Glucose potassium insulin (GKI) infusions are prescribed for patients with diabetes undergoing surgical procedures. A recent clinical incident highlighted the need to review current systems for prescribing GKI infusions when a patient with a very high serum potassium received a GKI infusion. A root cause analysis identified the prescriber's lack of knowledge about GKI infusions and inadequate guidance available as two of the major factors leading to the incident. The Foundation Programme curriculum advises that a core competency for Foundation 1 (F1) doctors is to be able “to prescribe drugs including fluids appropriately, clearly and unambiguously.” It is well recognised there are deficits in therapeutics training in the medical undergraduate curriculum and recently the General Medical Council has called for a nationally recognised prescription chart to minimise errors in prescribing. Potassium and insulin have been identified as high risk medicines where repeated serious errors have occurred and thus particular efforts need to be made to improve medication safety.

In the Trust there are GKI infusion guidelines available but no specific prescription chart. This study was set up to design and evaluate a standardised GKI prescription chart before it was deployed in clinical practice. Both fifth-year medical students and F1 doctors were included in the study.

**OBJECTIVES**
- To design a standardised GKI prescription chart.
- To assess fifth-year medical students and F1 doctors' baseline skills in prescribing GKI infusions.
- To assess fifth-year medical students' and F1 doctors' ability to prescribe GKI infusions with the aid of the current Trust guidelines.
- To assess fifth-year medical students' and F1 doctors' ability to prescribe GKI infusions on the standardised GKI prescription chart.
- To review fifth-year medical students and F1 doctors' views on prescribing GKI infusions.

**METHODS**
A working group including the pharmacist, consultant, diabetic nurses, and biochemist designed the new GKI prescription chart. Nineteen fifth-year medical students and 27 F1 doctors participated in the study over a one-week period. Participants were not aware that they were going to be assessed on GKI infusions prior to attendance.

The participants were presented with a written patient case scenario. In the scenario the patient required a “standard GKI infusion” prior to surgery and following on from surgery the patient required a second GKI infusion containing less insulin and no potassium. Under exam conditions the participants were asked to prescribe two GKI infusions for the patient using three different methods as follows:

- On an intravenous infusion prescription chart
- On an intravenous infusion prescription chart with the aid of the Trust guidelines
- On the GKI prescription chart

Prescription charts were collected in between each prescribing exercise. Participants also completed a questionnaire on their views on prescribing GKI infusions. All written work was kept anonymous.

**RESULTS**
The results are set out in Figures 1 and 2 (pS2). The questionnaire identified that all the medical students and seven of the doctors were not aware there were Trust guidelines on prescribing GKI infusions. Thirty-eight participants (83%) considered the current Trust guidance gave insufficient information on prescribing GKI infusions. All agreed that the new chart gave clear guidance on how to initially prescribe a GKI and all but one participant agreed it gave clear guidance on how to adjust insulin and potassium requirements. Forty-three participants (93%) agreed it was helpful to have a new chart which incorporated prescribing and monitoring guidelines. All agreed that they would feel confident in prescribing a GKI infusion in the future with the new GKI prescription chart.
chart compared with only 18 participants (38%) feeling confident with the current resources available.

**DISCUSSION AND CONCLUSION**

None of the medical students and only 52% of doctors were able to prescribe a GKI infusion on a chart without any reference sources. This highlights the need to have guidance on prescribing GKI infusions readily available. 84% of medical students and 81% of doctors could prescribe the first GKI infusion using the Trust guidance. However, only 16% of medical students and 22% of doctors could prescribe the second GKI infusion. This indicates that the guidelines gave insufficient advice on how to alter the content of insulin and potassium in the infusion in response to changing blood glucose and serum potassium levels.

The standard of prescribing of GKI infusions was significantly improved by all participants when they used the GKI prescription chart. All participants correctly prescribed the first GKI infusion. 95% of the medical students and 78% of the doctors prescribed the second infusion correctly. One possible explanation for this could be that the medical students read the chart more carefully since they have limited experience of prescribing.

The questionnaire results clearly demonstrated all doctors and medical students welcomed the new GKI chart. The main limitation of the study was that it was not possible to perform in clinical practice. In conclusion the standardised GKI prescription chart has been demonstrated to potentially significantly improve prescribing and reduce errors.

