due to be released. In preparation for this, an audit was conducted to review current prescribing of thromboprophylaxis for elective hip and knee replacement surgery patients.

The standards for the audit were:

- 100% of elective hip and knee replacement patients should be prescribed at least one form of mechanical prophylaxis.
- 85% of elective hip and knee replacement patients presenting with one or more patient-related risk factors should be prescribed pharmacological prophylaxis (Trust agreement with PCT).

OBJECTIVES

To determine whether appropriate mechanical prophylaxis was prescribed for elective hip and knee replacement patients.

To determine whether appropriate pharmacological prophylaxis was prescribed for elective hip and knee replacement patients in terms of drug, dose, frequency, route of administration, duration of treatment and timing of post-operative administration.

METHOD

A prospective data collection was undertaken on the Orthopaedic Surgery Ward. All elective hip and knee replacement surgery patients were included in the three-week data collection period. Any emergency or trauma related surgery, arthroscopy, and any elective orthopaedic surgery that involve upper limbs were excluded. Data was obtained from a number of sources including patient’s medical or surgical notes, pre-operative assessment form, prescription chart, discharge letter, any supplementary chart and discussion with nursing staff. The details of pharmacological prophylaxis in terms of the dose and frequency, route of administration, duration of treatment and timing of post-operative administration were obtained.

RESULTS

62 elective hip and knee replacement surgery patients were identified during the data collection period. 60 of them were reviewed in the audit as one of the surgeries was cancelled and one patient’s notes and drug chart were not available. All of the reviewed patients presented with one or more patient-related risk factors for VTE and hence should be prescribed pharmacological prophylaxis. The results are summarised in Table 1. All patients that were prescribed pharmacological prophylaxis were prescribed once daily dalteparin as per Trust formulary and dalteparin Summary Product of Characteristics (SPC).

DISCUSSION

100% of patients were prescribed at least one form of mechanical prophylaxis and thus the standard set was achieved. With respect to pharmacological prophylaxis, none of the patients were prescribed dalteparin pre-operatively. With respect to post-operative dalteparin it was
prescribed for 86% of hip replacement patients and 92% of knee replacement patients therefore the standard was met however inconsistencies in the prescribing practice for dose, duration of treatment and timing of post-operative administration highlighted the need for detailed and up-to-date Trust guidelines in order to standardise treatment. The recent update of NICE guidance on venous thromboembolism should aid the review and subsequent updating of Trust guideline. There is also a need for updated record keeping to standardise mechanical prophylaxis prescribing. The introduction of oral anticoagulants such as dabigatran and rivaroxaban to the Trust formulary may solve the practical issues associated with administration of subcutaneous dalteparin and allow all eligible patients to receive the appropriate extended prophylactic regimens. In conclusion, a more detailed Trust Guideline is required to support standardised prescribing of VTE prophylaxis in elective hip and knee replacement patients. Once the guideline has been implemented, a re-audit can be carried out to determine the compliance with updated guideline.

**REFERENCES**


**An audit of intravenous fluid prescribing and electrolyte monitoring in children**

E Ng, R Waters
Buckinghamshire Hospital NHS Trust, Buckinghamshire

Since 2000, four paediatric deaths following neurological injury from hospital-acquired hyponatraemia have been reported in the UK.1-3 The National Patient Safety Agency (NPSA) has issued advice to healthcare organisations on how to minimise the risks associated with administering IV fluids to children.4 A number of actions were been taken in the trust, one of which was the development of clinical guidelines for fluid management of paediatric patients; these give clear recommendations for fluid selection, calculation of requirements and clinical and laboratory monitoring. A new IV fluid prescription chart was also introduced.

This audit aims to investigate whether the NPSA and local procedures are being adhered to. This involves assessing the compliance of prescribing and monitoring of IV fluids against the new guidelines and adherence to accurate documentation requirements on the new charts. The results of this audit will be reviewed and recommendations made to improve current practice.

**OBJECTIVES**

- To determine the proportion of patients prescribed the appropriate IV fluid (standard 100%)
- To determine the proportion of patients prescribed the appropriate IV infusion rate (standard 100%)
- To determine the proportion of patients who had baseline plasma urea and electrolytes (U+E) and accurate weight measured which were documented on chart (standard 100%)
- To determine the proportion of patients who had plasma U+E and accurate weight measured if IV fluid continued over 24 hours (standard 100%)

<table>
<thead>
<tr>
<th>Standards</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 100% of prescribed infusion rate is appropriate for individual patient</td>
<td>100%</td>
</tr>
<tr>
<td>2 100% of infusion rate calculation is: documented</td>
<td>38%</td>
</tr>
<tr>
<td>signed</td>
<td>24%</td>
</tr>
<tr>
<td>dated</td>
<td>29%</td>
</tr>
<tr>
<td>timed</td>
<td>24%</td>
</tr>
<tr>
<td>checked</td>
<td>0%</td>
</tr>
<tr>
<td>reviewed</td>
<td>0%</td>
</tr>
<tr>
<td>3 100% of baseline plasma U+E and weight are measured</td>
<td>14%</td>
</tr>
<tr>
<td>and the results were documented on the chart</td>
<td>14%</td>
</tr>
<tr>
<td>4 100% of patients’ U+E are checked and documented 24 hourly while IV fluids are being administered</td>
<td>12%</td>
</tr>
</tbody>
</table>

**DISCUSSION**

All patients received the appropriate type of IV fluid at the correct rate; no errors has been reported during the audit period via DATIX incident report system. National and local standards highlight the importance of selecting the correct type of fluid as well as reviewing and monitoring. Plasma U+E should be checked before commencing the infusion and every 24 hours whilst IV fluids are being administered. It is vital to use these guidelines and chart correctly to prevent hyponatraemia caused by inappropriate IV fluid management.

This audit demonstrates that part of the paediatric IV fluid guidelines are not being adhered to. The results also suggest poor adherence to documentation. The potential harm caused by inappropriate IV fluid management is preventable. Therefore, the following recommendations were made:

- Present findings of this audit to doctors and nurses
- Education programme to raise awareness of IV fluid management and how to complete the IV fluid chart correctly
- To review if any changes are needed to the IV fluid chart itself
- Re-audit in six months’ time

Limitations identified are patients who are admitted over the weekends may not be reviewed and new doctors started during the data collection period and the change in practice pattern was seen.

**REFERENCES**

FACT: knowledge of antibiotics contraindicated in penicillin-allergic patients can be improved

G Cavell*, S Jaffer†
*King's Health Partners, King's College Hospital; †School of Pharmacy, King's College London

Risks associated with the use of penicillins in patients with documented penicillin allergy are well documented. Patients with known drug allergies have been identified as being at risk of medication error by the National Patient Safety Agency and the Department of Health.1,2 Within our trust awareness of allergy status is high on the medication safety agenda. In common with other trusts we have implemented a number of strategies to reduce the risk of patients receiving medicines contraindicated due to allergy. Despite these interventions reports where patients had been prescribed contraindicated drugs were being made to the incident reporting system.

This paper describes a project to determine whether lack of knowledge of antibiotics contraindicated in penicillin allergy may contribute to prescribing errors, and the development of a novel intervention to improve knowledge.

OBJECTIVES
- To measure prescribers’ knowledge of antibiotics contraindicated in penicillin-allergic patients
- To measure the impact of an intervention on prescribers’ knowledge

METHODS
Baseline questionnaire (Questionnaire 1): A structured questionnaire was designed and piloted. The questionnaire asked medical staff to state whether antibiotics used within the trust were safe, contraindicated or could be used with caution in patients with known serious penicillin allergy. In February 2009 medical staff were asked by pharmacists to complete a questionnaire in their presence without using information sources. Questionnaires were not left with prescribers for later completion.

Intervention design: Results of the questionnaire were analysed and discussed by the multidisciplinary medication safety team. An intervention, designed to ensure essential information was available to staff at all times, was developed and implemented. Plastic credit-card sized “FACT” cards were distributed to medical, nursing and pharmacy staff in post, and all new staff joining the trust. Cards were distributed between May and October 2009. Key messages from the FACT card were displayed as screensavers on trust computers.

Questionnaire 2: In November 2009 the questionnaire was repeated. Minor modifications were made to the questionnaire to incorporate formulary changes. Medical staff were asked by a single investigator to complete the questionnaire from knowledge in their presence. Results from the baseline and questionnaire 2 were collated and compared. Ethics committee approval was sought for the project but not considered necessary.

RESULTS
One hundred and sixty doctors completed Questionnaire 1 and 281 doctors completed Questionnaire 2. At baseline 93/160 doctors correctly recognised that all penicillins should be avoided, and of these 57 doctors correctly recognised that beta-lactam antibiotics should be used with caution or avoided. In questionnaire 2, 214/281 doctors correctly recognised that all penicillins should be avoided and of these 157 also knew that beta-lactam antibiotics should be used with caution or avoided. Results for each antibiotic are shown in Table 1.

DISCUSSION
The study confirms that some qualified doctors do not recognise antibiotics contraindicated in patients with serious penicillin allergy. The results of Questionnaire 1 confirmed that there may be lack of knowledge of Augmentin (6/160, 3.78%) and Tazocin (53/160, 33%), whose names do not suggest that they contain penicillin. Results for co-amoxiclav (8/160, 5%) and flucoxacinil (17/160, 10.6%) were surprising as their names suggest that they are penicillin-related. We adopted the acronym FACT to highlight these four drug names in the key message of the intervention.

Once daily dosing of gentamicin in the Buckinghamshire Hospitals NHS Trust

D Gibbons, B Cronolly
Buckinghamshire Hospitals NHS Trust

Gentamicin is an aminoglycoside antibiotic which has a number of indications.3 An audit was carried out in 2009 by junior doctors McColl and Green into the prescribing and monitoring of once daily dosing of

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Number of responses</th>
<th>Safe/use with caution</th>
<th>Significance (Chi-squared test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>amoxicillin</td>
<td>1 (0.6%)</td>
<td>5 (1.6%)</td>
<td>Not significant (p&gt;0.05)</td>
</tr>
<tr>
<td>Augmentin</td>
<td>6 (3.78%)</td>
<td>16 (5.7%)</td>
<td>Not significant (p&gt;0.05)</td>
</tr>
<tr>
<td>co-amoxiclav</td>
<td>8 (5%)</td>
<td>9 (3.2%)</td>
<td>Not significant (p&gt;0.05)</td>
</tr>
<tr>
<td>Tazocin</td>
<td>53 (33%)</td>
<td>34 (12.1%)</td>
<td></td>
</tr>
<tr>
<td>Gentamicin</td>
<td>1 (0.62%)</td>
<td>11 (3.9%)</td>
<td>Significant (p&lt;0.01)</td>
</tr>
<tr>
<td>benzylpenicillin</td>
<td>2 (1.2%)</td>
<td>6 (2.1%)</td>
<td>Not significant (p&gt;0.05)</td>
</tr>
<tr>
<td>piperacillin/tazobactam</td>
<td>n/a</td>
<td>23 (8.2%)</td>
<td></td>
</tr>
<tr>
<td>cefazidime</td>
<td>14 (8.8%)</td>
<td>15 (5.3%)</td>
<td>Not significant (p&gt;0.05)</td>
</tr>
<tr>
<td>cefuroxime</td>
<td>14 (8.8%)</td>
<td>12 (4.3%)</td>
<td>Not significant (p&gt;0.05)</td>
</tr>
<tr>
<td>meropenem</td>
<td>66 (41%)</td>
<td>60 (21.4%)</td>
<td>Significant (p&lt;0.001)</td>
</tr>
</tbody>
</table>

1 National Patient Safety Agency. Safety in doses: medication safety incidents in the NHS. NPSA 2005
2 Department of Health. Building a safer NHS for patients – improving medication safety. 2004
gentamicin on the surgical wards in the Buckinghamshire NHS Trust. The main recommendations from this audit included the revision of the gentamicin chart. A creatinine clearance column was introduced, which is intended for use as an aide-memoir by prescribers to monitor gentamicin and help with dosing intervals. This current audit expanded inclusion criteria to include both surgical and medical wards and assessed whether the recommendations implemented as result of 2009 audit were beneficial.

The aim of the audit was to review the prescribing and monitoring of gentamicin in surgical and medical wards within the Buckinghamshire NHS Trust with reference to the trust guidelines. The standards for this audit were:

1. 100% of patients are prescribed Gentamicin in accordance with the indications specified in Trust Guidelines
2. 100% of gentamicin charts have the patient’s weight recorded and the dose prescribed is correct according to the weight.

OBJECTIVES
■ To determine the percentage of patients who were prescribed Gentamicin in accordance with the indications specified in Trust Guidelines
■ To determine the percentage of patients whose gentamicin charts had the weight recorded and whether the dose was correct according to the weight.
■ To review the implementation and use of the gentamicin chart introduced in July 2009.

METHODOLOGY
A data collection form was designed to extract information from the notes of the cohort group. This information included, data on whether the indication for gentamicin was recorded and within Trust guidance, whether weight was recorded on the gentamicin chart and was the old or new chart being used. Two data collection periods were chosen: four weeks between September and October and four weeks between November and December in order to collect data on the two main Trust sites, Stoke Mandeville Hospital and Wycombe Hospital respectively.

The data collection form was piloted on five patients and amended. A box was added to state whether the old or new chart was being used. A list of patients (both medical and surgical) whose gentamicin levels were analysed by biochemistry between the above data collection periods was obtained by the author. Their notes were then retrieved from the audit department and relevant information recorded on the customised data collection form. This information was subsequently entered into an excel datasheet and analysed.

RESULTS
Data was collected for a total of 56 patients. The indication for the use of gentamicin was recorded on 26 (46%) of the gentamicin charts. Of those who had the indication recorded on the gentamicin chart 24 (91%) were in accordance with trust guidance. Twenty (35%) of patients’ charts had the patient’s weight recorded on the chart. Of these, 13 (65%) were given the correct dose per weight. Only one patient had their creatinine clearance recorded on the gentamicin chart during the study period and this was 35ml/min (moderate renal function).

In one department on one site, 100% of the gentamicin charts in use were an old version of the chart whereas on the other site 29% of the charts in use were an old version of the chart.

DISCUSSION
The use of gentamicin should be restricted to specific infections as indicated on the trust antibiotic flash card, Trust Guidelines or on the advice of the microbiology team. The reason for initiating gentamicin should be recorded on both old and new gentamicin charts. This audit found it was recorded in only 46% of cases. This is an important component of the chart as it allows doctors and pharmacists to assess whether gentamicin is being prescribed appropriately.

The patients’ weight was recorded on 35% of gentamicin charts. Of these 65% were prescribed the correct dose per weight. The need to establish the correct dose of gentamicin is crucial because the drug can be nephrotoxic. Only one patient had their creatinine clearance recorded on the new gentamicin chart which indicated that this newly introduced column was not being used by the doctors or pharmacists.

The issue of one site using old gentamicin charts and some old charts in use on the other highlighted that the effective implementation of the new chart needs to be addressed. The main limitation of this audit was the continuous use of the old gentamicin chart in some departments/wards in the trust.

In conclusion, the new chart was not in use trust wide and as a result the introduction of the new column to document creatinine clearance is potentially not having the desired effect on patient safety. There is a lack of awareness of how to use the new gentamicin chart and its additional components.

Recommendations: an awareness campaign should be undertaken including presentations, education sessions for prescribers and spot checks to ensure compliance with the new chart. Moreover ensure that the cyclical audit process continues for the Once Daily Dose Gentamicin Chart.

REFERENCES

Audit of availability of resuscitation drugs and ward checking accuracy

H King, C Collins
Department of Pharmacy, Kings College Hospital NHS Foundation Trust, London

National guidelines indicate certain medicines should be readily available for emergencies in clinical areas. Pharmacists are not currently responsible for this area of medicines management at this trust. Non-compliance with policy may have negative patient outcomes. An audit was carried out to check compliance with the trust policy and national guidelines.

OBJECTIVES
■ To audit compliance with trust policy on adult inpatient wards
■ To determine if all required drugs on resuscitation trolleys are present, in date and checked daily in accordance with policy
■ To ensure recommended second line resuscitation drugs are available

METHOD
A data collection form was designed to audit resuscitation trolley contents and checking logs. Data collected included whether all the correct drugs were present on the trolley, if there were any incorrect items, if the checking log was correctly completed, and which second line drugs were available as stock. The data collection form was piloted before extending the audit to all wards. A preregistration pharmacist collected the data which were entered into an excel spreadsheet and analysed.

Audit Standards
1. 100% of wards check crash trolley contents daily.
2. 100% of trolleys contain the correct drugs, as defined by the stock list.
3. 100% of drugs are in date and stored appropriately.
4. 100% of wards stock second line resuscitation drugs.
5. 0% of trolleys contain drugs not on the stock list.

RESULTS
Twenty-eight wards were audited between 29 October 2009 and 21 January 2010. No wards complied with all standards. See Table 1.
Table 1: Compliance with audit standards (n=28 in patient wards)

<table>
<thead>
<tr>
<th>Standard</th>
<th>Result</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% of wards check crash trolley contents daily</td>
<td>2/28 wards</td>
<td>Some wards had no evidence of logs; others carried out twice daily checks</td>
</tr>
<tr>
<td>100% of trolleys contain the 2/28 wards</td>
<td>compiled</td>
<td>Items unobtainable from manufacturer may have lowered this result</td>
</tr>
<tr>
<td>100% of drugs are in date and stored appropriately</td>
<td>25/28 wards</td>
<td>Three out-of-date drugs were discovered on separate wards; one a non-stock</td>
</tr>
<tr>
<td>100% of wards stock second line resuscitation drugs</td>
<td>6/28 wards</td>
<td>Restrictions on stock locations of adenosine and midazolam reduced compliance</td>
</tr>
<tr>
<td>0% of trolleys contain drugs not on the stock list</td>
<td>20/28 wards</td>
<td>A total of 13 non-stock items found across eight wards</td>
</tr>
</tbody>
</table>

DISCUSSION

Daily checking of trolley contents is required by the Trust and recommended by national reports. The trolley contents should be checked against the most recent resuscitation trolley stock list and signed for in the log book daily by nursing staff. The required items are clearly listed with a requirement to check expiry dates. There was evidence of non-compliance with the trust policy on almost all (26/28) of the wards audited.

Failure to stock the correct items was occasionally due to items being unavailable, but more often due to the wrong quantity being stocked. The drugs most commonly stored incorrectly were lidocaine and atropine, which were unavailable in the required strengths, and naloxone which was in the wrong pack size. The ward staff are responsible for replenishing stock on the trolley and pharmacy are responsible for supplying the items as urgent items in normal working hours.

The three drugs that were out of date were past their expiry by three, four and eight days. Two were lidocaine and the third was a non-stock epinephrine injection. Non-stock drugs should not be found on the trolleys unless they are a pharmacy-approved substitute for required unavailable items. Non-stock items should be removed if found during checking. Ultimately, if the checking procedure is carried out in the approved manner, the stock on the trolley will be 100% correct. No resuscitation drugs require refrigeration or other special storage conditions.

Second-line resuscitation drugs were taken to be the drugs listed by the Resuscitation Council’s minimum equipment requirements which were not already stocked on the crash trolley. Ward stock lists suggest only six wards hold all the second-line drugs. When audited, adenosine and midazolam were the most commonly non-stocked drugs. Midazolam is a non-stock item on all wards and can be ordered as a controlled drug by a select few. Adenosine is only stocked on wards where it is regularly required. Some wards stocked all these drugs, along with surplus stock of those on the trolley checklist, in a designated drawer in the stock room. Stock is replenished as per usual ward top-up.

Recommendations can be made to improve the management of resuscitation drugs on wards. The checking of resuscitation trolley contents needs to improve. Education of staff completing the checking procedure is needed, with reference to patient safety and how to obtain missing items.

Availability of items from the manufacturer cannot be controlled by ward staff. Where there are supply problems the stock list should be updated as to current available items and pack sizes. Ward managers, pharmacy staff and resuscitation co-ordinators should oversee the medicines management of resuscitation drugs, provide advice and reinforce the correct procedures. The introduction of second line resuscitation drugs bag brought to all emergencies would improve availability of required drugs.

To conclude, ward-based daily checking of the crash trolley contents needs to be improved. This can be done by education of staff and reinforcement of correct procedure. Second line drugs should be brought to all emergencies. Patient safety will be improved by having all recommended resuscitation drugs readily available in an emergency.

AIM AND OBJECTIVES

To assess and compare the use of enoxaparin and rivaroxaban for ETP as per Trust guidelines:

- To determine whether enoxaparin and rivaroxaban were prescribed as per SUHT ETP guidelines
- To assess patient compliance with the prescribed course
- To determine if patients suffered any adverse effects from the prescribed treatment
- To determine if concurrent therapy with aspirin and rivaroxaban increased the risk of side effects (rivaroxaban only)
- To establish if platelet count was monitored as specified in the Trust guideline (enoxaparin only)
- To determine the type of teaching provided and the subsequent confidence of patients in their ability to self-inject (enoxaparin only)
- To discover if anything could have been done to improve the service provided for ETP

METHODS

A project proposal was submitted to the trust’s clinical effectiveness team. They approved the project and stated that ethical approval was not necessary for this study. Baseline data was collected during November 2009 for patients discharged on enoxaparin (n=21). The audit was repeated in July 2010 for patients discharged on rivaroxaban (THR n=21, TKR n=22). Patients fulfilling the audit criteria were randomly selected on the ward and asked for consent. These patients were then telephoned at the end of their treatment course and asked a standard set of questions. The electronic discharge summary and blood results were...
checked for each patient. The results were then analysed and presented in a report.