**REFERENCES**


**TEVA LEADERSHIP AWARD 2010**

**Influencing cardiovascular prescribing across a managed clinical network**

**Williams H**

Southwark Health and Social Care & South London Cardiac and Stroke Networks

Traditionally, the development of clinical protocols and guidelines within the NHS has been led within organisations or in conjunction with one or two neighbouring organisations. Often different protocols apply within primary and secondary care and there is a lack of joined-up thinking across sectors, even though patients are frequently referred cross this wider geography. With this in mind, the South East London Cardiac and Stroke Network (SELCSN), set up a multidisciplinary cardiac prescribing forum (CPF) led by a consultant pharmacist, to facilitate the development of prescribing guidance across the six acute Trusts and six Primary Care Trusts (PCTs) within the sector.

**OBJECTIVES**

The aims of the CPF are to provide leadership on prescribing issues within the sector by:

- Developing comprehensive, evidence-based prescribing guidance, appropriate for use across the whole patient pathway and affordable within the local health economy
- Advising local formulary committees on the potential role and likely impact of newly launched drugs
- Providing education and training to healthcare professionals on prescribing issues
- Undertaking sector-wide audit on cardiac prescribing issues

**METHODS**

The CPF, with wide representation from local cardiologists, general practitioners, nurses and pharmacists, meets on a quarterly basis to ratify new guidance. The guidance is prepared by a Pharmacy Working Group (PWG) with membership from all local PCTs and acute Trusts. The areas chosen for guideline development are informed by PCT priorities (ie, lipid modification, clopidogrel, ACE/ARB ratios), national initiatives (QOF guidance, NHS Health Checks, NICE guidance) and newly launched drugs (ivabradine, prasugrel). Multi-disciplinary audits on prescribing issues are undertaken across the sector to assess the impact of new guidance and highlight issues which inform the on-going work plan.

**RESULTS**

Over the past three years the CPF, facilitated by the PWG have agreed a number of consensus guidelines (Table 1, pS3). These have been implemented across all PCTs and acute Trusts within the sector. The CPF have also run 12 educational events across the sector on the new guidance and other prescribing issues affecting clinical practice.

One example of a successful piece of joint working involved the development and implementation of sector-wide guidance on clopidogrel in 2008. An audit of communication of indication and duration of clopidogrel at discharge was undertaken. Lack of communication to primary care, identified through the audit, was addressed by acute trust pharmacy departments with a significant improvement in communication at re-audit six months later.1
The CPF is now a South London group running across both South East and South West London Cardiac and Stroke Networks covering 11 PCTs and 10 acute Trusts. The current work plan includes the development of guidelines for prescribing in HF, antibiotic prophylaxis of infective endocarditis, familial hyperlipidaemia, dronedarone and atrial fibrillation management to include stroke prophylaxis and rate and rhythm control in primary care. Since the development of the CPF, the role of pharmacy within the network has grown, with projects now covering the introduction of non-medical prescribers into cardiac rehabilitation programmes to optimise secondary prevention strategies, development of a Pan-London CPF, the role of pharmacy within the network has grown, with projects now covering the introduction of non-medical prescribers into cardiac rehabilitation programmes to optimise secondary prevention strategies, development of a Pan-London Stroke Pharmacists group and leadership of an industry working group.

DISCUSSION AND CONCLUSIONS
Developing the CPF and the PWG has required many of the leadership qualities highlighted in the NHS framework. Key challenges were to gain the confidence and respect of the clinicians from both primary and secondary care, setting a direction for the group with many competing demands and agendas, ensuring engagement from all stakeholder organisations and empowering the pharmacists to engage with and influence commissioners and clinicians to ensure full implementation of the guidelines once agreed. From a pharmacy perspective, there is now much closer collaboration between acute Trusts and PCTs. Regular meetings have allowed prescribing issues to be addressed before they become embedded within organisations, joint working to develop guidance has fostered a greater understanding of the differing pressures, particularly financial, in primary and secondary care.

“From a network perspective the CPF has been an enormous force for the good. It has enhanced the work of the network in relation to the equality agenda. Standardising prescribing guidance across 11 PCTs and 10 acute trusts helps to ensure equitable prescribing. The CPF has also helped to establish closer working relationships across the primary/secondary/tertiary care interface and a major advantage of working within a network is the ability to disseminate the healthcare boundaries.” — Lucy Grothier, Director, SLCSN

ACKNOWLEDGEMENTS
I would like to acknowledge the commitment and support of members of the Pharmacy Working Group and the SLCSN team, particularly Lucy Grothier and Sara Nelson

REFERENCES

WINNER OF POSTER PRIZE
Comparative efficacy and tolerability of antiepileptic drugs for refractory epilepsy
Bodalia PN*, Grosso AM*, MacAllister RJ†, Smith L‡, Dhillon S§, Wonderling D*, Sofat R†, Hingorani AD†
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Seventeen different antiepileptic drugs (AEDs) are licensed in the UK to reduce the frequency and severity of seizures in patients with refractory epilepsy. Published clinical guidelines however currently fail to inform prescribers on the comparative efficacy and tolerability of these agents. Meta-analyses are increasingly being performed to quantify treatment effects from trial data; however, these can only be done for treatments that have been directly compared with one another. Multiple-treatment meta-analysis is a novel and emerging method for synthesising information from a network of trials using Bayesian principles. Indirect comparisons are then estimated in the absence of active-comparator trials to establish a treatment hierarchy.

OBJECTIVES
The primary study objectives were to evaluate the comparative efficacy and tolerability of AEDs for refractory epilepsy using systematic review, traditional and emerging meta-analysis techniques in an attempt to rank current treatment options for this difficult-to-treat disease.

METHODS
Trials were identified using search criteria specified a priori (randomised, double-blind, adult, simple/complex partial seizures with/without secondary generalisation, treatment period eight weeks or more). The Cochrane Central Register of Controlled Trials (Cochrane Library 2009, issue 2), which contains the Epilepsy Group’s specialised register, Medline (1950 to March 2009), Embase (1980 to March 2009), and Current Contents Connect databases (1998 to March 2009) were accessed. A traditional meta-analysis (random-effects model) was performed initially to investigate heterogeneity. Subsequently, a treatment network was constructed and a mixed-treatment meta-analysis was undertaken using a Bayesian (random-effects) model. The primary efficacy outcome was responder rate (proportion of patients achieving a 50% reduction in seizure frequency from baseline) and the primary safety outcome was tolerability (incidence of premature withdrawal due to drug-related adverse events). The use of anonymised published data precluded the requirement for ethics committee approval.

RESULTS
Thirty-nine eligible trials were identified which included 6,021 patients randomised to 12 interventions, including placebo; 37 trials were placebo-controlled and two were active-controlled. The mean number of concomitant AEDs was three. Where more than one dose of active agent was studied the most common clinically employed dose was assessed. Of the 65 possible pair-wise comparisons between agents, 12 comparisons were apparent with only two being active-comparator controlled.
Traditional meta-analysis: All AEDs were clearly superior to placebo for the primary efficacy endpoint (odds ratio [OR] 3.81; 95% confidence interval 3.16 to 4.60). There was evidence of heterogeneity identified for 4/10 AEDs (overall I-squared = 45.4%). All AEDs demonstrated a greater risk of premature withdrawal for the primary safety endpoint (OR 3.20; 95% CI 2.30 to 4.44), with evidence of heterogeneity identified for 3/10 AEDs (overall I-squared = 56.8%).

Bayesian (network) meta-analysis: The generated relative risk treatment effect estimates failed to demonstrate superiority of any one agent; however, oxcarbazepine, topiramate, pregabalin and tiagabine appeared the most effective (not clinically significant differences). Similarly, there was no clear evidence to establish a tolerability advantage of one agent over another, although sodium valproate, levetiracetam, gabapentin and vigabatrin emerged as the best tolerated (not clinically significant differences). A hierarchical model suggests that AEDs with a trend for greater efficacy were correlated with poorer tolerability (see Table 1).