RESULTS

- Prescribing: 100% of patients were prescribed the correct drug, dose and duration as per SUHT guidelines.
- Compliance: 94% of patients completed the course of enoxaparin, 95% of patients completed or were still taking the course of rivaroxaban.
- Side effects: 17% of patients experienced side effects with enoxaparin, 7% of patients experienced side effects with rivaroxaban.
- Aspirin: 16% of patients took aspirin and rivaroxaban together. None of these patients experienced any adverse effects.
- Platelet count monitoring for enoxaparin was 100% before the start of therapy, 48% at day 5-10 and 17% at day 15-21.
- Teaching: 67% of patients were taught to self-inject on the ward, 22% taught themselves from the literature and 11% were taught by friends or relatives. 50% of patients felt confident in their ability to self-inject, 39% from ward teaching and 11% from the literature.
- Service improvement: Several patients on enoxaparin stated that they had difficulty arranging the disposal of their sharps bin. Some did not have enough space for all of the syringes in the sharps bin provided.

DISCUSSION AND CONCLUSION

- The 100% prescribing accuracy shows that the Trust guidelines are routinely followed.
- The high rate of patient compliance was expected with rivaroxaban but was surprising with enoxaparin, especially considering that only 50% of patients were confident with self-injection.
- The side effects encountered were mainly bruising and bleeding as expected with thromboprophylactic agents. More patients had side effects with enoxaparin than with rivaroxaban, mainly due to bruising at the injection site. It was interesting to note that 16% of patients took both aspirin and rivaroxaban with no adverse effects.
- Platelet count monitoring of patients on enoxaparin was not satisfactory after they had been discharged, possibly due to a lack of communication to the GP. We therefore arranged for an automatic message to appear on the discharge summary to the GP to request a platelet count at days 5-10 and 15-21 of therapy.
- Only 50% of patients were confident in their ability to self-inject. It was disappointing that only 67% of patients were taught to self-inject on the ward. We have asked ward nurses to target this to ensure that teaching starts early in the treatment course so that patients are confident by the time they leave hospital.
- Patients were having difficulty arranging for local councils to collect their sharps bin as they had not been pre-registered. We liaised with all of the surrounding councils and successfully implemented one common referral form instead of needing separate forms for each council. This form has been placed on our Trust website so it can easily be printed and faxed to the relevant council. The patient then keeps the form with the contact number to call when they are ready for their waste to be collected.
- The sharps bins supplied from the drug company were too small to hold the entire course of enoxaparin syringes and so multiple bins needed to be supplied. If this was not done the patient could not dispose of their syringes safely. We liaised with the drug company and arranged for larger sharps bins to be provided to the Trust free of charge for patients going home on enoxaparin.

The lessons learnt from the enoxaparin stage of this audit are still relevant and useful to the Trust as we use enoxaparin as ETP for hip fracture patients and abdominal cancer surgical patients. However, this audit highlighted several benefits of using rivaroxaban for ETP:

- No clinical waste collection or sharps bins necessary

REFERENCES

1. SUHT Guideline for Prevention of Thromboembolism in Adult Trauma and Orthopaedic Patients. GU-052. SUHT, 2006.
3. SUHT Guideline for Prevention of Thromboembolism in Adult Trauma and Orthopaedic Patients. GU-052. SUHT, 2009

Anticoagulation therapy in haemofiltration patients in critical care at Sandwell General Hospital

H Aujla*, MP Elliott1, EM Graham-Clarke2, JF Marriott*  
*School of Pharmacy, Aston University; 1Department of Pharmacy, Sandwell and West Birmingham Hospitals NHS Trust (SWBH); 2Department of Anaesthetics, SWBH

Continuous veno-venous haemofiltration (CVVH) is a renal replacement therapy used in critically ill patients whereby blood is passed through an extracorporeal haemofilter. Extracorporeal clotting is a major problem even with anticoagulant protection. Unfractionated heparin and epoprostenol† are most commonly used as governed by the patient's clinical state. Sufficient anticoagulant needs to be given to protect the filter; however, it is not necessary for the patient to be therapeutically anticoagulated (and in fact this may be detrimental).‡ At the study centre, the original anticoagulation guidance was designed to achieve therapeutic changes in clotting, whereas new guidance was developed to enable the CVVH circuit to be anticoagulated yet avoid the problems associated with therapeutic anticoagulation. For both guidelines heparin was expected to be the main anticoagulant used, together with epoprostenol if clinically indicated. At the end of 2008 a new CVVH machine, and anticoagulation guidance, was introduced into the critical care unit at Sandwell hospital, a large district general (SGH). This audit aimed to identify the anticoagulant used, the duration of filtration and the number of filter changes, both before and after introduction of the new machine and guideline. In addition, data was collected to determine if heparin dose alteration followed guidelines.

OBJECTIVES

1. To determine the effect of current anticoagulation practice on mean filter life in CVVH. This constituted a baseline providing an audit standard against which to measure any new protocol.
2. To audit if a new protocol meets, or exceeds, standards from the baseline group.

METHOD

The baseline audit was conducted between 15 July 2008 and 17 November 2008 and evaluated which anticoagulant, heparin or epoprostenol, was being administered and their prescribing pattern, to 15 patients on CVVH (using the BM25 machine). Anticoagulant guidelines were changed and five patients were evaluated between 22 November 2008 and 20 February 2009 using the Aquarius Six machine. Daily critical care monitoring charts for every patient receiving CVVH during the audit period were reviewed, and the relevant data documented on a pre-printed audit sheet by HA. Data for each patient was collected on anticoagulant used, anticoagulation dose (and the infusion rates), number and type of filters used, duration of filtration (including start and stop times), and the values of the monitoring parameters, the platelet count levels and APPT ratio.

RESULTS

Overall 15 patients received heparin as the first line anticoagulant agent and
two received epoprostenol: three patients initially received heparin and then epoprostenol (Table 1).

Heparin dose changes were analysed to see if they followed the guidelines and 42% met the old version, whereas only 29% met the new guideline. Under the old guideline 42% of filter changes were due to clotting problems compared to 67% post change.

**DISCUSSION**

Heparin was the main method of anticoagulation used both before and after the introduction of a new CVVH machine and guideline. Heparin or epoprostenol use prior to changes in guideline and machine were associated with similar filter lives. However, anticoagulation following the introduction of the new guideline appears to be associated with a shorter filter life, a greater incidence of clotted filters, and an increased failure to apply the guidelines correctly. The reason for new guideline non-adherence may be the small number of patients receiving CVVH using the new equipment and unfamiliarity with the associated guideline. The number of patients in the new guideline group is significantly smaller, and so may be more susceptible to individual patient effects than the older guideline group. The disparity in group sizes represents the inherent variability in the needs of the Critical Care patient population. It is, therefore difficult currently to establish if the decrease in filter life and increase in clotting problems is an inherent fault of the guideline, or because of failure to follow the guideline. It is recommended that further education of staff is conducted and a re-audit is undertaken when staff have had time to become familiar with both machine and guideline. This will be important because of the considerable clinical and financial implications if the new guideline fails to deliver at least similar performance to the original.

Another limitation of the study is the failure to collect data on heparin induced thrombocytopenia (HIT), suspected HIT and other coagulation abnormalities. This has two implications — firstly the choice of anticoagulant used, as the unit does not currently have strict guidance on which anticoagulant to use, and in what circumstances. Secondly it may be expected that reduced exposure to heparin (as with the new heparin guideline) could potentially reduce the incidence of HIT.

**REFERENCES**


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**Table 1: Summary of CVVH filter use and life under new and old anticoagulant and filter guidelines**

<table>
<thead>
<tr>
<th>Anticoagulant therapy</th>
<th>Average time on CVVH per patient (hrs) (range)</th>
<th>Average number of filter changes per patient (range)</th>
<th>Average filter life (hrs) (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Old guideline</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heparin</td>
<td>11 111 (14-409)</td>
<td>4 (1-7)</td>
<td>22 (7-44)</td>
</tr>
<tr>
<td>Epoprostenol</td>
<td>2 23 (12-33)</td>
<td>1</td>
<td>23 (12-33)</td>
</tr>
<tr>
<td>Heparin + epoprostenol</td>
<td>2 289 (54-523)</td>
<td>7 (3-10)</td>
<td>30 (21-34)</td>
</tr>
<tr>
<td><strong>New guideline</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heparin</td>
<td>4 45 (14-75)</td>
<td>3 (1-4)</td>
<td>14 (7-51)</td>
</tr>
<tr>
<td>Heparin + epoprostenol</td>
<td>1 118</td>
<td>5</td>
<td>21</td>
</tr>
</tbody>
</table>

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**Collaborative audit of pharmacy interventions which contribute to the safe use of insulin**

C Livingstone, J Nicholls
Clinical Directorate, East and South East England NHS Specialist Pharmacy Services

The potential for insulin to cause major patient harm when used in error is well recognised; in the United States, errors are reported more frequently with insulin than any other high-alert medicine. In England and Wales, the National Patient Safety Agency (NPSA) receives a large number of incident reports concerning unsafe use of insulin, including wrong dose, wrong product and insulin omitted. However, incident reports capture only a small proportion of errors and reporting rates vary enormously between organisations. Pharmacists have a professional requirement to ensure the use of medicines is safe and clinically appropriate, but since many interventions which prevent patient harm are not reported, the current contribution made by pharmacy staff to the safe use of insulin is unclear.

**OBJECTIVES**

1. To audit the frequency and type of insulin related patient safety incidents identified and resolved by pharmacy staff in acute, mental health and provider trusts across 4 Strategic Health Authorities.

2. To quantify the proportion of these incidents reported to the NPSA.

**METHOD**

Data collection forms were developed by the Clinical Directorate of the East and South East England Specialist Pharmacy Services with subsequent pilot and review in three care settings: acute, mental health and primary care provider bedded units. Data were collected in the last two weeks of April 2010 on any unintended or unexpected incident involving insulin which could have or did lead to patient harm. Incidents were coded as prescribing (reported here), supply or administration with further sub-codes adapted from those used by the NPSA. More than one coding could be used and a free text description of each incident was also included. Data were collected by pharmacy staff (pharmacists, preregistration students and technicians) during ward visits. For all patients on insulin, staff were asked to audit insulin prescribing against the following standards: Patients receiving insulin prior to admission have the same insulin product/form prescribed unless contraindicated; insulin dose, route and frequency is legible, unabbreviated and complies with any local guideline. To enable participation by various organisations and to capture a broad range of interventions, the audit could be conducted on any number of wards for one to five days. Data were analysed using Microsoft Access 2003.

**Table 1: Prescribing incidents involving insulin (n=1,602 patients)**

<table>
<thead>
<tr>
<th>Incident type</th>
<th>Number of incidents</th>
<th>Resolved by pharmacy</th>
<th>Reported within trust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omitted from prescription</td>
<td>82 (9%)</td>
<td>67 (81%)</td>
<td>2</td>
</tr>
<tr>
<td>Wrong/unclear product prescribed</td>
<td>69 (8%)</td>
<td>63 (91%)</td>
<td>2</td>
</tr>
<tr>
<td>Wrong/unclear dose or strength</td>
<td>204 (23%)</td>
<td>196 (96%)</td>
<td>0</td>
</tr>
<tr>
<td>Wrong frequency</td>
<td>5 (1%)</td>
<td>5 (100%)</td>
<td>0</td>
</tr>
<tr>
<td>Wrong route</td>
<td>14 (2%)</td>
<td>14 (100%)</td>
<td>0</td>
</tr>
<tr>
<td>Wrong/unclear administration device</td>
<td>437 (50%)</td>
<td>411 (94%)</td>
<td>1</td>
</tr>
<tr>
<td>Not prescribed according to local guideline</td>
<td>42 (5%)</td>
<td>36 (86%)</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>104 (12%)</td>
<td>87 (84%)</td>
<td>1</td>
</tr>
</tbody>
</table>
**RESULTS**

The audit was conducted in 54 trusts across South-East England (41 acute, five mental health and eight provider) and included more than 26,000 patients. There were 1,602 patients on insulin and 957 prescribing incidents reported (Table 1). Insulin was omitted from prescriptions on 83 occasions and there were 112 incidents where insulin was prescribed using an abbreviation for the word unit (eg "u"). Wrong/unclear product was reported most commonly with the insulins NovoMix 30, Mixtard 30 and Humalog. Incidents coded “other” included co-prescription of subcutaneous and intravenous insulin and unclear drug charts when dose changes made. Overall, 91% of prescribing incidents were reported to have been resolved by pharmacy staff.

A total of seven prescribing incidents were entered in local safety reporting systems.

**DISCUSSION**

This audit has demonstrated that pharmacists very frequently make prescribing-related interventions to support the safe use of insulin, but almost none are reported via local systems to the NPSA. The majority of medication incidents reported nationally involve administration, but it may be that the proportion of prescribing incidents that go unreported is particularly high. Some of the incidents, such as using abbreviations for the word units, have been repeatedly identified as problem areas, but remain unresolved without pharmacy intervention. This issue has subsequently been highlighted in the recent Rapid Response Report “Safer administration of insulin” and trusts will have to ensure reliable systems are in place to ensure abbreviations are never used by December 2010.

The audit enabled trusts to determine any local prescribing issues and consider different practices successfully employed in other organisations. Prescribing of devices used to administer insulin was particularly poor and requires further action. Trusts in South-East England volunteered to participate in the audit and chose which wards to include, so findings may not be representative of other areas.

In view of the number or incidents identified and the potential severe harm from insulin errors, it may be necessary to prioritise pharmacy services for this patient group and identify specific additional safety strategies to be implemented when ward pharmacy services are not available. Pharmacy staff resolve many incidents (beyond those reported to the NPSA) preventing patient harm; this vital pharmacy function is in place to ensure abbreviations are never used by December 2010.

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**REFERENCES**


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**An audit of starting and stopping intravenous insulin sliding scale**

**RH Mandalia**, J Reed, K Thakkar

Pharmacy Department, Diabetic Nurse Specialist, Hammersmith Hospital, Imperial College Healthcare NHS Trust, London

Uncontrolled hyperglycaemia is associated with increased morbidity, mortality and longer hospitalisation, thus it is imperative that blood glucose levels are properly controlled.1 Local practice of starting and stopping an intravenous insulin sliding scale (SSI) has not been audited in the past but with the anecdotal evidence of poor prescribing and compliance to local guidelines, it was necessary to audit current practice. The results from this audit would help inform a training agenda and develop future guidelines.

The aim of this audit was to assess current practice and ascertain awareness of local guidelines on how to stop a SSI. Local guidelines recommend that the first dose of insulin should be given 30 minutes before stopping the SSI and adjunct to a meal, and if the patient is on long-acting insulin it should be continued.2 There are no local guidelines stating indications for SSI, thus the following most common indications were chosen for the purpose of this audit: 3–5

- Diabetic ketoacidosis (DKA)
- Hyperosmolar hyperglycaemic non-ketotic coma (HONK)
- Pre-, intra- and post-operative care following major surgery
- Major vascular events
- Severe sepsis
- Dose finding strategies

**OBJECTIVES**

To assess the appropriate initiation of SSI.

To determine if the insulin sliding scale is stopped in accordance to local guidelines.

To ascertain the awareness of local guidelines

**Method**

The following standards were set:

- At least 80% of patients should be started on SSI for one of the indications listed above
- 100% of SSI should be stopped in accordance to the local policy

The first audit standard was not set at 100% as there are no local guidelines on appropriate indications for SSI. The audit was carried out across six wards (renal and admissions) at Hammersmith Hospital for a total of four weeks from 18 November to 16 December 2009 (Monday–Friday). A data collection tool was piloted over five days to test ease of use. No changes were made to the audit tool and data was collected prospectively by a single pharmacist for a further three weeks. The data was analysed using Microsoft Excel and the findings were presented descriptively against the audit standards. Following this a survey was carried out to gain an insight on doctors and nurses’ awareness of the current SSI policy. A questionnaire was designed to assess awareness and given to two doctors and three nurses at random on each ward and collected after 15 minutes. The data was compiled and analysed on Microsoft Excel in a similar way.

Inclusion criteria: All adult non-pregnant patients

Exclusion criteria: Neonates and patients transferred to other hospitals

**RESULTS**

During the four-week period 29 patients were commenced on SSI but a total of 26 patients were included in the study. Three patients were excluded because they were transferred to other hospitals before stopping the SSI. From the 26 patients, five patients had no past medical history of diabetes. Sixteen patients were on subcutaneous insulin before admission of
which seven patients were on long-acting subcutaneous insulin. Using the indications from the introduction 62% (n=16) were started on SSI appropriately. The inappropriate indications included raised blood glucose on admission (n=8), severe epigastric pain (n=1) and urinary tract infections (n=2). A total of 65% (n=17) stopped the SSI adjunct to a meal but none of the patients were given a dose of insulin 30 minutes before stopping the SSI. Administration of the long acting insulin was continued for one patient. The survey was completed by seven doctors and 11 nurses, and the results are shown below in Figure 1.

**DISCUSSION**

Despite the small study population it was evident that neither of the two audit standards was met. The first audit standard was not met as only 62% commenced SSI appropriately. This may be due to the absence of local guidelines stating appropriate indications and the varied degree of training offered to doctors. Local guidelines on stopping SSI were also poorly adhered to. Nursing staff are directly involved with stopping a SSI and the poor practice directly links to lack of awareness of any guidelines which is evident in the survey. The results of the survey showed that compared to nurses all the doctors were fully aware that guidelines for SSI exist but both groups did not realise they were specific to stopping a SSI. All the doctors were aware of when to stop the SSI and when to give the first dose of subcutaneous insulin but this was not filtered down to the nursing staff that ultimately terminates the SSI. This was also demonstrated in the results. Lack of training meant less than half the nurses were aware of when to stop a SSI and when to give the first dose of insulin. Not many nurses or doctors were aware of continuing the long acting insulin while on SSI. The one patient that continued the long acting insulin while on SSI was following pharmacist intervention on the ward round. This highlights the importance of the pharmacist’s role in enforcing policy and adhering to guidelines. Limitations of the methodology were that the surgical and endocrine wards were not included, and ward pharmacist awareness was not assessed. Reflecting on the results I would make the following recommendations:

1. Offer regular training to doctors and nurses
2. Ask pharmacists to encourage correct prescribing and discontinuation on the ward
3. Publicise the new diabetes policy using posters, and tailored training sessions.
4. Re-audit after six months using these results as a baseline

**REFERENCES**


**Vancomycin dosing guideline adherence and outcomes: a re-audit**

NK Basker, A Weston, K Hand
Southampton University Hospitals NHS Trust

Vancomycin is a glycopeptide antibiotic that is used in the prophylaxis and treatment of Gram-positive infection. Vancomycin has a narrow therapeutic window and so careful dosing and monitoring of serum levels is required to ensure effective treatment without adverse effects.1 During therapy, monitoring of the pre-dose (trough) level is recommended.

The British National Formulary altered recommendations for target pre-dose vancomycin concentrations in September 2006 from 5-10mg/L to 10-15mg/L.2 Clinical pharmacists developed an in-house pharmacokinetic model for dosing vancomycin according to the Ambrose method.3 A new dosing schedule for adults receiving intravenous vancomycin, designed to achieve the new higher target range, was introduced in this university hospital Trust in June 2007 (Table 1). An audit in November 2007 revealed poor compliance with guideline dosing recommendations, possibly reflecting limited dissemination of the guideline. This report describes a re-audit conducted to evaluate the impact of a training initiative and a pocket guideline distributed to junior doctors on adherence to trust vancomycin dosing guidelines.

**OBJECTIVES**

- To find the percentage of patients prescribed appropriate loading and maintenance doses of vancomycin.
- To evaluate serum level monitoring practices
- To compare dosing and monitoring practices with guideline recommendations
- To compare findings with baseline audit findings

**STANDARDS**

1. 100% of patients prescribed appropriate loading dose for their weight
2. 100% of patients prescribed appropriate initial maintenance dose for weight and CrCl.
3. At least 50% of vancomycin trough levels (when dosing follows the guideline) within the target range for the indication
4. 100% of patients having their blood sample taken to check vancomycin levels within the guideline-defined time frame after starting treatment

**METHODS**

During the data collection period (October to December 2009), patients prescribed vancomycin were identified by the investigator via the pathology laboratory from serum level requests. Patients were visited on the ward to record doses from drug charts, indication and patient demographics. Test results and renal function were captured through the hospital pathology system. Data were analysed using descriptive statistics from an Excel database.