DISCUSSION
This study fails to provide definitive evidence of clinical superiority (or a definitive tolerability advantage) for one AED over another. Therefore, it is recommended that guidance on treatment of refractory epilepsy should be based on other factors such as contraindications and treatment costs. However, in general, it appears that AEDs with the highest apparent efficacy are coupled with the highest apparent rate of treatment discontinuation due to adverse events. This systematic review and meta-analyses had several strengths but certain limitations were apparent. These include, but are not restricted to, the fact that the available prospective studies only provided information in the short term with limited longer-term follow-up data. In addition, many of the newer AEDs (eg, lacosamide) recruited a more intractable population of patients with refractory epilepsy, which biases the results in favour of drugs that recruited less difficult-to-treat populations.

This study highlights the need for prospective active-comparator trials to be undertaken in refractory efficacy and suggest that regulatory authorities consider mandating such research prior to granting marketing authorisation.

REFERENCES
2. Lavis JN. How can we support the use of systematic reviews in policymaking? PLoS Medicine 2009;6:e1000141.

Table 1: Hierarchy of AEDs (rank 1 being the highest for the given parameter) as estimated by a multiple-treatment network meta-analysis of randomised controlled trials

<table>
<thead>
<tr>
<th>Rank</th>
<th>Efficacy</th>
<th>Tolerability</th>
<th>Cost*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Oxcarbazepine</td>
<td>Sodium Valproate</td>
<td>Gabapentin</td>
</tr>
<tr>
<td>2</td>
<td>Topiramate</td>
<td>Levetiracetam</td>
<td>Sodium Valproate</td>
</tr>
<tr>
<td>3</td>
<td>Pregabalin</td>
<td>Gabapentin</td>
<td>Lamotrigine</td>
</tr>
<tr>
<td>4</td>
<td>Tiagabine</td>
<td>Vigabatrin</td>
<td>Vigabatrin*</td>
</tr>
<tr>
<td>5</td>
<td>Levetiracetam</td>
<td>Lacosamide</td>
<td>Pregabalin*</td>
</tr>
<tr>
<td>6</td>
<td>Sodium Valproate</td>
<td>Pregabalin</td>
<td>Tiagabine*</td>
</tr>
<tr>
<td>7</td>
<td>Zonisamide</td>
<td>Zonisamide</td>
<td>Oxcarbazepine</td>
</tr>
<tr>
<td>8</td>
<td>Vigabatrin</td>
<td>Tiagabine</td>
<td>Lacosamide*</td>
</tr>
<tr>
<td>9</td>
<td>Lamotrigine</td>
<td>Lamotrigine</td>
<td>Zonisamide*</td>
</tr>
<tr>
<td>10</td>
<td>Gabapentin</td>
<td>Topiramate</td>
<td>Topiramate*</td>
</tr>
<tr>
<td>11</td>
<td>Lacosamide</td>
<td>Oxcarbazepine</td>
<td>Levetiracetam*</td>
</tr>
</tbody>
</table>

* AED currently protected by a UK patent

How non-medical prescribing improved patient care on a surgical ward

Sassi-Jones K
Cwm Taf Local Health Board, Rhondda Cynon Taff

Prior to non-medical prescribing (nmp), doctors were responsible for the prescribing of inpatients medication. Prescribing duties was often not seen as a priority, due to other work commitments (theatre, out-patient clinics, and on-call). This often led to delays in prescribing patients regular medication on admission; current medication charts expiring and not being rewritten; delays in prescribing take home medication and thus patients discharge; and delays in prescribing and reviewing acute perioperative medication (eg, analgesia, antibiotics, antiemetics and laxatives). These examples potentially meant patients missed medication doses and/or received the incorrect medication. An in-house medicines reconciliation audit found that less than 70% of patients had their medication reconciled within 24 hours of admission. A review of reported prescribing errors (in-house) identified 27 errors over a six month period. Four of these errors related to the prescribing of anticoagulants and five to the prescribing of antimicrobials. In support of ‘The Hospital at Night concept,’ an audit (in-house) investigating the role of junior medical staff on night duty, found that one third of their time was spent completing routine tasks, such as rewriting inpatient medication drug charts and the prescribing of warfarin doses for patients unknown to them.

OBJECTIVES
To introduce and assess the impact of a pharmacist prescribing on an acute vascular surgical ward at a 600-bed district general hospital.