**RESULTS**

Seventy-three patients were included in the re-audit from a range of specialties (Table 2). Compliance with the standards was as follows:

---

**Table 1: New vancomycin dosing guideline**

<table>
<thead>
<tr>
<th>Creatinine clearance</th>
<th>Dose</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;100</td>
<td>1.5g</td>
<td>8hrs</td>
</tr>
<tr>
<td>70-100</td>
<td>1g</td>
<td>8hrs</td>
</tr>
<tr>
<td>60-70</td>
<td>1.5g</td>
<td>12hrs</td>
</tr>
<tr>
<td>45-60</td>
<td>750mg</td>
<td>12hrs</td>
</tr>
<tr>
<td>30-45</td>
<td>500mg</td>
<td>12hrs</td>
</tr>
<tr>
<td>20-30</td>
<td>750mg</td>
<td>24hrs</td>
</tr>
<tr>
<td>&lt;20</td>
<td>500mg</td>
<td>&gt;24hrs</td>
</tr>
</tbody>
</table>

**Table 2: Vancomycin serum levels according to dosing regimen and renal function**

<table>
<thead>
<tr>
<th>Initial maintenance dose (n=73)</th>
<th>Loading dose</th>
<th>First serum levels (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10</td>
<td>Loading</td>
<td>2 6 1 1</td>
</tr>
<tr>
<td>10-15</td>
<td>No loading</td>
<td>2 0 0 0</td>
</tr>
<tr>
<td>15-20</td>
<td>Loading</td>
<td>4 10 4 3</td>
</tr>
<tr>
<td>20</td>
<td>No loading</td>
<td>7 2 0 3</td>
</tr>
<tr>
<td>&gt;20</td>
<td>Loading</td>
<td>7 6 7 0</td>
</tr>
<tr>
<td></td>
<td>No loading</td>
<td>4 2 0 0</td>
</tr>
</tbody>
</table>
Antibiotic dosing in renal impairment

J Duff, K Hand
Southampton University Hospitals NHS Trust

Experience from a university hospital in the Netherlands reported that 69 (31%) of 225 adult patients prescribed antibiotics from internal medicine, surgery and neurology wards had a creatinine clearance (CrCl) of less than 50mL/min, at which most antibiotics require renal dosage adjustment. These 69 patients were prescribed 168 antibiotics, of which 129 required dose adjustment and 58/129 (45%) were dose-adjusted.

Within the UK hospital setting, where prescriptions are reviewed by a clinical pharmacist, renal dosing discrepancies should be detected and resolved. This may represent a threat to validity of renal dosing as a quality indicator for antibiotic prescribing in the UK as there is likely to be limited room for improvement. The purpose of this audit is to investigate whether dosing of antibiotics is consistently adjusted for renal impairment in a UK university hospital, whether under- or overdosing is detected by ward pharmacists and corrected and to evaluate associated outcomes.

DISCUSSION

It is evident that dissemination of the antimicrobial pocket guideline and prescriber training has coincided with improvement in adherence to the Trust vancomycin dosing guideline although there is still room for improvement. All patients who received a maintenance dose had blood taken to measure serum levels, and almost three quarters were taken within the timeframe recommended by the guideline.

The guideline delivered successful initial trough concentrations in 42% of cases, consistent with prediction data for the optimum pharmacokinetic (PK) methods. Thomson et al subsequently published PK modelling data and proposed less aggressive dosing for vancomycin; however this audit did not find consistently high serum levels despite more aggressive in-house dosing. Prescribers may perceive vancomycin levels above the target range as potentially nephrotoxic; however, in practice often only significantly high trough levels (>28mg/L) have been associated with toxicity. The trust plans to continue with the current vancomycin dosing guideline now ongoing education and clinical pharmacist implementation is vital in promoting adherence.

OBJECTIVES

1. To recruit patients on medical and elderly care wards prescribed antibiotics.
2. To identify under- or overdosing according to renal function.
3. To evaluate pharmacist intervention and any dose adjustments.
4. To compare outcome measures for patients dosed appropriately for renal function with patients overdosed or under-dosed for renal function.
5. To identify any areas for remedial action and propose appropriate solutions.

STANDARDS

1. 100% of patients with renal dysfunction dosed appropriately for renal function.
2. 100% of patients under- or overdosed have dose adjusted within 48 hours of pharmacist review.

METHODS

A data collection tool was designed and piloted. Data were collected over five days from eight medical and elderly care wards by a single auditor. Every prescription chart was reviewed and all patients prescribed antibiotics were included. Patients were excluded if they had no accurate weight recorded or if they were on dialysis. Outcome data were examined to determine if any over- or under-dosing had a detrimental effect upon the patient. Outcome measures included: serum creatinine; C-reactive protein; antibiotic serum levels (if appropriate); documented adverse drug reactions; monitoring were met for 50 (96%).

REFERENCES


RESULTS

Thirty-eight patients (21 from medical wards and 17 from elderly care wards), prescribed 96 antibiotics were included. Table 1 summarises the audit findings.

Only two of 96 antibiotic prescriptions required dose adjustment in renal impairment (one for co-amoxiclav and one for meropenem). In both cases, patients were prescribed doses higher than recommended for their renal function. There was no evidence of pharmacist intervention and dosing continued unchanged following pharmacist review of the prescription. No adverse outcomes were evident for these two patients. Four antibiotics (four patients) were under-dosed; one was a single dose administered prior to pharmacist review (amoxicillin) and three (chloramphenicol) were under-dosed on a mg/kg basis, again with no evidence of pharmacist intervention or adverse outcomes.

Standard 1: 87% (33/38) of patients had antibiotics prescribed at an appropriate dose for their renal function (90/96 prescriptions). However, dosage adjustment for renal dysfunction was only required for two prescriptions.

Standard 2: 0% (0/2) of patients who required dose adjustment for renal dysfunction had an appropriate dose adjustment made following pharmacist review.
DISCUSSION
The findings of this audit imply that it may not be safe to rely on pharmacists to intervene on dosing of antibiotics in renal dysfunction. Only two prescriptions in this audit required dose adjustment, but this did not take place despite pharmacist review. In the four cases of under-dosing, this was most likely due to errors in mg/kg dose calculation rather than intentional dose adjustment for renal dysfunction.

These findings suggest that there may be scope for improving antibiotic prescribing in renal dysfunction and it may therefore be appropriate to use renal dosing as an antibiotic prescribing quality indicator.

In the cases of over-dosing the pharmacist may have queried the dose; however there is no documentation to confirm this. Pharmacists must be encouraged to record when they have challenged an antibiotic dose with the prescriber even if the outcome is to continue with the original dose.

A repeat audit, sampling a larger cohort of patients, would be useful to confirm these findings. It should focus on those patients with significant renal impairment, selecting them with the help of the biochemistry laboratory and then considering what medications they are prescribed.

REFERENCES

Epidural safety: wrong dose, wrong drug, wrong route
SJ Heap, AM Conway, A St Clair Jones, W Caddy
Brighton and Sussex University Hospitals NHS Trust, Brighton (BSUH)

The consequences of epidural misadministration are serious and led to the death of a patient at BSUH in 2001. This and national events resulted in a 2007 National Patient Safety Association (NPSA) safety alert, with associated audit cycle and formed the basis of this investigation.

OBJECTIVES
- To assess improvements required to improve pharmaceutical aspects of epidural analgesia
- To investigate BSUH’s compliance with current best practice
- To identify any practices which could be cause for concern

METHOD
The study was conducted over a two-week period at the Royal Sussex County, Royal Alexander and Princess Royal Hospitals, which together form BSUH Trust.

To achieve the aims, the investigation was subdivided into three parts:
- The first re-audit of epidural compliance since the 2007 NPSA alert
- An on-site check of epidural storage guideline compliance
- A questionnaire directed at staff working with epidural patients and procedures, limited to anaesthetists, Operating Department Practitioners and recovery ward nursing staff

RESULTS
Re-audit: A comparison of the findings from the NPSA audit of 2007 with those from the re-audit during early 2009 are outlined below in table one, showing an improvement and the cessation of green line-labelling. See Table 1.

**Table 1: NPSA epidural audit results for 2007 and 2009**

<table>
<thead>
<tr>
<th>Question (target audit standard, %)</th>
<th>Audit year (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct epidural set used (100%)</td>
<td>19 (100.0%)</td>
</tr>
<tr>
<td>Line labelled with a sticker (100%)</td>
<td>18 (94.7%)</td>
</tr>
<tr>
<td>Of those labelled, is the sticker yellow (100%)</td>
<td>10 (50.0%)</td>
</tr>
<tr>
<td>Of those labelled, is the sticker green (0%)</td>
<td>17 (85.0%)</td>
</tr>
<tr>
<td>Bodyguard pump used (100%)</td>
<td>19 (100.0%)</td>
</tr>
<tr>
<td>Drug added to the pre-mixed bag (0%)</td>
<td>0 (0.0%)</td>
</tr>
</tbody>
</table>

**Figure 1: BSUH staff opinions compared with those of a 2005 study in Lewisham**

**DISCUSSION**
The re-audit showed a marked improvement and that labelling of lines is now compliant with national guidance, however one line was left unlabelled, perhaps signifying a need for permanently pre-labelled giving sets. The professional questionnaire raised some interesting points, detailed below:

A. Staff generally rated their own knowledge above that of their colleagues, implying a lack of confidence whilst 40% of staff felt the Trusts record
of epidural safety was below average. There was a bias in this group towards longer-serving members, with one explanation being that the 2001 incident biases the opinions of these staff, possibly indicating the need for improved feedback from audit cycles. B. Medics were broadly in favour of the national rationalisation of epidural products, however there were significant numbers (17.9%) who were opposed to this on the grounds of reduced choice for tailoring care to individual patients. The recent Trust-wide replacement of bupivacaine and ropivacaine by levobupivacaine was deemed to be much safer for patients, however a small number saw this as a substitute for improving other good practice. C. Staff almost unanimously felt training was adequate for their needs, however this may indicate the opposite to be the case as staff are unaware of the depth of further knowledge available. This was of particular concern to the acute pain team. D. The most significant improvement thought possible to patient safety by staff was the introduction of an epidural-only connection device, which would prevent the inadvertent misadministration of epidural products to other routes.

**REFERENCES**


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**An audit of compliance with Buckinghamshire Hospitals NHS Trust anticoagulant induction regimens for the management of patients with atrial fibrillation (AF)**

C. Weir, L. Pazik
Buckinghamshire Hospitals NHS Trust

In March 2007, new anticoagulant guidance was issued by the NPSA to ensure the safe use of anticoagulants. It identified safety indicators for anticoagulant services that can be used to compare Trust policy to practice. The alert advocated the use of low dose warfarin induction for the management of patients with atrial fibrillation (AF). Anecdotal evidence from clinical pharmacists suggested that many inpatients with AF were being initiated on warfarin using a rapid induction regimen (typically 20–30mg of warfarin over the first three days) as opposed to being started on low dose warfarin (1–2mg daily) as recommended. An audit of warfarin induction was undertaken to determine whether AF patients were being anticoagulated appropriately within Buckinghamshire Hospitals NHS Trust.

The standard for the audit was: 100% of patients with AF that require anticoagulation are initiated on warfarin using a low dose induction regimen.

**OBJECTIVES**

- To determine the number of patients with uncomplicated AF initiated on low dose warfarin
- To compare the compliance rates with low dose warfarin induction for patients initiated as inpatients to those initiated in the anticoagulant clinic
- To determine the number of patients with uncomplicated AF who received rapid induction and appropriate dalteparin administration
- To record and compare the first International Normalised Ratio (INR) at the anticoagulation clinic following initiation of warfarin therapy

---

**Table 1: Number of patients excluded from the audit and reasons for exclusion**

<table>
<thead>
<tr>
<th>Data problem</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of patients identified for collection</td>
<td>54</td>
</tr>
<tr>
<td>Patients were not prescribed warfarin</td>
<td>8</td>
</tr>
<tr>
<td>Patients were already warfarinised</td>
<td>6</td>
</tr>
<tr>
<td>Patients had no warfarin chart in notes</td>
<td>6</td>
</tr>
<tr>
<td>Patients did not meet the inclusion criteria for the audit.</td>
<td>7</td>
</tr>
<tr>
<td>Total number of patients included</td>
<td>27</td>
</tr>
</tbody>
</table>

**Table 2: Analysis of patients’ INR measurements one week post warfarin induction**

<table>
<thead>
<tr>
<th>INR</th>
<th>Below range</th>
<th>Within range</th>
<th>Above range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low dose induction</td>
<td>9</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Rapid induction</td>
<td>6</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

**METHOD**

Data was collected across the Trust of all patients who were initiated on warfarin for AF between March and June 2009 inclusive on both an inpatient and outpatient basis. Patient details included the patients name and Hospital (MRN) number.

Data was retrieved retrospectively from patient notes identified through the Medical records and Clinical audit department. The data was retrieved using a data collection form, the form was designed and piloted initially on patients on the emergency admissions unit, following the pilot a table was added making it easier to record warfarin doses and INR measurements.

**RESULTS**

Fifty-four patients were screened for inclusion in the audit. A number of patients had to be excluded for the reasons detailed in Table 1. Twenty-seven patients were included in the final audit.

It was found that 44% of warfarin induction regimens in patients diagnosed with AF were compliant with Trust guidance. Reasons for non-compliance were: co-prescribing of dalteparin, the initiation of patients on high dose warfarin or both. When comparing inpatient to anticoagulant clinic warfarin initiation it was found that 25% (4 out of 16) of inpatients received the low dose induction regimen compared to 75% (8 out of 11) of patients in the anticoagulant clinic.

On analysis of patients’ INR measurements one week post warfarin induction, it was found that there was a higher incidence of over-anticoagulation with rapid induction compared with low dose induction (Table 2).

**DISCUSSION**

This audit highlighted that the majority (56%) of AF patients being initiated on warfarin are prescribed rapid induction regimens. Patients initiated on warfarin rapid induction were generally found to have higher INR levels one week after induction in comparison to those receiving low dose induction regimens.

One limitation to this audit was the large number of patient notes that had to be excluded from the audit (27 patient notes out of the 54 obtained), a recommendation for future audits would be to perform a prospective study.

One reason for the prevalent use of rapid induction was the cardiologists’ view that it would be clinically appropriate to load a patient on warfarin for AF as long as therapeutic dalteparin is given concurrently. The current Trust guideline was developed by the haematologists in accordance with guidance from the British Journal of Haematology.

One recommendation would be that a revised clinical guideline be drawn up to specify under what circumstances low dose warfarin...
Vancomycin is a classical glycopeptide antibiotic effective against severe gram-positive bacterial infections. Intravenous vancomycin has a narrow therapeutic index and requires close monitoring of serum concentration. The Trust Adult Antimicrobial Guide (referred to as “trust guidelines”) was developed to support and promote clinicians’ appropriate prescribing of antibiotics.

A baseline audit conducted between 17 November and 5 December 2008 assessed the adherence to trust guidelines on vancomycin prescribing, administration and therapeutic drug monitoring (n=40). The results showed poor adherence and consequently possible poor management of vancomycin therapy. The present audit set out to assess the quality of pharmaceutical care received by the individual patients previously audited and individual patients’ clinical outcome based on vancomycin management.

**OBJECTIVES**
- To assess the quality of vancomycin management received from day 1 to 5 of treatment in individual patients
- To compare the quality of management with actual patient outcomes

**STANDARDS:**
- Vancomycin level is taken at the appropriate time
- The action taken on vancomycin level is appropriate
- Patient clinical outcome improves

**METHOD**
Retrospective data collection from electronic patient records (EPR) and/or paper clinical notes, observation and drug charts of 20 patients from the previous audit. Laboratory results of serum drug levels, white cell count (WCC) and C-reactive protein (CRP) were assessed. Documented patient improvement entry made in patients’ notes by multidisciplinary teams was sourced.

The criteria used in assessing proper vancomycin management (referred to as “vancomycin management criteria”) were: appropriate dose and frequency, drug levels taken at right time, correct action taken on drug levels, and absence of unnecessary missed doses.

The criteria used in assessing clinical outcome (“clinical outcome criteria”) were an improvement in WCC, CRP, and clinical condition. The limitation of the audit was the small number of patients and incomplete documentation by clinical staff.

Table 1: Summary of vancomycin management and clinical outcome in individual patients

<table>
<thead>
<tr>
<th>Patient</th>
<th>Time levels taken appropriate</th>
<th>Appropriate action taken on drug levels</th>
<th>Unnecessary missed dose</th>
<th>WCC/CRP Temp improvement</th>
<th>Drug level within reference range</th>
<th>Overall clinical Improvement</th>
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</thead>
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<tr>
<td>1</td>
<td>No</td>
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</table>

The criteria used in assessing clinical outcome (“clinical outcome criteria”) were an improvement in patient clinical outcome.
Proactive risk management of local anaesthetic infusions for nerve blocks

A Fox, J Trim
Departments of Pharmacy andAcute Pain, Southampton University Hospitals Trust (SUHT)

Local anaesthetics (LA) are used as one of the treatment modalities to relieve postoperative pain. Continuous infusions of bupivacaine used to block pain transmission have also been shown to reduce pain and opioid requirements whilst improving patient outcomes after surgery.1 A number of nerve blocks are performed within SUHT including femoral nerve and paravertebral nerve blocks as well as stump wound infiltration. Two NPSA medication safety alerts2,3 highlighted the general risks associated with injectable medicines (alert 20) and specifically epidural infusions (alert 21). During the implementation of these alerts in SUHT it became clear that LA infusions posed a similar risk to epidurals and needed to be reviewed.

OBJECTIVES
■ To identify the risks associated with current LA infusion practice
■ To review LA concentrations stocked and rates of infusion used
■ To review and assess the suitability of other infusion devices/delivery methods
■ To implement agreed standardised practise trustwide

METHODS
A working party consisting of a pharmacist, anaesthetist and acute pain nurse was set up as a subgroup of the trust medication safety group. The group worked on the objectives outlined above and set out to make recommendations. Local incident reports and epidural audits were also reviewed.

RESULTS
Identified risks: The working party identified the following risks with LA infusions.

■ Risk 1: Inadvertent IV administration due to similarities of administration process. This risk was increased in patients with comorbidities as these patients are more likely to have multiple lines administering parenteral medications at the same time.
■ Risk 2: Preparation of the LA infusion in clinical areas prior to use. This practice is common for numerous drugs but increases the risk of medication errors particularly when multiple manipulations are required to make the infusion.

Infusion practice: Rates of infusion ranged from 5 to 12mls/hour; concentrations used were 0.125%, 0.15% and 0.25%. Delivery devices reviewed included prefilled dedicated delivery systems and dedicated LA infusion pumps with premixed infusions.

Implementation: Following the review a decision was made to purchase dedicated infusion systems of a similar design to the epidural pumps but a different colour (grey). The LA chosen was bupivacaine 0.125% as this was already stocked in the pharmacy in a pre-mixed bag.

Funding was secured from the trust following presentation to the trust board and training for the pumps was rolled out to an agreed timetable.

DISCUSSION AND CONCLUSION
Local implementation of the NPSA recommendations identified a specific risk of inadvertent IV administration of a LA infusion. There were several areas of risk associated with current practice.

In addition, infusion syringes were being prepared by nursing staff in treatment rooms using multiple LA ampoules to fill a 50ml standard IV syringe for us in a syringe pump. The high risk nature of LA coupled with the number of manipulations required gave this process a high risk rating on the SUHT injectable risk assessment.

The multidisciplinary working party made recommendations and a new system was introduced. A risk assessment of the new system was carried out and the following areas identified:
■ Risk 1: Safe storage of LA infusion. All LA pre-filled bags are stored separately from IV fluids in the same way as epidurals. Regular audit undertaken by Pharmacy has shown 100% compliance with storage requirements.
■ Risk 2: Identification of pre-filled bags. All LA pre-filled bags are printed "For Regional Block Use Only" and this could cause confusion. To help avoid confusion labels with “For Regional Block Use Only” have been produced and are applied to the bags when set up in theatre. It was considered in SUHT that though undesirable, inadvertent epidural administration of a LA was preferable to inadvertent IV administration.
■ Risk 3: Identification of giving set. All dedicated giving sets have a “for regional block use only” label applied patient end of the giving set.
■ Risk 4: Inadvertent IV infusion of LA. The new system is visually and technically different from administration of an IV infusion in contrast to previous practice. This should help to prevent IV administration of a LA.

Future work: Training and roll-out of the new system continues with continuous feedback from clinicians and nurses. The concentration of LA is to be increased in order to reduce flow rates. It is hoped that a single 500ml bag of LA will be suitable for all patients. This will help storage issues and reduce the need for ward nursing staff to access the pump and change the infusion bag.

By proactively identifying the risks involved in administration of LA block in SUHT and developing specific solutions to prevent errors the use of these blocks has been made significantly safer.

REFERENCES
1 Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine.; Acute Pain Management: Scientific Evidence 2nd Ed. National Health and Medical Research Council 2005.

Comparing the clinical quality of discharge prescriptions written by pharmacists to those written by doctors

K Callaghan, A Considine, S Knighton
Department of Pharmacy, King's College Hospital NHS Trust

Facilitating discharge is a key role for pharmacy staff and is important for patient outcome and satisfaction. To improve this process the clinical pharmacy team introduced a pharmacist-led discharge prescription-writing service, known as “drug lists”.

Currently NICE guidelines recommend that all information regarding medication changes made during inpatient stay should be clearly and accurately provided to the patient’s GP on discharge.1 Previous local work has investigated the service impact of pharmacist-written drug lists. However, as yet no work has been done to investigate the clinical quality of
drug lists. It is anticipated that by assessing this there will be evidence to support the further development of pharmacist-written drug lists across the trust.

**OBJECTIVES**

Compare pharmacist-written drug lists to doctor-written discharge prescriptions for:

1. The number and types of amendments required on discharge prescriptions.
2. The quality of information given on the discharge prescriptions regarding changes made to medication during inpatient stay.

**STANDARD**

100% of discharge prescriptions should clearly state which medication changes were made during inpatient stay as well as explain the reasons behind these alterations.

**METHOD**

Data was collected prospectively from four study wards, between Monday and Friday over a period of three months. The divisions chosen were:

- Area 1 (Pharmacist-written drug lists, specialist medicine)
- Area 2 (Pharmacist-written drug lists, non-specialist medicine)
- Area 3 (Doctor-written discharge prescriptions, specialist medicine)
- Area 4 (Doctor-written discharge prescriptions, non-specialist medicine)

Discharge prescriptions were identified using a system that records which prescriptions have been sent to pharmacy for dispensing and by contacting the ward Pharmacist. A copy of the patients’ drug chart, which details their medication history and reconciliation at admission, was also made.

Objective 1 of the study was completed for Area 1 and Area 3 only.

For Objective 2 of the study the discharge prescription was compared to the patients’ medication history on admission. The number and type of medication changes made during the admission and if these were detailed on the discharge prescription were recorded.

**RESULTS**

Of 97 discharge prescriptions reviewed 48 were pharmacist-written drug lists (29 area 1, 19 area 2) and 49 were doctor-written discharge prescriptions (20 Area 3, 29 Area 4).

**Objective 1:** None of the drug lists written by the pharmacist in Area 1 (n = 29) required amendment following screening by the second checking pharmacist. In comparison, 40% (n = 8/20) of prescriptions written by the doctor in Area 3 required amendment.

**Objective 2:** Of the 97 discharge prescriptions reviewed, 84 had had medication changes made during their admission. This equated to 485 changes. Of these 233 were highlighted on the discharge prescription. Table 1 details the breakdown of this.

A far higher percentage of the pharmacist-written discharge prescriptions detailed a reason for medication changes made.

**DISCUSSION**

The standard set for this study was not reached by either pharmacists or doctors and work will need to be done to ensure the importance of detailing medication regimen changes upon discharge is stressed.

In comparing the quality of information provided on pharmacist-written drug lists and doctor-written discharge prescriptions, it is clear that there is disparity (Table 1). It is evident that the reason for medication change is more documented in specialist areas when compared to non-specialist divisions. Potentially this demonstrates that pharmacists placed in specialist areas are better positioned to use their focused knowledge to write drug lists than those working in non-specialist areas. As a result, the development of the drug list system should be considered first in specialist clinical areas, followed by a consideration to pilot ways to better introduce drug lists in non-specialist divisions.

This demonstrates that pharmacist-written drug lists improve clinical quality of the discharge prescription, which should help in the rolling out of the drug list initiative and helping improve a patient’s overall inpatient experience.

**REFERENCES**


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**Table 1: Number of medication changes during in-patient stay documented on discharge prescription**

<table>
<thead>
<tr>
<th>Speciality</th>
<th>Area 1</th>
<th>Area 2</th>
<th>Area 3</th>
<th>Area 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of medication changes</td>
<td>134</td>
<td>56</td>
<td>183</td>
<td>112</td>
</tr>
<tr>
<td>Is change highlighted on discharge letter?</td>
<td>70 (52%)</td>
<td>36 (63%)</td>
<td>66 (36%)</td>
<td>61 (54%)</td>
</tr>
<tr>
<td>Is reason for change documented on discharge letter?</td>
<td>54 (77%)</td>
<td>11 (31%)</td>
<td>14 (21%)</td>
<td>4 (7%)</td>
</tr>
</tbody>
</table>

**Table 2: Types of medication changes made during admission**

<table>
<thead>
<tr>
<th>Number and type of medication changes</th>
<th>Area 1 (n = 134)</th>
<th>Area 2 (n = 56)</th>
<th>Area 3 (n = 183)</th>
<th>Area 4 (n = 112)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New drug initiated</td>
<td>80 (60%)</td>
<td>50 (9%)</td>
<td>149 (81%)</td>
<td>95 (84%)</td>
</tr>
<tr>
<td>Existing drug stopped</td>
<td>44 (33%)</td>
<td>5 (9%)</td>
<td>28 (15%)</td>
<td>10 (9%)</td>
</tr>
<tr>
<td>Drug replaced</td>
<td>3 (2%)</td>
<td>1 (2%)</td>
<td>6 (4%)</td>
<td>3 (3%)</td>
</tr>
<tr>
<td>Dose changed</td>
<td>5 (4%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>3 (3%)</td>
</tr>
<tr>
<td>Other</td>
<td>2 (1%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (1%)</td>
</tr>
</tbody>
</table>

---

**A case report of the concurrent use of continuous vancomycin infusion (CI) and plasma exchange (PE)**

H McHale, Z Hickman, D Pogson, P Sadler
Portsmouth Hospitals NHS Trust, Portsmouth

A patient with Wegener’s granulomatosis on daily plasma exchange (PE) required vancomycin for MRSA pneumonia. Vancomycin twice daily intermittent infusions (II) were started; however, after three days of therapy, trough levels remained subtherapeutic. It was suspected that the delay in achievement of therapeutic levels may have been due to clearance by PE.

The evidence for vancomycin clearance due to PE is controversial. Some small studies demonstrate minimal clearance with PE1 while others show increased clearance of up to 48.5%.2

As vancomycin has a time-dependent action it is important to ensure therapeutic levels are achieved promptly and for as long as possible. Therefore it was thought that a continuous infusion of the drug may be beneficial.

Continuous infusions (CI) have been shown to have comparable efficacy and tolerance to intermittent dosing and one study reported that the MIC was exceeded after 24 hours and for the duration of the CI.3 However, no literature on the concurrent use of CI and PE could be found.

**OBJECTIVE**

The aim of this case study is to demonstrate vancomycin levels that were obtained whilst the patient was on daily PE with II and CI.
To develop and pilot a MCA assessment tool

METHOD

The patient received 5L PE daily for 14 days. Renal function was good. On the fifth day of PE vancomycin II 1g bd was started, increasing after 48 hours to 1.5g bd, aiming for levels of 15-20mg/l. Doses were administered post PE and 12 hours later to maximise drug distribution before the subsequent PE. Trough levels were monitored initially 48 hours after commencing vancomycin and then every 24 hours. When therapeutic levels had not been achieved 48 hours after the increased dosage a CI was started post PE with a 1g stat dose followed by a continuous infusion of 2g over 24 hours. The concentration of the maintenance infusion was 5mg/ml. Initially levels were taken 12 hours post initiation of the CI, (i.e. before the next PE) and also post PE to determine the effect PE was having on vancomycin clearance and whether further 1g stat doses would be required. The infusion was increased to 3g over 24 hours after the results of the first level were received with the aim of achieving target levels of 15mg-25mg/l. Levels were then taken every 24 hours (pre-PE) and on the last day of treatment an additional level post PE was taken. Times of doses administered and levels taken are shown in Figure 1.

RESULTS

Levels achieved with II and CI are shown in Figure 1. It was difficult to achieve therapeutic vancomycin levels with II, 48 hours after initiation of II 1g bd, levels were only 3.3mg/l. With the increased dose of 1.5g bd trough levels taken 24 hours after the dosage change (pre-PE) only increased to 6.6mg/l and 24 hours later dropped to 5.5mg/l.

When CI 2g over 24 hours was initiated levels doubled within the first 12 hours to 10mg/l. Levels post PE on this dose dropped slightly to 9.3mg/l indicating that further 1g stat doses were not required. The dose was then increased to 3g over 24 hours and levels taken 12 hours later increased to 11.2mg/l. Vancomycin levels achieved at 24 hourly intervals after this were 15.9mg/l, and 17.7mg/l. A last level taken post PE before the vancomycin infusion was stopped was 15.9mg/l.

The patient subsequently recovered from the infection and was discharged after a prolonged respiratory wean.

DISCUSSION

Vancomycin continuous infusion enabled therapeutic levels to be achieved within 60 hours of initiation and maintained while the patient was on PE. This case report also indicates that PE may not clear vancomycin as effectively as initially thought once target levels had been achieved.

This case report is limited as it is not possible to determine whether the doubling of vancomycin levels seen 12 hours post initiation of CI was solely due to the method of administration or whether these levels would have been achieved in the same time with further II doses. The low levels may have been the result of initial distribution of the drug. McClellan et al estimated that there is only minimal vancomycin II clearance with PE by measuring the amount of vancomycin in the plasma removed.1 However, with the importance of achieving therapeutic levels promptly and the fact that vancomycin has a time-dependent action it was felt in this case that prolonged subtherapeutic levels may indicate that the patient was not being treated effectively.

Further research into vancomycin CI with PE is needed to determine if the use of CI does reliably achieve therapeutic levels quicker and for a longer duration than II.

REFERENCES


The development and evaluation of a “medication compliance aid” assessment tool for use in a secondary care setting

J Dunlop*, C Parsons*, S Laird®, R O'Hare1, R McNulty1
*Queens University Belfast; 1Southern Health and Social Care Trust; 2South Eastern Health and Social Care Trust

Therapeutic goals will not be achieved if patients are non-concordant with medication regimens. This can result in worsening disease management, hospital readmissions and subsequent increased costs.1 Barriers to medication adherence are numerous and well documented. One method of improving compliance is multidose repackaging, commonly referred to as a “medication compliance aid” (MCA), Dosette or Medidose box. MCAs are only effective in patients who are orientated in time/place and who can remove the dosage forms from the aid compartments. Although there are many advantages to their use, MCAs are time consuming to fill and medication stored alongside other drugs in a MCA invalidates the medication product licences. MCAs are often requested inappropriately for patients who require alternate methods of support for medication adherence and often MCA requests are too close to patient discharge for dispensary staff to fulfil the requirements.

There have been no specific studies undertaken to evaluate the prevalence and appropriateness of compliance aids in a secondary care setting. In primary care, one study considered the prevalence of MCAs, concluding that an assessment should be performed to determine individual needs and the appropriateness of an MCA.2 Another study evaluated the cost-effectiveness of multidose repackaging in long-term care institutions, suggesting that future research should focus on the selection of patients who benefit the most from multidose repackaging.3

AIM AND OBJECTIVES

To develop and evaluate the use of MCAs in a secondary care setting:

- To develop and pilot a MCA assessment tool
- To evaluate current practice relating to the use of MCAs

METHOD

Key stakeholders were identified (nursing staff, clinical pharmacists and technicians, community pharmacist) and their views as well as a literature search informed the development of the pilot MCA assessment tool. The tool was piloted over one week where all requests for MCAs through the pharmacy dispensary were referred to the researcher for assessment using the MCA assessment tool.

Current practice required the annotation of the discharge letter with a request for the dispensary to supply a MCA. The prevalence and appropriateness of MCA use in the hospital was established via the retrospective use of the MCA assessment tool on all discharge prescriptions.
from December 2009. A senior clinical pharmacist in the hospital reviewed the MCA requests for appropriateness of MCA use in this patient and for suitability of prescribed drug storage in a MCA.

RESULTS
An MCA assessment tool was produced for use within the hospital. Thirty-four patients were discharged with a MCA in December 2009 with 30 patients (88%) deemed suitable for a MCA. The median patient age was 84 years (range 43–94 years). The median number of drugs per MCA was five (range one to five) and the majority of the medications included were for the management of chronic conditions. Twenty-four of the 34 discharge prescriptions (71%) had contact details for a community pharmacy to facilitate long-term follow-up with an MCA. Table 1 shows the reasons for the MCA use in patients discharged in December 2009, with age as the most common reason. Some patients had more than one reason.

Key stakeholders identified concerns regarding MCA requests such as timing of requests, suitability of drugs for inclusion e.g. soluble aspirin and who requested the MCA. Although nurses were aware that only solid oral dosage forms were suitable for inclusion in a MCA they were not aware which drugs were unsuitable therefore this information was included as an appendix to the MCA assessment tool. A staff identifier for who requested the MCA was also included on the assessment tool in order to facilitate queries regarding the appropriateness of the request. The MCA assessment tool also included a section to confirm long-term supply of a MCA via the patient-nominated community pharmacist prior to initiation of the service on discharge.

DISCUSSION
This study demonstrated that current practice in the hospital was to supply MCAs to patients with a median patient age of 84 years prescribed a median number of five medications and that 88% of requests were suitable. This study attempted to develop a tool to improve the appropriateness of MCA requests and to streamline workflow at discharge through a busy dispensary. The MCA assessment tool was successfully developed and used retrospectively but due to time constraints was not used prospectively prior to the end of the study period. This study however highlighted some key issues in the supply of MCAs including the lack of knowledge at ward level regarding unsuitable medicines for inclusion in an MCA, and the need to confirm long-term supply of an MCA with a nominated community pharmacist prior to initiation of the device as well as the need to consider alternative methods of medication adherence such as intensive patient counselling.

LIMITATIONS
This was a retrospective study that led to assumptions regarding the reasons for MCA for some patients. For future work we would seek to use this tool prospectively. We assumed that all patients with cognitive impairment would receive an MCA, they were excluded from this study.

REFERENCES

Are warfarin patients with atrial fibrillation reviewed using the CHADS2 score?
S Li-Yan-Hui, A Shah, I Man, A Nandani

The CHADS2 score is a stroke risk stratification scheme, which estimates the risk of stroke in elderly patients with atrial fibrillation (AF), which increases the risk of stroke four- to five-fold. The scheme produces a score out of 6 to quantify the risk of thromboembolic stroke in patients. There are five risk factors: Congestive heart failure, Hypertension, Age >75 years, Diabetes (worth a point each) and Stroke/transient ischaemic attack (worth two points). AF patients with a CHADS2 score >2 should remain on warfarin, while aspirin is an option in those with a CHADS2 score of <1. The CHADS2 score is a simple classification scheme, compared to the low, medium, high stratification scheme suggested by NICE. Rather than researching patient’s history, the CHADS2 score allows physicians to tick the yes/no boxes based on their patient’s relevant conditions.

The North Central London Anticoagulation and Stroke Prevention Services (NCLASP) determined which AF patients were at greater risk of thromboembolic stroke by using the CHADS2 score. The clinical governance board at NCLASP proposed a “standard” that all patients should receive a minimum annual review with a doctor.

AIM
Currently, there are no recognised standards for doctors to review patients and their use of warfarin in AF. The objectives of this audit were:
1. Using the proposed “NCLASP standard”, to determine how many AF patients have received an annual review.
2. To establish whether risk-assessed patients should continue taking warfarin (using the CHADS2 Score).

METHOD
Following a pilot, data was collected prospectively on AF patients who attended a primary care anticoagulation clinic, over one month. Patients’ doctors were contacted to clarify any information queries. Each patient was only included once, even if they visited the clinic more than once during the data collection period.

RESULTS AND DISCUSSION
Data was collected from 93 patients with AF, seen at the clinic over one month. 73% of patients had a CHADS2 score ≥2 and with their concurrent AF, thus should remain on warfarin. According to Figure 1, 27% of patients should be off warfarin and/or on aspirin. (7% and 20% of patients had a CHADS2 score of zero and one, respectively)

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Table 1: Analysis of reasons for MCA use

<table>
<thead>
<tr>
<th>Reason for MCA use</th>
<th>Patient number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>11</td>
</tr>
<tr>
<td>TIA or stroke</td>
<td>5</td>
</tr>
<tr>
<td>Parkinson’s disease</td>
<td>4</td>
</tr>
<tr>
<td>Non-compliance</td>
<td>3</td>
</tr>
<tr>
<td>Polypharmacy</td>
<td>2</td>
</tr>
<tr>
<td>COPD</td>
<td>1</td>
</tr>
<tr>
<td>Poor vision</td>
<td>1</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 1: Percentage of patients and their CHADS2 score

- % of Female patients
- % of Male patients
- % of all patients

<table>
<thead>
<tr>
<th>Score of CHADS2</th>
<th>Percentage of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>
respectively, and doctors should review these patients’ warfarin requirements.) Therefore, of the 373 patients with AF attending clinic, 101 patients could stop their anticoagulant therapy, leading to a potential saving of £27,169 (based on £26.90/visit and 10 visits/year).

81% of patients had been told that they would have to be on warfarin lifelong. However, 18% of patients were unclear of their duration of treatment and were to remain on it until informed otherwise. Annual use of a CHADS2 Score would minimise prolonged treatment.

Over 50% of patients at the clinic had not been reviewed by their doctor since initiation of treatment, and only 17% of patients had undergone an annual review within the suggested “standard”.

CONCLUSION
The data shows that the majority of patients had not had an annual warfarin review by their GP or hospital consultant. 27% of the patients seen with a CHADS2 score of < 1 should be reviewed with a view to stopping their anticoagulant.

Considerations such as age, adherence, dementia, polypharmacy, side effects (most significantly haemorrhage) and additional co-morbidities such as uncontrollable hypertension and/or a history of bleeding, may affect decisions made for patients’ anticoagulation.

The number of patients unsure of how long they are to remain on warfarin and those presuming that they are going to be on it lifelong, suggests that patients are not fully aware of why they are taking the drug and the risk factors contributing to why they are on it.2 Almost 20% of patients were not informed as to how long their warfarin treatment was. The implications — some patients remain on warfarin, when aspirin or no anticoagulant therapy would be reasonable. Due to the increased incidence of bleeding associated with warfarin, patients with a low CHADS2 Score should be reviewed by their GP for potential discontinuation of anticoagulation.

RECOMMENDATIONS
■ All patients attending the warfarin clinic should have their CHADS2 Score calculated for them, if their CHADS2 Score is one or less, their GP should be contacted and asked for a warfarin review to assess the patient’s needs.
■ Patients who have not had a warfarin review within the year, should request a review.
■ Patients who are unsure of why they are on warfarin or how long they are to remain on warfarin should be informed.
■ The audit should be repeated over a longer duration of time, i.e. 4 months, to ensure that all patients taking warfarin for AF are seen in the clinic.
■ An audit should be repeated after 6 months this time in order to follow up as to whether the patients have had an annual review with their GP, especially those patients with a CHADS2 Score <1.
■ Another factor to consider is the length of time that the patient has been in range. Studies have shown that continued treatment with warfarin offers no or limited benefit, if a patient cannot achieve and maintain a therapeutic INR for more than 40-70% of the time or mortality and stroke respectively.3

REFERENCES
3 National Institute for Health and Clinical Excellence. 36 Royal College of Physicians Atrial Fibrillation: Primary and Secondary Care 2006.
Are prescribing errors appropriately reported?

C Burgess, G Cavell
Pharmacy Department, King's College Hospital NHS Foundation Trust, London

The role of the clinical pharmacist in identifying and correcting prescribing errors is well recognised.1 The definition of a prescribing error including

Table 1: Method of group formation

<table>
<thead>
<tr>
<th>Groupwork task</th>
<th>Method of group formation</th>
<th>Number of students (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmaceutical care plan</td>
<td>Allocated by teacher-practitioner</td>
<td>101 (73%)</td>
</tr>
<tr>
<td>Pharmaceutical care plan</td>
<td>Chosen myself</td>
<td>37 (27%)</td>
</tr>
<tr>
<td>Project</td>
<td>Allocated by teacher-practitioner</td>
<td>22 (17%)</td>
</tr>
<tr>
<td>Project</td>
<td>Chosen myself</td>
<td>115 (83%)</td>
</tr>
</tbody>
</table>

Most students indicated they preferred to select their own groups for the assessed tasks. Reasons included choosing students with a similar work ethic or who lived in close proximity to facilitate practicalities such as meeting outside of class.

Where group function was deemed “satisfactory”, influencing factors included student domination, lack of participation, absenteeism and poor motivation. Lack of tutor support was also attributable. Most students felt that the assessment methods chosen were appropriate, and mark allocation fair. Where students indicated that assessment methods were inappropriate, reasons included unequal group participation and perceived differences in project workload and level of difficulty.