METHOD
In July 2008 the first non-medical pharmacist prescriber at The Royal Glamorgan Hospital began prescribing at ward level. Data on all prescribing events, including medication prescribed and the circumstances under which it was prescribed (inpatient chart, take home prescription, during consultant ward round etc) were recorded for the first three months by the prescriber. Any medication prescribed was documented in the clinical notes and discussed with a member of the medical team providing care for that patient. With the exception of controlled drugs, the nmp could prescribe any licensed medication from The BNF, within her area of competence or specialty as per guidance on nmp issued by The Royal Pharmaceutical Society of Great Britain.

RESULTS
A total of 109 prescribing interventions were recorded by the pharmacist. One hundred and sixty-four (53%) events involved prescribing patients regular medication, either on admission or when a

Table 1. New items prescribed by the non-medical pharmacist prescriber according to BNF therapeutic class

<table>
<thead>
<tr>
<th>BNF therapeutic class</th>
<th>Number of items prescribed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticoagulants and protamine</td>
<td>18</td>
</tr>
<tr>
<td>Analgesics</td>
<td>22</td>
</tr>
<tr>
<td>Antibacterial drugs</td>
<td>18</td>
</tr>
<tr>
<td>Others</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>77</td>
</tr>
</tbody>
</table>
new drug chart was required, and 68 items were prescribed on the patient’s discharge prescription. A total of 77 (25%) new items were prescribed, which have been tabulated according to their British National Formulary (BNF) therapeutic class (Table 1).  

**DISCUSSION**

The top three categories of new items prescribed (Table 1) were closely linked to the following topical and key target areas relating to patient safety initiatives.

**Control of infection** *Clostridium difficile* infection: How to deal with the problem (Department of Health); Surgical Site Infection (NICE); Antimicrobial Stewardship (1000 Lives Campaign). These publications aim to reduce the incidence of healthcare-associated infection, and highlight the importance of rationalising antibiotic prescribing.

**Medication Safety** Medicines Reconciliation (NICE/NPSA): Recommends that pharmacists should be involved in medicines reconciliation as soon as possible after admission; Making It Safer for Patients Taking Anticoagulation (NPSA): highlights the importance of pharmacist involvement in the management and dosing of patients on anticoagulants.

**Anticoagulation** Thromboprophylaxis (NICE); Warfarin Prescribing and Monitoring (NPSA).

Other benefits of the role included prompter prescribing of the inpatient medication chart upon admission, and facilitation of the discharge process, enabling take-home medication to be prescribed and assembled sooner. In many instances the pharmacist identified and prescribed medication that had been unintentionally omitted on admission by the clerking doctor. Service users were asked their opinion on the new role of the pharmacist, and positive feedback was received. An audit (in-house) of prescribing on the surgical ward demonstrated 100% compliance against prescribing standards for the nmp, compared to an overall compliance of less than 75%. To date no nmp errors have been reported. The perceived benefits of the role from the nmp’s perspective are numerous including the prompt prescribing and review of both acute and chronic medication; the education of junior doctors through the sharing of good practice; and an enhancement to the role of the clinical pharmacist providing better integration at ward level and increased job satisfaction.

Work is needed to assess the true impact of this service on patient outcomes. The author has also used her experiences to help produce a trust wide policy on non medical prescribing to help guide future nmp’s.

**REFERENCES**


**The role of rescue medications in the management of COPD exacerbations**

Culy A, Roberts D, Liew J and Yeoman T medicines team, NHS Cambridgeshire

Chronic obstructive pulmonary disease (COPD) affects approximately 900,000 people in the UK, with an estimated 2 million further undiagnosed cases. It is characterised by airflow obstruction, caused by chronic inflammation of the airways and parenchymal tissue causes damage to the lungs. NICE guidance, published in 2004, outlines the management of patients with COPD. It recommends that patients should be advised on self management using COPD exacerbations. This includes the provision of a course of antibiotics and corticosteroids to keep at home, to be used promptly at the first signs of an exacerbation, known as ‘rescue packs.’ The aim is to reduce the number of emergency admissions to hospital. The draft NICE guidance also advocates the use of rescue packs, in line with the current guidance.