DISCUSSION

Educational literature acknowledges that student, tutor and external factors influence group function.2 The method of group formation is also influential.3 The results indicated that most students preferred to form “friendship” groups. Reasons for this included choosing colleagues with similar academic abilities and ensuring social adhesion. These mirrored findings in the literature.1 Small group sizes ensured minimal disruption to the wards and minimised the risk of passenger behaviour; however, this still emerged where lack of participation was identified. Poor tutor support due to work pressures was also identified as a factor hindering group function, which is echoed in the literature.2 In the future, students will be asked to provide individualised tutor feedback, which will be communicated with tutors and their line managers to provide information about performance and enhance commitment to teaching students. External factors, such as perceived differences in project difficulty and workload also influenced group function.2 Future projects will be reviewed to standardise them where possible, although this will be difficult to achieve. All students within the group were awarded the same mark, which was unfair where passenger behaviour emerged. The method of mark allocation will be reviewed with consideration of peer or self-assessment.

OBJECTIVES

■ To measure the number of self-reported clinical pharmacy contributions which meet the published definition of a prescribing error and which meet the Trust definition of a reportable prescribing error.
■ To compare the number of locally reportable prescribing errors with errors reported as adverse incidents
■ To propose target monthly prescribing error reporting rates for clinical pharmacists to be incorporated into a performance scorecard

METHODOLOGY

Data recorded during contribution week 2008 were collated in an Excel spreadsheet. Data were sorted by clinical division. The investigator examined each contribution and compared it to (a) the published prescribing error definition (DPE) and (b) the trust reportable prescribing error definition (RPE). The investigator recorded whether the contribution met either or both definitions. Contributions which were reported as adverse incidents using the trust incident reporting system were also highlighted. The percentage of contributions that were defined as both RPEs and DPEs was calculated. The number of trust RPEs reported by each division was used to propose target reporting rates for inclusion on a scorecard.

RESULTS

During contribution week 2008, 616 contributions categorised as prescribing errors were reported by pharmacists. Of these 571/616 (93%) were confirmed as prescribing errors using the published definition. One hundred and thirty three contributions were classified as trust RPEs, representing 22% (133/616) of all recorded prescribing errors and 23% (133/571) of prescribing errors meeting the published prescribing error definition. Twenty-five errors (25/616, 4%) could not be classified due to lack of information or confusing descriptions in the contribution report.

Table 1: Frequency of reportable prescribing errors identified by pharmacy staff

<table>
<thead>
<tr>
<th>Division</th>
<th>Number of RPEs identified per week</th>
<th>Percentage of all reports</th>
<th>Proposed target reporting rate per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>General medicine</td>
<td>40</td>
<td>30%</td>
<td>40</td>
</tr>
<tr>
<td>Surgery</td>
<td>26</td>
<td>20%</td>
<td>25</td>
</tr>
<tr>
<td>Haematology</td>
<td>14</td>
<td>14%</td>
<td>15</td>
</tr>
<tr>
<td>Paediatrics</td>
<td>17</td>
<td>13%</td>
<td>20</td>
</tr>
<tr>
<td>Cardiology</td>
<td>14</td>
<td>11%</td>
<td>15</td>
</tr>
<tr>
<td>Liver</td>
<td>8</td>
<td>6%</td>
<td>10</td>
</tr>
<tr>
<td>Outpatients (pharmacy)</td>
<td>4</td>
<td>3%</td>
<td>5</td>
</tr>
<tr>
<td>Women’s Services</td>
<td>2</td>
<td>1%</td>
<td>2</td>
</tr>
<tr>
<td>Private patients</td>
<td>1</td>
<td>&lt;1%</td>
<td>2</td>
</tr>
<tr>
<td>Intensive care</td>
<td>1</td>
<td>&lt;1%</td>
<td>2</td>
</tr>
<tr>
<td>GUM/HIV</td>
<td>1</td>
<td>&lt;1%</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>100%</td>
<td>–</td>
</tr>
</tbody>
</table>

REFERENCES

Eighteen contributions categorised as prescribing errors by reporters (18/616, 3%) did not meet either prescribing error definition. A small number of errors met the trust RPE definition but not the published prescribing error definition.

Seven of the 133 errors which met the Trust RPE definition were reported to the trust as adverse incidents (7/133, 5%).

Prescribing errors that were not classified as trust RPEs but met the published definition commonly involved errors in prescription writing when admitting and discharging patients (e.g. minor errors/omissions on discharge prescriptions unlikely to cause patient harm), and errors involving legibility and legality of non-critical prescriptions (e.g. omission of signature).

The frequency of trust RPEs identified within each clinical division is described in Table 1.

**DISCUSSION**

The results of this project indicate that clinical pharmacists commonly encounter RPEs. The high number of RPEs noted in General Medicine and Surgery are likely to be a reflection of high bed numbers combined with prescribing from a broad catalogue of medicines. Relatively high numbers of RPEs were also seen in haematology, paediatrics and cardiology where bed numbers are lower, but medicines used are more likely to result in clinically significant adverse effects if incorrectly prescribed, e.g. chemotherapy and insulins. Pharmacists in other highly specialist areas such as Liver, HIV and Intensive Care are less likely to identify and correct trust RPEs as a relatively narrow range of medicines are prescribed according to predefined protocols.

Only 23% of recorded DPEs met the trust definition of a reportable prescribing error. Use of the published definition reflects the rate of all prescribing errors including those of minor or no clinical significance, but without careful interpretation may result in a falsely high impression of the risk of patient harm from prescribing errors.

Analysis of local clinical pharmacy contribution data has enabled us to establish an incidence of reportable prescribing errors within our trust. This information has been used to propose target rates for adverse incident reporting activity of clinical pharmacy teams which can be measured and targeted for improvement.

**REFERENCES**


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**Impact of change in practice: pharmacist-led respiratory syncytial virus (RSV) immunoprophylaxis clinic**

**T Vaghela, C Ramesh**

Watford General Hospital, West Hertfordshire Hospitals NHS Trust

Respiratory syncytial virus (RSV) bronchiolitis is a common cause of lower respiratory tract disease in infants and young children in the winter period. Premature babies, children with chronic lung disease (CLD) and congenital heart disease (CHD) are at high risk of developing severe RSV disease. The mortality rates in these infants are high (3.4% vs <1%). Environmental factors such as exposure to RSV and tobacco smoke is associated with severe RSV disease.

Palivizumab is a monoclonal antibody licensed for preventing serious RSV bronchiolitis in high-risk infants. Immunoprophylaxis with palivizumab is the only strategy that has demonstrated consistent efficacy in reducing hospitalisations in high risk infants. The recommended dose of palivizumab is 15mg/kg body weight, administered by intramuscular injection once a month throughout the RSV season (October to March).

In 2006 a pharmacist-led RSV immunoprophylaxis clinic was set up following a review of the 2005–06 immunoprophylaxis programme, which showed 50% hospital admission of infants who received palivizumab immunoprophylaxis. The new multidisciplinary clinic team consisted of pharmacist independent prescriber, consultant paediatrician and a paediatric nurse. At the first clinic appointment, the pharmacist obtains informed consent and discuss about RSV and palivizumab. The pharmacist also gives information on hand hygiene, minimising exposure to RSV and avoidance of tobacco smoke which is reinforced at each subsequent clinics. After weighing the baby the pharmacist prescribes the palivizumab and the nurse administers it.

**OBJECTIVE**

To measure the impact of a new pharmacy-led RSV immunoprophylaxis clinic on hospital admission rates in high-risk infants with RSV bronchiolitis.

**METHOD**

Retrospective data was collected for all infants who attended the clinic from 2006/07 to 2009/10. Using a standardised form, clinic attendance, adverse events and hospital admission with RSV bronchiolitis during RSV season were documented. Preclinic data for the season 2004/05 and 2005/06 were collected along with adverse events and hospital admission with RSV bronchiolitis.

**RESULTS**

All infants received palivizumab in accordance with the local peri-natal network guidelines. The results are set out in Tables 1 and 2.

**DISCUSSION**

The results show that in the four years since the implementation of the clinic there have been no hospital admissions of high risk infants with RSV bronchiolitis. This is in contrast to the preclinic results where five out of 15 infants were admitted over a two-year period. The reduction in the number of high risk infants admitted with RSV bronchiolitis following the introduction of the pharmacist-led clinic may be due to a number of factors. One major contributing factor is parental education which forms an important part of any immunoprophylaxis program. At the initial visit the pharmacist provides detailed information on palivizumab, discusses the risk factors associated with development of severe RSV bronchiolitis such as...
Development of an electronic document to record medicines reconciliations completed by pharmacists in a large teaching hospital

LJ Harper, A Asghar, A Burgin, N Kirby, E Lamerton, K Mellor, M Stapleton, S Wills, J Whittam, J Scanlan
Department of Pharmacy, Salford Royal NHS Foundation Trust, Salford.

NICE/NPSA technical patient safety solutions for medicines reconciliation on admission of adults to hospital (NICE/NPSA/2007/ PSG001) indicates that a medicines reconciliation should occur as soon as possible after admission to hospital for all acute and emergency admissions for adult patients. Extended inpatient stays and delayed discharges may occur if medicines reconciliation is not appropriately completed. It is expected that the majority of medicines reconciliations will be performed by pharmacists as part of scheduled ward pharmacy visits.

Salford Royal NHS Foundation Trust (SRFT) has an electronic patient record (EPR) system which can be accessed by all healthcare professionals working within the trust. The EPR is a computer-based system which mirrors the function of patient paper notes. Healthcare professionals add patient information as free text or using structured forms. Pharmacists are authorised to write clinical notes on the EPR and it was agreed that it would be beneficial for pharmacists to document on the EPR medicines reconciliations that they had undertaken. This information would then be readily available to all staff and, as the document is date and time stamped, would facilitate audit of the number of medicines reconciliations undertaken.

OBJECTIVE
To develop an electronic document on the EPR to record the medicines reconciliations completed by pharmacy staff.

METHODS
The senior clinical pharmacy team developed a medicines reconciliation policy for the trust based on the NICE guidance and evidence from the literature. Within the policy, standards for the completion of medicines reconciliation by pharmacists were devised and approved by the trust’s Medicines Management Group. It was agreed that the most appropriate place to document the medicines reconciliation was on the EPR. Discussions took place with all the clinical pharmacists and from the results the senior clinical pharmacy team developed an electronic document in conjunction with the EPR team. This document was tested for two months on all wards. After this time feedback was obtained from all clinical pharmacists. The document was then updated and launched hospital wide.

The medicines reconciliation document now contains the full drug history and information regarding patient adherence to treatment, in addition to the source of information, allergy status and compliance aid details. This information is recorded in the main as structured tick box entry. The drug history is entered as a free text list. Feedback was requested from all clinical pharmacists to evaluate the use of the document.

RESULTS
The electronic medicine reconciliation document has been in use within the trust for six months. The number of patients admitted over this six-month period totalled 24,862. The number of patients who received medicines reconciliation from a pharmacist within 24 hours of admission is 17,900 (72%). This is comparable with other trusts in our region.

Thirty-eight clinical pharmacists utilise this document and have found it easy to use. It can take from five to 15 minutes to complete with the majority of documents completed around five minutes. The pharmacists perceive that it has improved communication between pharmacists and ward staff, especially for patients who are transferred between wards. The medicines reconciliation is located in a single location thus avoiding duplication of work.

DISCUSSION
The development of the electronic document has improved the consistency of medicines reconciliation completed by pharmacists. Anecdotally, it has improved communication between both pharmacy and ward staff. It has also enabled accurate auditing of the percentage of medicines reconciliation completed by pharmacists within the trust.

The electronic document is a consistent and effective method of recording medicines reconciliation completed by pharmacists.

REFERENCES

REFERENCES
3 Synargis Summary of Product Characteristics. 12.01.2010
A study to assess the impact of a pharmacist in the general surgical preoperative assessment clinic (POAC) at Southampton University Hospitals NHS Trust

N Howarth
Southampton University Hospitals NHS Trust, Southampton

The role of the pharmacist in a POAC is one that seems to be expanding nationwide. Several hospitals already use pharmacists and pharmacy technicians in POACs and the development of these roles has been previously reported. Research has shown that pharmacists in POACs reduce the severity and number of pharmacy interventions needed on the wards, obtain a more accurate drug history, improve the quality of the prescribing, and by organising discharge prescriptions in advance, reduce the number of dispensed items needed and the time taken to dispense them.

The intention of this project is to see if the benefits achieved by other hospitals could be repeated in SUHT. This research will focus on the accuracy of the drug history, mainly to assess the number and severity of errors in drug histories. Also, the attitudes and opinions of patients towards the pharmacist working in the POAC will be assessed.

OBJECTIVES
1. To collect baseline data by recording the errors identified in drug histories from patients on admission.
2. For a pharmacist to start working in the preoperative assessment clinic.
3. To repeat the data collection once the pharmacist has been working in the clinic for at least six months.
4. To assess the attitudes and opinions of patients towards the pharmacist working in the preoperative assessment clinic.

METHOD
A literature search was conducted and information gathered about existing POACs with pharmacist involvement. The project protocol was submitted to the Local Research Ethics Committee for consideration and they replied stating that ethics approval was not necessary for this project. Baseline data was collected by ward-based pharmacy staff for patients who had been seen in the POAC (n = 44). A pharmacist then started working in the clinic, taking drug histories from as many patients as possible in the time available. Nursing staff also referred patients to the pharmacist if they fulfilled the defined referral criteria. When the pharmacist had completed six months of work in the POAC, the data collection was repeated. Data was collected for patients who had their drug history taken either by the nursing/medical staff (n = 57) or by the pharmacist (n = 59) in the POAC. The numbers of errors found on admission to hospital by ward based pharmacy staff were recorded and statistically compared. The individual errors were analysed by three specialists: a consultant anaesthetist with a special interest in preoperative assessment, a senior POAC nurse and a consultant pharmacist. They awarded each error a specific severity rating according to a predefined key where a score of 1 represented a major error and a score of 5 was a minor discrepancy. The severity scores were analysed for each of the three data sets and statistically compared. All patients seen by the pharmacist during the first month of working in the POAC were asked to complete a questionnaire to assess how they felt about being seen by a pharmacist in the clinic.

RESULTS
The mean severity score for the baseline data was 9.13 out of a possible 15. After the pharmacist had been working in the POAC for six months, the mean severity score for errors made by the nursing/medical staff was 8.85 while the mean severity score for errors made by the pharmacist was 8.50. The difference between these figures was not statistically significant.

The patient questionnaire showed that all patients who returned the questionnaire (n=54) felt comfortable talking to the pharmacist about their medicines for what they felt was an appropriate amount of time.

DISCUSSION
When the pharmacist took the drug history in the POAC instead of the nursing/medical staff, the number of errors significantly reduced (p=0.001) compared to the baseline data. The difference in the number of errors between the pharmacist and the nursing/medical staff after the pharmacist had been working in the POAC for 6 months was highly significant (p<0.001).

The number of errors made in drug histories can be significantly reduced by having a pharmacist taking drug histories in the POAC instead of nursing/medical staff. However, the severity of errors does not reduce by having a pharmacist in the POAC.

All patients felt comfortable talking to the pharmacist about their medicines in the POAC.

REFERENCES
RESEARCH

Exploring patients’ perspectives on self-monitoring of oral anticoagulation therapy

B Coleman
Whittington Hospital, London

Patient self-monitoring of oral anticoagulant therapy (OAT), where the patient measures their own INR on a small hand-held machine, has been technologically feasible since the 1980s. After measuring their INR, dosing advice can be sought from a healthcare professional (“self-testing” — PST), or the patient can decide on the appropriate dose of warfarin (“self-management” — PSM). At present, the level of local patient demand for OAT self-monitoring is not known.

OBJECTIVE
This study was conducted to determine the proportion of our local patient population that would be willing to undertake warfarin self-monitoring, and the factors associated with a willingness to self-monitor.

METHOD
Patient perspectives were collected using a semi-structured questionnaire. A preliminary set of questions was developed and sent to experts for comments. The resultant instrument was then piloted through face-to-face interviews with ten patients taking OAT.

The sampling frame for the survey was the patient list of the Anticoagulant Monitoring and Stroke Prevention Service. The population of interest was adult patients attending one of the clinics of the Trust’s Anticoagulation and Stroke Prevention Service, who met the following criteria:

- A long-term indication for warfarin
- A good grasp of the English language (as judged by clinic staff)

Patients who were on an alternative oral anticoagulant, who were out of the country long-term, or who had been interviewed during the piloting stage were excluded.

A calculated sample size of 224 was required to give a measurement precision of +/- 6%. With an assumption of an expected 30% response rate, 672 questionnaires were sent out using a systematic random sampling process. A questionnaire, covering letter and a postage-paid envelope for return were posted to all subjects. Assuming that the majority of respondents would not be familiar with warfarin self-monitoring, an information sheet was also provided to allow for a more informed view of the method of monitoring.

Data were coded and entered into SPSSv16, which was used to generate descriptive statistics. Frequencies were expressed as a percentage with confidence intervals applied to indicate the spread of results where appropriate. Univariate analyses were used to identify factors associated with a willingness to self-test oral anticoagulation. Chi-square with Fisher’s Exact Test were used for nominal variables; Mann-Whitney U Test was used for ordinal variables. Local Research and Ethics approval was granted for the study.

RESULTS
297 questionnaires were returned, representing a response rate of 44%. Respondents were predominantly elderly, and 41% were female and 58% male (three respondents did not state which sex they were). Nearly all of the respondents (99%) had been on warfarin for at least one year, with over half (134 patients) taking the drug for more than five years.

53% of respondents (150) said that they would be interested in self-testing their warfarin treatment if the Whittington clinic set up a support programme. These patients are likely to be younger (< 65 years), better educated and have correspondingly fewer concomitant medications.

In conclusion, although 53% of survey respondents indicated that they would be willing to self-monitor their oral anticoagulation, when those who were willing to self-monitor and purchase a coagulometer were considered this proportion dropped to 15%. Currently the cost of a coagulometer (around £399 per machine per patient) and this may represent a further barrier to introducing wider self-monitoring of oral anticoagulation to patient populations.

REFERENCES

Assessment of medicines adherence by primary and secondary care pharmacists in Yorkshire and Humber: a survey

R Khatib1, E Waterman1, C Acomb1, J Lad1, J Moran1, Y Tariq1
1Leeds Teaching Hospitals NHS Trust and the University of Leeds; 1Leeds Teaching Hospitals NHS Trust

The National Institute for Health and Clinical Excellence (NICE) clinical guideline “Medicines adherence” estimates that between a third and a half of all medicines prescribed for long-term conditions are not taken as

Table 1: Patient factors associated with a willingness to self-test

<table>
<thead>
<tr>
<th>Factor</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Younger age (those &lt; 65 years)</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>Educated to a higher level (those educated to GCSE level and above)</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>Clinic visits causing disruption to life</td>
<td>p &lt; 0.015</td>
</tr>
<tr>
<td>Good health (those with perceived “good” or “excellent” current health status)</td>
<td>p = 0.016</td>
</tr>
<tr>
<td>Fewer concomitant medicines</td>
<td>p = 0.037</td>
</tr>
<tr>
<td>Prior awareness of self-testing</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>Ability to sample and test blood</td>
<td>p &lt; 0.001; p &lt; 0.001</td>
</tr>
<tr>
<td>Ability and willingness to purchase coagulometer</td>
<td>p &lt; 0.001; p &lt; 0.001</td>
</tr>
</tbody>
</table>
To assess the awareness of this NICE guideline on adherence. To compare practice in primary and secondary care pharmacy in developing patient tailored adherence interventions. 

OBJECTIVES
- To assess the awareness of this NICE guideline on adherence
- To determine methods used to measure adherence assessment
- To compare practice in primary and secondary care pharmacy in Yorkshire and Humber

METHODS
Two separate electronic questionnaires were designed for pharmacists working in primary and secondary care. The questionnaires were piloted and comments used to modify the content. Between November 2009 and January 2010 the questionnaires were sent out via email to 16 hospital NHS Trusts and approximately 150 community pharmacies across the Yorkshire and Humber region. After discussion with the research governance lead for pharmacy it was decided the survey did not need research ethics committee approval.

RESULTS
See Table 1. Fourteen (88%) questionnaires were completed by the hospital trusts. Of those 13 (93%) were aware of the NICE guideline. All participant hospitals reported that they perform some sort of adherence assessment.

The details provided by the hospitals showed that adherence assessment is not carried out in a structured form. It is considered to be an assumed informal component of “Drug History Taking” or as part of specific service which requires very close monitoring of therapy e.g. clozapine. The most common method used was informal verbal questioning (12 (86%)) and no hospitals used a structured questioning technique or a validated tool. None of the hospitals provided formal training on assessing adherence.

There was a poor response to the questionnaire sent to community practice with only 28 (19%) questionnaires completed. Table 2 contains a summary of the results. Despite the lack of use of validated tools, some form of adherence assessment was used by 23 (82%) of pharmacies. Twenty (71%) of the community pharmacies did not have specific policies or SOPs about adherence.

In hospital and community pharmacy the role of assessing adherence is undertaken by a variety of staff. Pharmacists are the major assessor but pharmacy technicians have a significant role.

DISCUSSION
A representative sample of hospitals completed the survey compared with only 28 (19%) of community pharmacies. With such poor response from community practice we are unable to draw any firm conclusions about practice in the community. Several superintendent pharmacists of pharmacy chains did not agree to take part in the survey. We are unsure of the reasons for this and this may require further study. In community practice there was a greater variety in the techniques used with the most common methods being informal questioning and as part of the use of medicines use reviews (MURs).

There appears to be good awareness of the NICE guidelines among respondents. It is apparent that the majority of adherence assessment takes place as informal discussion, when close monitoring of therapy is required or when non-adherence is suspected. There seems to be a lack of a structured approach to assess adherence with no use of any validated adherence assessment tools such as the Morisky Medication Adherence Scale–8 (MMSA-8)† or The Adherence Estimator.† There seems to be a need to raise awareness among the pharmacy team about tools available to assess adherence and how to apply them in practice.

Generally, there seems to be no formal training requirements on assessing adherence in either sector. Due to the high importance of this subject, we recommend that it becomes incorporated into postgraduate training courses. There is also a clear lack of policies and SOPs specifically for the assessment of adherence. As expert providers of pharmaceutical care, pharmacists should lead the way on the assessment of adherence to medicines. The pharmacy teams in primary and secondary care should have in place formal adherence training programmes and assessment tools to screen patients for possible non-adherence and potential causes. This should be supported by policies and SOPs. Further study is needed to better capture the practice in the community sector.

REFERENCES

A comparison of healthcare professional and patient’s perspectives of medicines-related problems

N Opara*, D Thompson1, S Puthrasingam2, J Clarbour3, S Dhillon*
1School of Pharmacy, University of Hertfordshire; 2Centre for Research in Primary and Community Care, University of Hertfordshire; 3Luton and Dunstable Hospital NHS Foundation Trust, Luton

Medicines-related problems (MRPs) resulting from inappropriate prescribing, inappropriate monitoring, non-adherence, communication

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Table 1: Summary results from 14 hospital trusts within Yorkshire and Humber

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Number meeting the criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware of NICE guidance on adherence</td>
<td>13 (93%)</td>
</tr>
<tr>
<td>Use informal verbal discussions or questioning to assess adherence</td>
<td>12 (86%)</td>
</tr>
<tr>
<td>Use a structured questionnaires or verbal techniques to assess adherence</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Use a direct measure of drug effect to assess adherence e.g. blood pressure, or drug serum levels</td>
<td>4 (18%)</td>
</tr>
<tr>
<td>Have general policies and / or SOPs which include adherence as an element with a broader context.</td>
<td>3 (21%)</td>
</tr>
<tr>
<td>Have specific policy / SOP on assessing adherence</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Provide training on how to assess adherence as part/element within other training e.g. drug history training</td>
<td>3 (21%)</td>
</tr>
<tr>
<td>Provide specific training on assessing adherence</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

Table 2: Summary results from 28 community pharmacies within Yorkshire and Humber

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Number meeting the criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware of NICE guidance on adherence</td>
<td>19 (68%)</td>
</tr>
<tr>
<td>Adherence assessment used in their practice</td>
<td>23 (82%)</td>
</tr>
<tr>
<td>Have general policies and / or SOPs which include adherence as an element with a broader context.</td>
<td>8 (29%)</td>
</tr>
<tr>
<td>Provide training on how to assess adherence as part/element within other training e.g. drug history training</td>
<td>1 (4%)</td>
</tr>
</tbody>
</table>
Table 1: MRPs identified on admission to hospital (n=10)

<table>
<thead>
<tr>
<th>Healthcare professional’s perspective</th>
<th>Patient’s perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 Atrial fibrillation; suboptimal digoxin levels</td>
<td>Gastrointestinal disturbance due to digoxin</td>
</tr>
<tr>
<td>P2 Hypotension; xamoterol, indapamide, furosemide, co-amiloride and losartan</td>
<td>No identification of MRP</td>
</tr>
<tr>
<td>P3 Worsening congestive cardiac failure; non-adherence with furosemide</td>
<td>Stopped taking furosemide due to increased urinary frequency</td>
</tr>
<tr>
<td>P4 Fall and hypotension; co-codamol and bendroflumethiazide</td>
<td>Stopped taking prednisolone to horrible feeling afterwards</td>
</tr>
<tr>
<td>P5 Hypotension; furosemide and nicorandil</td>
<td>Difficulty opening blister packs of aspirin</td>
</tr>
<tr>
<td>P6 Electrolyte imbalance; bendroflumethiazide</td>
<td>Non-adherence with furosemide due to feeling of dizziness</td>
</tr>
<tr>
<td>P7 Hypotension and dizziness; furosemide, doxazosin and solifenacin</td>
<td>Poor satisfaction with GP consultation</td>
</tr>
<tr>
<td>P8 Bradycardia (propanolol)</td>
<td>No identification of MRP</td>
</tr>
<tr>
<td>P9 Upper gastrointestinal bleed (aspirin)</td>
<td>Not sure if taking medicines correctly at home</td>
</tr>
<tr>
<td>P10 Angioedema (ramipril)</td>
<td>Difficulty managing medicines, unsure of dosing</td>
</tr>
</tbody>
</table>

P = Patient; GP = general practitioner

Table 2: Healthcare professional and patient’s categorisation of MRPs identified (n=10)

<table>
<thead>
<tr>
<th>Strand criteria (clinical pharmacist)</th>
<th>Gordon’s coding frame (Patient)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 Too little of the correct medicine</td>
<td>Unwanted side effect</td>
</tr>
<tr>
<td>P2 An adverse drug reaction/side effect</td>
<td>No identification of MRP</td>
</tr>
<tr>
<td>P3 Not taking the prescribed medication</td>
<td>Unwanted side effect, non-adherence</td>
</tr>
<tr>
<td>P4 An adverse drug reaction/side effect</td>
<td>Difficulty opening containers/ packs</td>
</tr>
<tr>
<td>P5 An adverse drug reaction/side effect</td>
<td>No identification of MRP</td>
</tr>
<tr>
<td>P6 An adverse drug reaction/side effect</td>
<td>Unwanted side effect, non-adherence</td>
</tr>
<tr>
<td>P7 An adverse drug reaction/side effect (GP)</td>
<td>Inadequate discussion with doctor</td>
</tr>
<tr>
<td>P8 An adverse drug reaction/side effect</td>
<td>Difficulty managing medicines, unsure of dosing</td>
</tr>
</tbody>
</table>

P = Patient; GP = general practitioner

failures and knowledge gaps have resulted in hospital admissions.1,2 MRPs include adverse drug reactions (ADRs), unwanted side effects and treatment failures involving medication therapy of which a considerable percentage are preventable.3 MRPs observed in older patients are a major health concern due to the resulting increase in morbidity and mortality.1 Though most of the current understanding on MRPs is from the healthcare professional’s (HCPs) perspective,1,4 it is vital to acknowledge the older patient’s perspective in order to address the problems reported from their viewpoint.

OBJECTIVES

To examine MRPs from the perspective of HCPs and older patients admitted to elderly care wards to identify how they may be supported to minimise the occurrence of a medicines related hospital admission.

METHOD

The study was ethically approved by the National Health Service (NHS) research ethics committee and the Luton and Dunstable Hospital NHS Foundation Trust. Over a non-consecutive 26-week period between May 2009 and February 2010, admissions to five elderly care wards (patients 65 years) were prospectively reviewed by one clinical pharmacist to identify patients admitted with a suspected MRP. A MRP was defined as “an undesirable patient experience that involves medication therapy and that actually or potentially interferes with a desired patient outcome”.

Patients identified with a suspected MRP on admission from the clinical pharmacist’s perspective were invited to participate in a screening interview prior to discharge to enable the identification of MRPs from their perspective and to complete the dataset required to ascertain an actual MRP cause of admission.2 The Hallas and Strand criteria were used to classify and categorise MRPs from the HCP’s perspective.1,4 Gordon’s semi-structured MRP screening tool and coding frame were used to identify and categorise MRPs from the patient’s perspective. Quantitative procedures were used to describe the characteristics of participants.

RESULTS

Ten patients took part in the screening interviews, of whom seven (70%) were female and six (60%) lived alone in the community. The mean age was 83 years (range 78–91 years) and all classified their ethnic origin as white. The mean number of medicines was 10 (range 6–17) and the mean number of co-morbidities was 6 (range 3–13). Table 1 lists MRPs identified on admission. From the HCP’s perspective, a MRP on admission was identified in all 10 patients; however, findings from the screening interviews noted only seven (70%) patients reported experiencing a MRP. Using the Strand criteria, from the HCP’s perspective, seven (70%) patients had a medical condition due to an ADR of known side effect (Type A). Patients reported intentional non-adherence due to unwanted side effects of their medicines. Table 2 presents a comparison of MRPs categorisation from the HCP’s perspective and the older patient’s perspective.

DISCUSSION

Unwanted side effects of prescribed medicines were a common concern from both the HCP and older patient’s perspective. Differing perspectives were noted where some patients reported no MRPs compared to the clinical pharmacist’s perspective. Support for older patients in the management of long-term conditions and medicines use is essential to improve patient health outcomes. Adequate monitoring, active engagement during consultations and better understanding of potential barriers to medication adherence is needed in order to provide effective support for older patients in the community. Although this study has enabled the older patient’s perspectives to be acknowledged, the small sample size of the participants in this study limits the generalisability of patient’s views noted.

REFERENCES


Benchmarking ward-based clinical pharmacy activity

S Millen
Southampton University Hospitals NHS Trust (SUHT)

Benchmarking ward-based clinical activity provides an opportunity to measure the range of services offered and the staff time allocated in the delivery of the measured activity. It allows imbalance to be addressed and can encourage change if results are appropriately used. In addition it facilitates comparison of data with other providers. Benchmarking ward-based activity is a challenge. Several papers have been published identifying many of the difficulties.1 The role of pharmacists in medicines management is well recognised.2,3 However, there is no evidence to support any “gold

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standard” for pharmacy skill-mix. At SUHT, pharmacy staff visit wards to facilitate supply and to ensure the safe and effective use of medicines. At ward level, pharmacists’ responsibilities include: medicines reconciliation, checking prescription charts for legality, accuracy of prescribed medication and patient counselling. What grade of staff delivers which activity and how time is shared between activities was unclear. A project was developed to conduct a multicentre pilot of a ward activity assessment tool to identify what ward pharmacy staff do and collectively review the results.

OBJECTIVES
To measure the activity of clinical pharmacy services, at ward level in SUHT.

METHOD
In December 2009 three teaching hospitals collected data on clinical pharmacy ward activity. The pharmacy staff working on the wards across SUHT collected data for one week describing activities that were undertaken on the ward. A proforma was used for the data collection to ensure consistency, and guidance notes were made available to participants. These had been piloted previously. Teaching sessions on the use of the form were held within the department during the week prior to the audit. A register was taken to ensure all staff underwent training and were not inadvertently missed.

Ward-based activity data was recorded in excel, results relate to SUHT data only.

RESULTS
■ 79% of all hospital in-patient admissions are seen by pharmacy staff
■ 612 hours of time was spent on wards
■ 1819 patients’ own drugs (PODs) were assessed during the audit period of which 75% were assessed by band 4 and 5 staff, 17% were assessed by band 6 or 7 staff (0.14 wte)
■ 588 (69%) of allergy boxes required clarification or correction by pharmacy staff (0.26 wte)
■ 847 Medicines Reconciliation (MR) occasions were recorded of which 43% were completed by band 4 and 5 staff, 41% by band 6 and 7 pharmacists, the remainder by senior staff
■ Of the 1424 discharges written during the audit period, 654 were screened and dispensed by pharmacy, of which 42% were issued directly from the ward
■ 43% of items on discharge prescriptions were from PODs, which represents a considerable saving to SUHT
■ 141 occasions of patient education were recorded (0.62 wte)

One wte technician for each 0.88 wte pharmacist employed in the department.

DISCUSSION
In order to assign a staff allocation to the activity the project group agreed, in collaboration with their teams a standardised time per activity. In the results above one minute was allocated per allergy box checked and corrected and per POD assessed. 10 minutes were allocated to patient education.

The results collected demonstrate that in general “technical” activities are performed by technical staff (band 4 and 5). The majority of PODs (75%) were assessed by this grade of staff. The majority of MR (84%) were completed by technical or junior pharmacy staff. Efficiency could be improved by increasing the number of MRs performed by technicians and reducing junior pharmacists time in this activity. Staff costs could be further minimised by getting band 3 staff more involved at ward level assessing PODs.

Direct discharge of TTOs from the ward by pharmacy staff has been proven to be faster than sending discharge prescriptions to pharmacy and therefore, supports a reduction in length of stay. Efficiency could be enhanced if the number of discharges completed directly from the ward increased.

Quality, innovation, productivity and prevention (QIPP) savings are likely by re-aligning staff time in different proportions. In SUHT direct patient counselling only accounted for 0.62 wte. If time could be reallocated from other tasks e.g. allergy checking or through prioritisation (triage) of patients to reduce numbers of patients seen to less than 79%, this time could be invested in patient counselling, which would be expected to reduce readmission rates. In introducing this change a risk / benefit analysis would be required and outcome measures set and agreed as part of the initial plan. We are currently agreeing a prioritisation policy to release pharmacist time for other activities within SUHT. This project is invaluable in providing audit data to measure these changes.

Acknowledgments This work would not have been possible without the help and support of the clinical team within SUHT and the inspiration of our G&STFT colleagues.

REFERENCES
1 Child, D. Is benchmarking all it’s cracked up to be? Pharmacy Management 2002; 18; p 44 - 45

Clinical pharmacy contribution to the safe and effective use of medicines on wards

S Millen
Southampton University Hospitals NHS Trust.

The SUHT clinical pharmacy service is designed to support key trust targets using the most appropriate staff to deliver the required activity to minimise cost. The role of pharmacists in medicines management is well recognised. At SUHT, pharmacy staff visit wards to review prescriptions, supply medicines and intervene in therapy where required. A recent report from the GMC, the EQUIP study, showed that nearly 9% of prescriptions in a selection of UK hospitals contained an error when written. Intervention monitoring is defined as the number of times the member of pharmacy staff interact with other members of the clinical team or the patient to improve the efficiency of medication use or to reduce the risk of medication use.

Objectives
■ To measure intervention activity and the cost effectiveness of interventions
■ To measure the range of clinical interventions and document the actions that pharmacists have undertaken in ensuring safe and accurate prescribing.

METHOD
In December 2009, three teaching hospitals collected data on the interventions undertaken on the ward. A proforma was used for the data collection to ensure consistency, and guidance notes were made available to participants. These had been piloted previously. Interventions were recorded in MS Access. Results relate to SUHT data only. As an annual service evaluation no ethics application was required.

RESULTS
■ Of 994 interventions made in total during the week of data collection, 92% were accepted, 7% were for information, 1% were rejected
■ Pharmacy staff identified safety (56%) and efficacy (29%) as the most
important reasons that required them to make an intervention. Concordance (7%), cost effectiveness (4%) and reduced length of stay (3%) make up the remainder.

Adding drug, changing dose and monitoring for toxicity made up 49% of interventions.

In addition of the 767 clinical screens performed by the clinical pharmacists, 99% of interventions were made by Senior pharmacists (band 7, 8a and 8b).

Of the 847 medicines reconciliations logged (as part of the medicines reconciliation at the point of admission), 30% were incorrect and required intervention resulting in 270 individual changes to medication.

In addition of the 767 clinical screens performed by the clinical pharmacists 36% were incorrect and resulted in 325 individual changes being made.

69% of prescriptions required pharmacy staff to clarify or correct the allergy status.

47% of discharge prescriptions seen at ward level were incorrect.

99% of interventions were made by Senior pharmacists (band 7, 8a and 8b) band 8c staff (1%) did not record “interventions” made proactively on ward rounds etc.

There appears to be a correlation between pharmacy staff establishment (numbers and experience) and the number of interventions. This is supported by a national publication.6

ECONOMIC EVALUATION

The classification of seriousness in the GMC report1 was used to calculate the number of each intervention at SUHT. A systematic review5 was used to inform NICE guidance.1 This assigned a value to interventions made during medicines reconciliation. This data has been used to facilitate the calculation of a value per intervention (Table 1).

Using this economic data, this would suggest that clinical pharmacy services at SUHT have the potential to prevent significant costs (between £91,605 and £198,038 per week) that may be incurred if the medication risks remained undetected. Data indicates that 611 hours of pharmacy department time are spent on the wards in any one week. The total cost of the hours spent by pharmacy staff on the ward is £13,212 per week.

DISCUSSION

A significant proportion of the pharmacist’s efforts are direct and indirect interventions during the patient’s stay.5 In a teaching hospital where turnover of junior medical staff poses obvious, unavoidable difficulties, pharmacists provide an invaluable consistency of approach. Contributions made by pharmacists serve a number of functions encompassing medicines management, promoting patient safety/experience and attempts to meet directorate/trust targets.

Apart from the direct interventions recorded, the pharmacy department contributes significantly to the safe use of medicines in several other ways. Pharmacists are involved in the development, implementation and audit of medicine related guidelines, and have an increasing involvement in the formal education of undergraduate and post graduate staff.

There are limitations to this study highlighted by the lack of band 8c interventions (1%) where proactive patient management was not perceived to be an intervention. In addition it is not possible from this data set which interventions relate to which part of the patients journey. A second cycle has just been completed to clarify this query. Any re-design of clinical services to reduce workforce numbers is likely to reduce the numbers of interventions made and increase the risk to the trust in consequence a cost to the trust maybe incurred due to medication errors being unrecognised. This information must be considered when redesigning services.

REFERENCES

5. A systematic review of the effectiveness and cost effectiveness of interventions aimed at preventing medication error (medicines reconciliation) at hospital admission, The University of Sheffield, School of Health and Related Research (ScHARR), 2007

Table 1: Economic analysis

<table>
<thead>
<tr>
<th>Error classification</th>
<th>Prescribing errors stratified by consequence (%)</th>
<th>Numbers applied to SUHT data set</th>
<th>Cost avoidance (from University of Sheffield)</th>
<th>Potential cost avoidance at SUHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potentially lethal</td>
<td>2%</td>
<td>20</td>
<td>£1,086-2,120</td>
<td>£21,700-42,400</td>
</tr>
<tr>
<td>Potentially serious</td>
<td>5%</td>
<td>50</td>
<td>£713-1484</td>
<td>£35,650-74,200</td>
</tr>
<tr>
<td>Potentially significant</td>
<td>53%</td>
<td>527</td>
<td>£85-150</td>
<td>£2,386</td>
</tr>
<tr>
<td>Minor</td>
<td>40%</td>
<td>398</td>
<td>£0-6</td>
<td>£91,605-198,038</td>
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Adverse drug events in patients: A pilot study on the use of a trigger tool for the detection of ADEs in patients admitted to a medical admissions unit

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With increasing costs to health services due to adverse drug events (ADEs), healthcare professionals are continually searching for ways to provide better-quality care at lower cost. ADEs represent a significant proportion of hospital admissions, and are costly and frequent. Accurate detection is essential due to the significant proportion of admissions related to ADEs. Strategies need implemented for efficient ADE detection with the aim of reducing admission rates whilst raising awareness. Difficulty lies when establishing a clear cause-effect relationship between a drug and an adverse reaction. There is a lack of standardised methods and definitions, so inaccuracies in prevalence rates reveal the need for future research to reduce ADE-related admissions.

OBJECTIVES

1. To determine the suitability of the trigger tool in the detection of drug-related ADEs.
2. To determine the main drugs/drug classes involved in ADE-related admissions.
3. To compare detection rates of ADEs using the trigger tool and traditional pharmacist medication history taking methods.

METHODS

A prospective review of patients admitted over a two-week period to a medical admissions unit in a teaching hospital was carried out to evaluate the performance of a 22-item ADE detection trigger tool (adapted from the Institute for Healthcare Improvement7) and to determine the rate of ADE-related admissions. Patients 18 years of age,
admitted via the A&E department and who had a medication history and reconciliation carried out by a clinical pharmacist were included in the study. A pharmacy undergraduate student reviewed patient charts using the trigger tool and IHI methodology (Figure 1) to identify positive triggers.

A further review of the patient’s chart was carried out by a second reviewer (a clinical pharmacist) allowing each trigger identifying a potential or actual ADE to be confirmed and validated. Detected ADEs were categorised on the basis of harm using the index of the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) with each ADE type classified according to standard ADE classification (Type A, Type B, Compliance Issues, Therapeutic Failure, Drug Withdrawal and Intentional Overdose). For each patient, the trigger tool-detected ADEs were compared to the medication history taking. These patients are prioritised according to local Trust policy; those taking 4 regular medications or, on a high risk medication or those who have been recently discharged. This would suggest a limitation to this study design.

This pilot study identified the potential use for trigger tools as a robust method of detecting ADEs and ADE-related admissions and could be incorporated into the clinical pharmacist’s medication history taking process.

REFERENCES

ADVERSE DRUG EVENTS TRIGGER TOOL

T1 Antihistamine/Rash
T2 Fall
T3 Nausea/Vomiting/Anti-emetic
T4 Diarrhoea/Constipation/Laxative/Antidiarrhoeal
T5 Calcium reonium/Salbutamol/Insulin
T6 Abnormal INR <-2, >3.5
T7 WBC <4x106
T8 Platelets <50,000
T9 Drug level requested
T10 Deranged LFTs
T11 Medication started recently
T12 Oversedation/Lethargy
T13 Abdominal pain
T14 Rising serum creatinine/urea
T15 Hypotension
T16 Hypo-/Hyperglycaemia
T17 Medication stopped or held
T18 Confusion
T19 Deranged electrolytes
T20 Bleed (haemotypsis/malena/bruising)
T21 Altered heart rate
T22 Poor concordance

RESULTS
During the study, of the 50 patients sampled, a total of 26 ADEs were detected through utilisation of the trigger tool while only a total of 19 potential ADEs were recorded by pharmacists (73% of total detected by trigger tool). The rate of ADE-related admissions was calculated at 42%. Drugs most commonly implicated were opioids (19.2% of ADEs detected) and chemotherapeutic agents (15.4%), followed by diuretics (11.5%) and warfarin (7.7%). Triggers most commonly related to the ADEs detected were “medications stopped/held” (25%) and “medication recently started” (15.9%).

DISCUSSION
Trigger tools have a potential role in driving quality improvement in ADE detection by ward pharmacists, in this instance in the medical admissions unit. Results show more ADEs were detected with the trigger tool giving rise to a higher rate of ADE-related admissions compared to other studies, which have reported prevalence rates of between 4% and 28%.3 Utilising and adapting a list of triggers is beneficial to the clinical pharmacist as it provides a suitable and robust tool of identification of ADEs potentially responsible for the admission. Implementation of this tool in hospitals could be used to reduce the burden of ADE-related admissions and increase ADE detection, thereby improving the benefit/harm ratio of medications to patients.

This study demonstrates that using a trigger tool can lead to a higher ADE detection rate, over and above that of the clinical pharmacist’s method of medication history taking. However, the need for more accurate pharmacist documentation of ADEs was highlighted, especially as the pharmacist may have recognised an ADE occurrence but not documented it. The high rate of ADEs reported in this study may be due to the method of patient selection used as each patient included already had a documented medication history. These patients are prioritised according to local Trust policy; those taking 4 regular medications or, on a high risk medication or those who have been recently discharged. This would suggest a limitation to this study design.

This pilot study identified the potential use for trigger tools as a robust method of detecting ADEs and ADE-related admissions and could be incorporated into the clinical pharmacist’s medication history taking process.

FIGURE 1: The trigger tool (adapted from IHI1)

Evaluation of the opinions of Level 3 undergraduate pharmacy students in relation to the use of objective structured clinical examinations (OSCEs)

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Re-engineering within the NHS over the past 10 years has provided novel opportunities for the multidisciplinary (MDT) team. Roles traditionally occupied by one professional group e.g. pharmacists, are now being filled jointly or completely by appropriately trained alternative professions e.g. checking of prescriptions by Accredited Checking Technicians. The Department of Health has described the pharmacy profession as one that could and would expand its scope of practice e.g. minor ailment schemes, independent and supplementary prescribing, also an increased role in public health. Pharmacist undergraduate and postgraduate education has evolved to meet these changing roles, which has led to the need for novel assessment methods e.g. OSCEs to determine professional competence i.e. the “shows how” tier of Millers Triangle.

First introduced in 1975,3 OSCEs are employed extensively in medical, nursing and dentistry education all over the world. Currently a small
number of UK Schools of Pharmacy (SoP) employ OSCEs as an assessment method e.g. Manchester, Brighton and Aberdeen SoP. OSCEs within pharmacy are likely to become more common after the new education standards from the RPSGB are published, as it is expected that SoP will have to demonstrate competence of graduates in clinical skills as opposed to the current demonstration of knowledge.

OSCEs have been piloted as a formative assessment in the SoP for Level 3 pharmacotherapy module in January 2010 with the aim to introducing summative OSCEs during Level 4 pharmacotherapy starting December 2010. The pilot OSCEs assessed clinical decision-making skills including identification of pharmaceutical care issues via review of in-patient medication kardexes as well as communication skills with members of the MDT. Students’ opinions of OSCEs have rarely been investigated. This study sought to determine the views of Level 3 students on the use of OSCEs as an assessment method.

OBJECTIVE
To evaluate the opinions of Level 3 undergraduate students regarding OSCEs as a new method of assessment in the pharmacotherapy module.

METHODS
After a comprehensive literature review, a questionnaire was developed for students to complete voluntarily. To ensure content and construct validity, the questionnaires were piloted with five Level 4 students and reviewed by five teacher practitioners (TPs). Question topics included; stress levels, effect of having more than one student in the room, comparison with other examination methods and running of the OSCE. A five-point Likert scale, from strongly disagree through to strongly agree, was used. Some free text space and a general comments section on OSCEs was available.

Ethical approval was achieved from the university. The data were analysed quantitatively using SPSS and free-text comments were reviewed by hand for key themes although this did not constitute a formal qualitative analysis.

RESULTS
There was a high questionnaire response rate of 95% (115/121). 52% (60) agreed they understood what was expected of them during the OSCE with the presence of another student in the room (due to lack of OSCE performance space) affecting 57% (65) of student stress levels. 72% (82) described the OSCE as more stressful than a written exam although only 18% (21) believed that the OSCE was more difficult than a written exam and 52% (59) described it as a similar difficulty to the pharmacy practice scenarios.

In relation to their level of preparation, 41% (47) students agreed that they were given adequate directions prior to the OSCE and 78% felt that they had insufficient time to complete the OSCE. Students were advised to revise prior to their OSCE, 81% (92) of students stated they did not know how revise for this type of assessment. Asked for suggestions as to support in relation to OSCE revision, 89% (102) suggested online tutorials and 88% (100) suggested class-based tutorials. 77% (88) agreed that OSCEs measured clinical skills necessary as a pharmacist in almost “real life” situations.

DISCUSSION
OSCEs as a form of assessment in the SoP are novel for staff and students alike. The high response rate to this study (95%) reflects the level of interest in this topic and the representativeness of the data recorded. This study has highlighted some key areas for improvement in both the preparation and conduction of OSCEs by the SoP staff as well as students’ lack of familiarity and subsequent lack of time to complete the scenarios. Students found the OSCE more stressful than a written exam but not more difficult, possibly reflecting lack of familiarity with the exam technique as is shown by their response to the question relating to how to revise for this assessment, where the majority had no experience or understanding of how to prepare despite oral and written preparation provided by the SoP. Most students (58%) described the presence of the TP, in terms of performing a role within the OSCE, made the OSCE more stressful stating “A TP has a clinical knowledge base and may fault a students’ lack of knowledge more heavily than an actor”, showing a lack of understanding regarding the assessment of OSCEs i.e. whether the TP is playing the part of the doctor or not, they will be assessing the student not the actor.

Interestingly, most students believed that this method of assessment should be included in the MPharm and were a useful method of ensuring their retention of clinical skills if used regularly throughout the degree. Further research will be undertaken after the summative OSCEs in December 2010.

REFERENCES

What medicines information do members of the public request from help-lines?

VA Marvin*, C Park*, A Joshua†, J Valentine*, L Vaughan*
*Members of the Medicines Management Project Team for Northwest London Collaboration for Leadership in Applied Health Research and Care (CLAHRC), Chelsea and Westminster Hospital NHS Foundation Trust; †NHS Direct

As part of a CLAHRC project in medicines management, hospital pharmacists are working in partnership with NHS Direct. The overall aim of the project is to improve medicines management at discharge from hospital through full medicines reconciliation. We were interested what further information patients and public require about medicines when they are at home and why.

OBJECTIVE
To find out what information is requested from pharmacist-supported help-lines by members of the public in order to help identify any unmet need for education about managing their medicines.

METHOD
We analysed anonymised, documented calls made by members of the public to the hospital Medicines Information (MI) help-line and to NHS Direct. All were coded for type of medicine and reason for phoning (using 9 categories including interaction queries, storage or expiry date advice). All queries were also considered for potential harm resulting from medicines, had the call not been made. LREC approval was granted prior to starting the project.

RESULTS
Five hundred calls from members of the public were received by the hospital MI help-line in six months. The majority obtained the telephone number from the information card given to them by pharmacy at discharge or with their outpatient medicines (see Figures). A random sample of 500 calls to the National NHS Direct number were collated from the pharmacist advisor call logs during a similar period (but representing only a fraction of the 2.5% of NHS Direct calls that are medicine specific and handled by pharmacists).

Antimicrobial agents and analgesics accounted for approximately half of all calls to these help-lines. The reason for phoning was most often to ask about interactions (27%), directions for use and concordance problems (26%). Advice on adverse effects either actual or potential accounted for 13% of calls and a further 9% were about use of medicines during pregnancy or breastfeeding. In 7% the caller was concerned that an error
had occurred in prescribing or dispensing and needed to check before taking their medicines. Queries about further supplies, formulations available and storage issues accounted for the remainder. In approximately 17%, wrong or insufficient information had been supplied with a prescribed medicine. In nearly half of calls there was judged to be potential for harm, (1% serious enough to require intervention), had the enquirer not sought information.

**DISCUSSION**

This analysis shows that there is a real and important need for information about medication, in addition to that supplied on the label or package insert or given verbally face to face with a patient. This is particularly evident for commonly prescribed medicines that are taken short term such as antibiotics and analgesics. Other researchers have found that information given in patient leaflets is sometimes inadequate or poorly presented in the UK, and this is particularly so in relation to side effects(1). Improving the provision of information to patients on discharge is recommended by the Care Quality Commission.2 Patient and public access to MI telephone lines is a vital safety net and could be expected to help with this communication and lead to a decrease in harm from medicines. We have shown a measurable potential for harm in the hypothetical absence of medicines help-line facilities and we are committed to improving public and patient awareness of the numbers they can call.

Our findings may limited to comparison with hospitals where MI services are managed and accessed in a similar way and similar patient groups attend or are admitted. Though the NHS Direct data were pooled from different centres nationally, further analysis on more calls is needed to systematically check patients' notes in both primary and secondary care. Through the CLAHRC project we are endeavouring to find ways of communicating this information confidentially between NHS Direct and MI pharmacists at the hospital where treatment was given.

**REFERENCES**


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**PREREGISTRATION POSTERS**

**Do assertive outreach patients with schizophrenia receive adequate cardiovascular risk monitoring as per NICE guidance?**

J Payne, L Cornell
Sherwood Forest Hospitals, Kings Mill Hospital, Mansfield.

People with schizophrenia have a life expectancy that is 20% less than those in the general population.1 This has been attributed to the higher incidence of cardiovascular disease and type II diabetes found in these patients. A greater cardiovascular risk in this patient group may be linked to patients having a poorer diet, to smoking more and exercising less than the general population, as well as the fact that many second-generation antipsychotics have adverse metabolic effects that contribute to the risk.2 It is therefore essential that regular monitoring of physical health (particularly cardiovascular risk) is carried out for patients with schizophrenia. It is the pharmacist’s role to limit adverse patient outcomes associated with medication. It is for this reason, and because the National Institute for Health and Clinical Excellence (NICE) updated their schizophrenia guidelines in March 2009, that this area was audited.

**OBJECTIVES**

1. To determine whether annual cardiovascular risk assessments are conducted in schizophrenia patients under the care of the Nottinghamshire Healthcare NHS Trust Assertive Outreach (AO) Team, as per the NICE guideline for schizophrenia2 (and consequently the NICE Lipid Modification guideline1 to which it refers).
2. To determine whether the results of such cardiovascular risk monitoring are documented in the patient’s secondary care notes as per the NICE schizophrenia guideline.
3. If shortfalls are identified, explore methods for improving cardiovascular risk monitoring.

**CRITERIA AND STANDARDS**

To follow are parameters documented within the NICE “Lipid modification” guideline which require annual monitoring in patients with schizophrenia, each is a criteria for assessment of the audit: smoking status, alcohol consumption, blood pressure, body mass index (or another obesity measure), fasting total cholesterol, LDL and HDL cholesterol, triglyceride levels (if fasting total cholesterol not available), fasting blood glucose, renal function, liver function and thyroid stimulating hormone levels (if dyslipidaemia is present). The final criterion for measurement is that results of annual cardiovascular risk monitoring should be documented in the patient’s secondary care notes. The target standard for each is 100%.

**METHOD**

For inclusion into the audit patients had to be diagnosed with schizophrenia, schizoaffective disorder, schizophreniform disorder or delusional disorder and be under the care of the AO team. Patients who were excluded included those with a diagnosis of drug induced psychosis and those for whom the required data could not be adequately collected. Data was collated between October and December 2009 by accessing and systematically checking patients’ notes in both primary and secondary care. This was done by pharmacists working in the North Nottinghamshire Primary Care Trust and Sherwood Forest NHS Trust respectively. A questionnaire was also completed by each member of the AO team to assess
their understanding of cardiovascular risk monitoring and highlight any training needs.

RESULTS

As can be seen in Figure 1, no cardiovascular risk parameter met the 100% standard for annual monitoring. The audit also found that on average 30% or fewer patients had any information recorded in their secondary care notes.

The responses to the questionnaire showed potential barriers to routine physical health monitoring. For example, only 33% of AO team members were confident in interpreting monitoring results, only 50% knew what physical health parameters needed to be measured for their patients and only 34% felt the team had reliable systems in place to remind them when a patient’s cardiovascular risk monitoring was due.

DISCUSSION

The low rates of cardiovascular risk monitoring found by the audit could be attributed to the fact that AO patients are difficult to engage. The greater levels of monitoring seen for non-invasive parameters may be due to the fact that patients are more willing to consent to them.

As the rate of parameter documentation in secondary care notes is considerably less than the rate of monitoring, it is clear that improvements need to be made in communication between primary care (where the majority of monitoring is conducted) and AO in secondary care.

Ten patients were excluded due to having an incomplete data set. The reasons for this were: inaccurate GP details (n = 6); and health centres’ refusal to take part (n = 4). The absence of ten patient's data would have made the audits findings less representative. Having inaccurate GP details documented in the patients’ notes raises concerns that the AO team cannot liaise with primary care, or that the patient's concerned may not be made the audits findings less representative. Having inaccurate GP details documented in the patients’ notes raises concerns that the AO team cannot liaise with primary care, or that the patient’s concerned may not be.

Recommendations developed from the findings of this audit include:

1. Training for AO team members regarding NICE guidance and signposting to training packages already available about conducting physical health monitoring in patients
2. A monitoring form to be incorporated onto the “community cards” employed by AO to prescribe medication, to act as a reminder for annual assessment (similar to that employed by Essex Partnership NHS Foundation Trust)
3. Creation of a standardised letter for ease of correspondence between AO, the patient and their general practitioner when arranging an appointment for cardiovascular risk assessment.

To conclude, the audits objectives were met. Improvements need to be made to ensure that schizophrenia patients’ receive annual cardiovascular risk monitoring. Once recommendations have been implemented the topic should be re-audited to confirm that progress has been made.

REFERENCES


Venous thromboembolism prophylaxis in elderly medicine

K Houlihan

Preregistration Pharmacist, Department of Pharmacy, Care of the Elderly Directorate, Newcastle upon Tyne Hospitals NHS Foundation Trust

The Department of Health made recommendations in 2006 in “Prevention of VTE in Hospitalised Patients”. Until the National Institute of Clinical Excellence clinical guidance (CG92), “Venous thromboembolism: reducing the risk”, the protocols for risk assessment were significantly less established for medical than surgical patients. Tinzaparin, although not licensed for VTE prophylaxis in medical patients, is the first line agent within the Care of the Elderly Directorate. Various aspects of LMWHs had to be taken into consideration such as contraindications (CI) to its use, drugs with which they must be used in caution, monitoring involved in their use along with risk factors for VTE, bleeding and local procedures. These factors were used as a baseline for setting the audit standards which were:

- In COTE each patient should receive VTE prophylaxis with the exceptions of fully mobile patients or where a specific contraindication exists
- Tinzaparin should be administered as 3500units subcutaneously once daily at 6pm
- Patients with risk factors for bleeding should not receive VTE prophylaxis

OBJECTIVES

The aim of my project was to evaluate the prescribing of LMWH for VTE prophylaxis in elderly medicine and determine the level of compliance with the local protocol on the use of LMWH as thromboprophylaxis in elderly medical patients by means of audit and evaluation of whether a LMWH was prescribed or not, dosage administration and dosage omissions.

METHOD

Data were collected from all patients on three COTE wards based on one site for the initial audit. I designed a data collection table and I used this to collate data for each patient combining information from the electronic prescribing system and patients medical notes across three COTE wards under the following headings; Age, Risk Factors, Contraindications, Safe Prescribing, Effective Prescribing, Failure to prescribe when indicated, Prescribed when not indicated. I disseminated and discussed my project findings with the project tutor and COTE Clinical Governance Lead Consultant in order to cascade the findings down to the junior doctors. The decision was taken to re-audit on only one of the COTE wards “C” which appeared to have the greatest need for improvement. Two very simple interventions were put into place for the re-audit to:

1. Provide a place for the junior doctors to record the decision making process on an individual patient basis, in the form of a section in an admission proforma (AP) designed by the clinical governance lead for COTE which was being piloted on the ward at the time.
2. Perform a trial of increasing the stock level of tinzaparin on the ward to target the issue of missed doses and determine whether this could be improved on.

These changes were left in place for six weeks to take effect before collating the reaudit data.
An audit of the consistency between GP and cystic fibrosis centre held medication records for adult CF patients

Z Irshad, R Berry
University Hospital of North Staffordshire, Stoke-on-Trent

Patients with cystic fibrosis (CF) are commonly prescribed complex drug regimens, usually initiated by the CF centre and continued by their GP. The "CF Clinic must ensure that the G.P. is adequately informed about the medication recommended" in order to prevent the occurrence of medication related adverse events.

The recent addition of a pharmacist to the CF team at the North West Midlands CF centre brought to attention the discrepancies between medications the patients had been prescribed in primary care, and what their clinic records suggested they should have been taking. These discrepancies between medical histories and clinic records of recent clinic attendees highlighted the importance of the consistency required.

OBJECTIVE
To establish whether medication records kept by G.P. surgeries and the CF centre are the same for all adult patients.

AUDIT STANDARDS
100% of the medication records from the GP surgeries and the CF centre will match.

METHOD
Medication records for all adult patients at the CF centre were requested from their surgeries and compared with the most current CF centre clinic letter available in March 2010.

In addition, questionnaires were sent out to all of the GPs to try and gauge their views on the clinic letters sent out by the CF centre.

RESULTS
GP and clinic medication records for 34 patients, containing a total of 449 items, were compared. No patient records were found to be identical. The results are summarised in Figure 1.

Overall GPs were satisfied with the communication they received from the CF clinic.

DISCUSSION
Only 45% of items were found to be identical between both sets of records. The consistency between medical records therefore needs to be greatly improved in order to provide CF patients with the highest standard of care possible.

The clinical input of a pharmacist may help to prevent errors relating to unclear or incorrect clinic letters before they are sent to the GP. Any recent changes in medication should be clearly highlighted. Patient clinic letters should also be updated after an inpatient stay so that any medication changes that may have been made are recorded. Prescribers should avoid using old clinic letters to write inpatient prescription charts.

An increase in communication with patients regarding their medication may help to bridge the gap between primary and secondary care prescribers. The use of patient hand-held records would allow GPs and clinic prescribers to be aware of any changes in medication before the arrival of a clinic letter or the arrival of a notification by the GP.

An improvement in the channels of communication between all prescribers and their patients is necessary to ensure that patients receive the highest standards of care possible.

REFERENCES
An audit of the standard heparin infusion protocol at Royal Sussex County Hospital (RSCH).

C Casserly, C Proudfoot
Pharmacy Department, Royal Sussex County Hospital, Brighton and Sussex University Hospitals NHS Trust

Brighton and Sussex University Hospitals (BSUH) introduced a new standard heparin infusion protocol in November 2009. A new protocol was introduced because a National Patient Safety Agency Alert (NPSA) 2007 called for the revision of protocols for anticoagulation services, heparin specific recommendations included the use of a standardised ready to administer infusion of sodium heparin (1000 units in 1ml), minimise the use of concentrated products and changes in daily dose should be made by adjusting the rate of administration. Furthermore, the former BSUH heparin infusion protocols were outdated and in need of revision. The new standard heparin infusion protocol which complies with NPSA recommendations was written by the lead anticoagulation pharmacist in conjunction with a consultant haematologist and was approved by the trust’s Thrombosis Committee.

OBJECTIVES
The aim of this audit was to assess the effectiveness of BSUH’s new standard heparin infusion protocol.

METHOD
A data collection form was designed and successfully piloted. Ward pharmacists were asked to complete the data collection form when they had a patient on a heparin infusion. Data was collected over a three month period at the Royal Sussex County Hospital (RSCH) site. Details not recorded on the data collection form were retrieved from Winpath (blood results database) and the patients’ notes. Data was then analysed using simple statistics to provide a percentage of patients for whom the protocol was effective.

RESULTS
A total of 22 patients were identified as having received a heparin infusion. The protocol was adhered to (as defined by measurement of baseline platelet and clotting screen, correct initial infusion rate and correct rate adjustments) in 12 of the 22 cases (55%). Failure to perform a baseline clotting screen accounted for the majority of non-adherence, a baseline platelet count was not performed in two cases and the initial infusion rate was incorrect in one case only.

Seven patients were excluded from protocol effectiveness analysis as infusions were stopped before 24 hours. Of the 15 patients whose activated partial thromboplastin times (aPTTs) were recorded after 24 hours, 11 (73%) were therapeutic (aPTT 1.5-2.5) within 24 hours of infusion commencing. In the cases where this was not achieved, three of the patients were subtherapeutic and one patient was supratherapeutic at 24 hours.

Three patients experienced bleeding, two minor bleeds from wound sites and one patient experienced haematuria and the infusion was stopped. Three other patients experienced aPTT > 5 (5.1, 5.2, 5.5) with no bleeding. There was no incidence of heparin induced thrombocytopenia (HIT).

DISCUSSION
The data suggests that the new heparin infusion protocol is effective i.e. the aPTT ratio is in range 1.5-2.5 (2-2.5 for mechanical heart valves and vascular indications) 24 hours after initial dose.

The incidence of adverse events was also recorded. Adverse events were defined as serious bleeding, aPTT > 5, HIT and other (details given on data collection form). Six patients (27%, n=22) experienced adverse events as detailed above. None of the adverse events required a Datix (serious incidence report) or a Medicines and Healthcare products Regulatory Agency (MHRA) yellow card report. None of the patients experienced HIT, this compares favourably with the recorded incidence of HIT. An incidence of thrombocytopenia of up to 30% and an incidence of thrombocytopenia with thrombosis of <1% have been recorded.

REFERENCES

Audit on Seretide prescribing in adult inpatients within Buckinghamshire Hospitals NHS Trust

SY Tan, V Anand
Buckinghamshire Hospitals NHS Trust

Effective management of asthma and chronic obstructive pulmonary disease (COPD) is important for disease control. Yet, an annual increase of 5-6% hospital admissions related to exacerbations of asthma and COPD has been reported. These reports highlight the importance of appropriate and optimal drug inhalation therapy.

Seretide is the only fluticasone propionate / salmeterol combination inhaler product licensed in the UK for asthma and COPD. At present, the only product from the Seretide range licensed for use in COPD is Seretide 500 Accuhaler. It is a high volume and costly drug used in Buckinghamshire Hospitals NHS Trust, with a total expenditure of £56,000 from April 2008 to March 2009.

This audit was undertaken to identify Seretide prescribing trends within Buckinghamshire Hospitals NHS Trust, in particular off license usage.

OBJECTIVES
To determine:
- Whether the Seretide inhalers prescribed were continuation of existing treatment
- The percentage of patients on high doses* of Seretide during hospitalisation which were continuation of therapy
- Whether 100% of Seretide inhalers were prescribed in COPD and asthma patients according to the licensed doses and frequencies as recommended in the current British National Formulary (BNF) and summaries of product characteristics (SPC)
- Whether 10% of Seretide inhalers were prescribed for off-license indications
- The percentage of patients prescribed Seretide that are discharged on high doses* (* high doses refer to 200-500 micrograms fluticasone propionate twice daily)

METHOD
All adult inpatients prescribed Seretide during the period 10–20 November 2009 were identified via the following routes:
- On the wards by ward pharmacists or technicians
- In dispensaries by technicians and pharmacists
- In-house computer dispensing records

Using the patient details identified from the above sources, the investigator collected data from medication charts and medical notes every two days. Details recorded included:

1. Whether the Seretide inhalers prescribed were continuation of existing therapy
2. The percentage of patients on high doses* of Seretide during hospitalisation which were continuation of therapy
3. Whether 100% of Seretide inhalers were prescribed in COPD and asthma patients according to the licensed doses and frequencies as recommended in the current British National Formulary (BNF) and summaries of product characteristics (SPC)
4. Whether 10% of Seretide inhalers were prescribed for off-license indications
5. The percentage of patients prescribed Seretide that are discharged on high doses* (* high doses refer to 200-500 micrograms fluticasone propionate twice daily)
Audit of the prescribing, documentation and administration of palivizumab in Wrexham Maelor Hospital for the RSV season 2009–10

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Respiratory syncytial virus (RSV) commonly causes mild “cold like” symptoms. However, babies who were born prematurely with other health issues are at risk of developing bronchiolitis. Palivizumab is a monoclonal antibody licensed for the prevention of lower respiratory tract infection caused by RSV. It is given as an intra muscular injection on a monthly basis throughout the five months of the RSV season. Following a Health Technology Assessment, the Joint Committee on Vaccination and Immunisation’s (JCVI) subgroup on RSV updated their recommendations regarding who should be given palivizumab, there is now a conflict between their recommendations and the licensed indication.

OBJECTIVES
The aim of the audit was to ascertain how palivizumab is prescribed in Wrexham Maelor Hospital (WMH) as there is no local guideline governing this. All patients prescribed palivizumab should meet either the licensing indication or the JCVI recommended indication and if they do not, then the rationale for prescribing should be clearly documented in the notes.

METHOD
The auditor attended all palivizumab clinics throughout the RSV season and documented every patient weight and dose given. The auditor also retrieved every patient’s medical notes from archives in order to identify the indication for prescribing.

RESULTS
The hospital spent a total of £71,007 on palivizumab within five months and 19 patients were given palivizumab. However, only 14 patients were given the recommended five doses. Of the 19 patients, only eight (42%) fulfilled both the JCVI recommendations and the licensed indication. However, five patients (26%) solely met the licensed indication, and six patients (32%) did not meet either standard. This means that overall, 11 patients (58%) who were given palivizumab did not meet the recommendations for use by the JCVI. There was no clear documentation of the indication for treatment and the auditor often had to ascertain where in the criteria each patient fitted by assessing their medical notes.

DISCUSSION
Documentation of the indication for prescribing palivizumab was limited. Within the WMH, prescribing was neither based solely on the JCVI recommendations or on the license. In particular, patients over 12 months of age who were given palivizumab did not meet the JCVI recommendations and were more expensive to treat on a mg/kg basis. The tertiary care centre have developed their own guidelines to include both the license and the JCVI guidelines and developed a standard documentation form to document every dose given.

As a result of the audit findings, the main recommendation is that WMH should develop their own criteria for prescribing palivizumab by including both the JCVI recommendations and the license. This would clarify who should be given palivizumab. There should also be a recognised alert card in all palivizumab patients medical notes and a form should be developed to enable the recording of complete dose cycles. This would enable future audits to be undertaken.

REFERENCES
1 Health protection agency http://www.hpa.nhs.uk/Topics/InfectiousDiseases/InfectionsA-Z/

Table 1: Percentage of Seretide inhalers prescribed according to indication (n=55)

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<tr>
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<th>Licensed indication</th>
<th>Unlicensed indication</th>
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<tr>
<td>COPD</td>
<td>7 (13%)</td>
<td>28 (51%)</td>
</tr>
<tr>
<td>Asthma</td>
<td>16 (29%)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Asthma/ COPD</td>
<td>4 (7%)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Total</td>
<td>27 (49%)</td>
<td>28 (51%)</td>
</tr>
</tbody>
</table>

a. Dose, frequency, device type for Seretide
b. Indication for Seretide
c. Reason for admission
d. Whether Seretide is new or continuation of previous prescription
e. Medicines related to COPD/asthma on admission

The data collected were transcribed and analysed by the investigator using Microsoft Excel.

RESULTS
Fifty-five patients were recruited during the period of study. Forty-seven (85%) of the Seretide inhalers prescribed were continuation of existing treatment, and 44 (80%) of these involved high dose prescriptions. Six patients were newly initiated on high doses of Seretide, but only two of them were initiated by respiratory consultants.

73% of the Seretide inhalers were prescribed according to licensed doses and frequencies, before interventions by pharmacists. Results also highlighted that Seretide inhalers were primarily prescribed off licence for COPD (51%). See Table 1.

The percentage of patients prescribed Seretide that were discharged on high doses could not be determined due to loss of follow-up on discharged patients.

DISCUSSION
This audit highlighted that a significant number of Seretide inhalers prescribed were high dose prescriptions, which were continuation of existing COPD or asthma treatments. However, it is unknown whether these were initiated in primary or secondary care. Most of these patients were admitted due to respiratory causes, but whether they were using their inhalers correctly remains unclear. Since not all patients will be seen routinely by their GP, all patients’ inhalers and inhaler technique should be reviewed during their hospital stay.

Only 73% of the prescriptions were written according to licensed doses and frequencies. This may be due to dose confusion between different devices. In these cases, pharmacy input was valuable as most of these were rectified by the intervention of ward pharmacists before administration. Education sessions to remind prescribers of the different dosing regimens between Seretide Evohaler and Accuhaler may be useful.

51% of Seretide inhalers in the trust were used off license, primarily the Seretide 250 Evohaler. There are potential cost savings of £20 per patient per month if these patients were switched to the therapeutic equivalent Seretide 300 Accuhaler. A comparison of the costs, clinical effectiveness and risks involved between all licensed COPD inhalers should be conducted to assist clinically effective prescribing.

In view of the cost of the product, appropriate Seretide prescribing is essential for effective and optimal COPD and asthma management. As such, some of recommendations in the audit are forwarded for use by the respiratory team in an attempt to improve current prescribing practices. A re-audit against the action points should be undertaken in the future.

REFERENCES
3 In house JAC computer dispensing records, Buckinghamshire Hospitals NHS Trust, 2009.
Audit of the use of intravenous paracetamol in surgical patients

S Light
Department of Pharmacy, Gloucestershire Hospitals NHS Foundation Trust

The intravenous formulation of paracetamol, Perfalgan, is licensed for “the short-term treatment of moderate pain, especially following surgery, and for the short-term treatment of fever, when administration by intravenous route is clinically justified by an urgent need to treat pain or hyperthermia and/or when other routes of administration are not possible”\(^1\). Therefore administration of intravenous paracetamol should be restricted to a small group of patients without an available or reliable oral route of administration.

Following a review of ward expenditures at Cheltenham General Hospital, intravenous paracetamol has consistently appeared in the top 20 items, particularly for many of the larger surgical wards. It is suspected that in some cases it may be being prescribed or administered to patients inappropriately.

**OBJECTIVES**
This audit aimed to assess all post-surgical patients (at least 50) on the six main surgical wards at Cheltenham General Hospital to determine if they received intravenous paracetamol appropriately, according to the Perfalgan Summary of Product Characteristics (SPC).

**METHOD**
Data was collected for five days on each of the six surgical wards at Cheltenham General Hospital during February 2010. This involved a nurse-led data collection approach and an auditor who reviewed each of the patients who had received a dose of intravenous paracetamol to determine if they had been administered this “appropriately” (a dose administered to patients receiving no oral medications at the same time).

**RESULTS**
Over the audit period, 110 doses of intravenous paracetamol were recorded by the nurses of which 28 (26%) were administered inappropriately (Figure 1). As shown in Figure 2, over 60% of the total 28 doses of intravenous paracetamol inappropriately administered occurred on PRS ward, the large gastrointestinal surgical ward at the hospital. All patients on MNT (private ward) and DXT (trauma and orthopaedics speciality) received intravenous paracetamol appropriately, according to the Perfalgan SPC.

Converting these figures into cost and extrapolating this data to approximate the total additional cost across the entire hospital per annum a grand total of £41,666 would have been lost due to inappropriate administration of intravenous paracetamol.

**DISCUSSION**
It is evident that a considerable number of post-surgical patients are likely to be receiving intravenous paracetamol inappropriately, i.e. when they have an available and reliable oral route of administration. In these patients, intravenous paracetamol is essentially being administered off licence. The main reasons for this are unclear however the following factors are likely to contribute significantly to the current situation:

- All charts reviewed had paracetamol prescribed “PO/IV” therefore the route of administration was ultimately decided by nurses administering the paracetamol
- Route of administration was rarely reviewed so where the intravenous formulation was initially appropriate e.g. immediately post-surgery, this is not often the case long term but was overlooked
- Convenience of intravenous administration in patients with established intravenous access
- Currently no trust policies exist on the safe prescribing or administration of intravenous paracetamol

To improve the current situation, the results of this study will be published to raise staff awareness of the problem; posters have been affixed to the Perfalgan cupboards of all wards prompting nursing staff to reconsider their decision to administer intravenous paracetamol and training packages are being designed to help support both prescribers and nurses when considering the appropriateness of intravenous paracetamol for their patients.

**REFERENCES**
An audit of the implementation of a hypoglycaemia treatment algorithm on adult wards: how nurses’ knowledge of the treatment of hypoglycaemia has changed

L K Cameron, S Scarle
Chelsea and Westminster Hospital NHS Foundation Trust

There are currently an estimated 1.8 million diabetics in the UK,1 which equates to 3% of the population. The percentage of patients in UK hospitals who are diabetic is likely to be considerably higher than 3%, as diabetes is associated with co-morbidities that may necessitate admission to hospital. Diabetic patients treated with insulin or oral hypoglycaemic agents are at risk of hypoglycaemia2 as oral intake may be poor while in hospital and insulin requirements may be uncertain during a period of illness. As such, healthcare professionals must have a clear treatment pathway for managing episodes of hypoglycaemia in an inpatient setting. Having medicines to treat hypoglycaemia readily available on the ward is already standard practice within the trust. However, in line with the NPSA’s plan to make insulin a priority,1,4 healthcare professionals specialising in diabetes wanted to use these medicines. Therefore a hypoglycaemia treatment algorithm was proposed. Its purpose was to give nursing staff a step-by-step guide to treating hypoglycaemia, including oral and non-oral options so that it was applicable to both the conscious and unconscious patient.

OBJECTIVES

The objective of the audit was to assess nurses’ knowledge of the treatment of hypoglycaemia before the formal algorithm was available, and to gauge the improvement in knowledge after kits containing an algorithm were in use on the ward.

Kits containing a treatment algorithm were implemented on to two adult wards, in order to give an impression of whether they were helpful in improving knowledge of the treatment of hypoglycaemia.

STANDARDS

The audit standard was: 100% of nurses questioned score 12/12 in the hypoglycaemia treatment questionnaire.

METHODS

Two or three nurses from each ward were asked, in a questionnaire, to define hypoglycaemia and to outline the treatment they would give to patients experiencing hypoglycaemia in three scenarios. The scenarios covered a range of blood glucose measurements, and one scenario asked about a patient who was unconscious. Table 1 outlines the points available. The questionnaire was conducted at baseline (where nurses were working from sources such as the BNF) and again once hypoglycaemia kits were in use on the wards and the treatment algorithm had been explained to nurses. Results were analysed using simple, descriptive statistics.

RESULTS

No nurse scored 12/12 in either the baseline or the post-implementation audit. At baseline the mean score was 7.4/12, and in the post-implementation audit the mean was 9.7/12. Table 1 gives a breakdown of the percentage of nurses stating each answer.

DISCUSSION AND CONCLUSION

The baseline audit identified that nursing knowledge was variable. The post-implementation audit showed that knowledge of the treatment of hypoglycaemia improved, perhaps due to the education that accompanied the roll-out of the kit. The percentage of nurses stating each point went up in the post-implementation audit in every case: the only exception being “bleep the doctor”. This may be due to differences in questioning technique, or due to nurses feeling more confident treating hypoglycaemia with the algorithm in place. The sample size was considerably smaller in the post-implementation audit (n = 6 compared with n = 22 in the baseline) so it is difficult to draw firm conclusions.

In further work it became apparent that the practice of the treatment of hypoglycaemia did not improve with the implementation of the kits. The reasons for improvement in knowledge but not practice are unclear, and a comprehensive package of education to accompany the roll-out across all adult wards is recommended.

REFERENCES


Uncollected outpatient medicines in a children’s hospital — the clinical, financial and operational implications

H Boothman
Preregistration Pharmacist, Alder Hey Children’s NHS Foundation Trust

The overall NHS expenditure on medicines in 2008 was £11.6bn.1 As efficiency savings of £1bn are required by 2012/13 it is important to eliminate any unnecessary expenditure in the NHS,2 which includes waste medicines. Funding for staff will also be affected, with efficiency improvements and savings required to meet financial targets. Uncollected prescriptions mean unnecessary expenditure of staff time as the prescriptions are dispensed and then returned yet the patient never receives the benefit of the medicine.

In addition to financial and operational implications there are also clinical and child protection issues that uncollected prescriptions may lead to.
Table 1: The breakdown of uncollected prescription items

<table>
<thead>
<tr>
<th>Category</th>
<th>Owing</th>
<th>Returned</th>
<th>&quot;Wasted&quot;</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of items</strong></td>
<td>48</td>
<td>106</td>
<td>28</td>
<td>180</td>
</tr>
<tr>
<td><strong>Cost of items</strong></td>
<td>£3,134</td>
<td>£5,138</td>
<td>£391</td>
<td>£11,663</td>
</tr>
<tr>
<td><strong>Cost per annum (approximate)</strong></td>
<td>£25,000</td>
<td>£22,000</td>
<td>£1,600</td>
<td>£48,600</td>
</tr>
<tr>
<td><strong>Operational cost per annum</strong></td>
<td>£1,380</td>
<td>£3,360</td>
<td>£1,680</td>
<td>£9,420</td>
</tr>
</tbody>
</table>

CONCLUSIONS

- The financial and operational implications of uncollected prescriptions must be reduced especially in the current financial climate as large savings in the NHS are required. This audit has demonstrated that drugs to the value of approximately £23,600 per annum are dispensed for outpatients and A&E patients at Alder Hey Children's Hospital each year but are not collected. Fortunately the majority of these drugs can be recovered leaving the value of wasted drugs at £1,600 per annum. In addition to this value the uncollected prescriptions cost the department approximately £9,500 in operational costs per annum of which none can be recovered.

REFERENCES

prescribed between health authorities in England. Additionally, a recent drug use review highlighted varying prescribing practices between specialties within the trust itself. By closely complying with national guidance and only initiating ARBs as second-line treatments, hospitals can minimise costs without compromising patient care. The overall aim of the audit was to establish if ACEs were being initiated ahead of ARBs as first-line treatment across the trust.

OBJECTIVES
A To identify all in-patients currently taking ACEs and/or ARBs across thirteen wards at Charing Cross Hospital during the audit period.
B To establish where these agents were first prescribed [ie in primary or secondary care].
C To establish the indications for which the ACEs/ARBs were first prescribed.
D In patients taking an ARB, to establish if the ARB was initiated following first-line treatment with an ACE.
E In the case of patients commenced on an ARB as a first-line agent within the Trust, to record the specialties of the prescribers responsible.

METHOD
Data was collected on 12 medical wards and one surgical ward at Charing Cross Hospital over two-and-a-half days. All available inpatient drug charts were checked to identify patients currently taking an ACE and/or an ARB. Once patients had been identified, information from the drug chart, medical notes, the patient themselves, ward handover sheets and the electronic discharge prescription system was used to answer the audit objectives. Where possible, the existence and nature of any ACE intolerance was confirmed with the patient themselves.

RESULTS
Seventy patients were identified as being on drugs targeting the renin-angiotensin system. Of these, the trust was responsible for the initiation of an ACE in 20 patients (35.1% of the total) and an ARB in five patients (25% of the total) (Figure 1). Three patients were commenced on ARB monotherapy, and two were prescribed ARBs in addition to an ACE (see Table 1).

DISCUSSION
Of 11 patients commenced on ACEs or ARBs during their current admission, 90.9% (n= 10) were prescribed ACE monotherapy as a first-line treatment. This suggests that ACEs are consistently being prescribed as first-line agents within the hospital. No prescribing speciality stood out as being linked with inappropriate first-line ARB prescribing.

In the three instances where ARB monotherapy was initiated by the trust, 67% of patients (n= 2) had been switched to an ARB due to an ACE-related cough. Patient RP was the only patient commenced on ARB monotherapy during his current hospital stay. He was re-started on irbesartan for hypertension a few weeks after it was stopped by his GP due to hypotension. This could be seen as a logical re-introduction in an ACE-intolerant patient; however it proved impossible to confirm whether or not the patient had actually received a first-line ACE. This makes the appropriateness of this prescribing decision hard to assess.

Two patients (2.9% of the total number) were commenced on ARBs as an “add-on” to an ACE. This is not routine practice, and its appropriateness can only be assessed on a patient-by-patient basis. In one patient, the combination of enalapril and irbesartan was clearly in-line with guidance set out in the Trust formulary. In the other patient, the rationale for an ACE/ARB combination was less definitive.

Overall, the audit seemed to indicate that within the trust cost-effective ACEs are being initiated ahead of more expensive ARBs.

REFERENCES