**AIM**

To establish how patients with COPD are managed in relation to their exacerbation medication and to investigate the influence of rescue packs on hospital admission rates for patients with COPD.

**OBJECTIVES**

1. To determine the number of patients who are currently eligible for a rescue pack and from those, determine the number of patients who currently have a rescue pack. Eligibility criteria: a confirmed diagnosis of COPD using objective lung function tests; the patient has had two or more exacerbations in the past year.
2. To compare the number of admissions to hospital for patients before and after being issued with a rescue pack.
3. To find out from those patients who received a rescue pack, how they felt about it, with the use of a questionnaire containing both open and closed questions.

**METHOD**

A search of each patient’s practice electronic prescribing, clinical results and consultation records was conducted to collect information relating to rescue pack issue, exacerbations, hospital admissions and documentation of spirometry results. Data was collected on 25–28 January 2010 and patient confidentiality was maintained by using patient identification codes. Telephone interviews were conducted on 2–5 February 2010 using a predesigned questionnaire. The regional lead clinician for COPD and PCT Medicines Management leads for COPD were involved in devising the questionnaire.

**KEY RESULTS**

Eighty-one patients at Great Staughton Surgery were identified from the surgery COPD register. Two patients were excluded as they had a diagnosis of bronchiectasis and one other patient was excluded as they were a new patient to the surgery and had an incomplete medical record.

**DISCUSSION**

Table 1 shows that 26% of patients on the surgery COPD register are currently eligible for a rescue pack. This means that they have a predicted FEV1 <80%, a FEV1/FVC ratio <0.7 and have had 2+ exacerbations of COPD in the last year. Of this 26%, 15% do not have a pack despite being eligible. Reasons may include refusal by the
Table 1. A comparison of those patients who received a rescue pack and those eligible for a rescue pack. Of those who received a rescue pack, the number of admissions to hospital prior to and since the issue of the pack

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients who received a rescue pack</td>
<td>26/78 (33%)</td>
</tr>
<tr>
<td>Patients eligible to receive a rescue pack</td>
<td>20/78 (26%)</td>
</tr>
<tr>
<td>Eligible patients who received a rescue pack</td>
<td>17/20 (85%)</td>
</tr>
<tr>
<td>Patients admitted to hospital in the five years prior to rescue pack issue</td>
<td>4/26 (15%)</td>
</tr>
<tr>
<td>Patients admitted to hospital since the issue of a rescue pack</td>
<td>0/26 (0%)</td>
</tr>
</tbody>
</table>

Figure 1. Patient responses to the question, ‘Do you think that having a rescue pack stopped you from calling an emergency doctor or ambulance, or stopped you from having to go into hospital?’ (n=21)

- Yes: 4 (19%)
- No: 2 (10%)
- Not sure: 15 (71%)

Table 1 indicates that from the sample of patients that received a rescue pack, 15% were admitted to hospital in the five years prior to receiving their pack and none of them had been admitted since receiving their pack. This only corresponds to four patients and so only limited conclusions can be drawn. It must also be taken into account that medical records were searched for the five years prior to the packs being issued, but the time after receiving the pack varied depending on when the patient received that pack. One patient had only had a pack since December 2009. The key question from the patient interviews is represented in Figure 1. Patients reported that they feel the packs provide them with reassurance that they have access to treatment promptly, hence prevented the need to access NHS acute services. The main reasons for not needing to call were because treatment could be started earlier and that treatment is available at weekends, bank holidays or while on holiday. One patient hoped that the pack would prevent an admission because it “stops the worry, stress and anxiety because I’ve got the pack as a back up, which can prevent exacerbation coming on”.

This study has highlighted some important future considerations. To allow for accurate data collection and therefore the ability to fully determine the effect of rescue packs on hospital admissions, there needs to be clear and consistent coding used each time a rescue pack is issued. Although the majority of patients have no problems with keeping their rescue packs, some patients raised concerns about them, especially regarding the use of steroids. Future studies could investigate access of out-of-hours GP services, calling an ambulance and being admitted separately. This would provide more valuable data regarding patient opinion on being admitted to hospital with an exacerbation.

**REFERENCES**


**An evaluation of the views of tutors and dispensary managers involved in the Preregistration trainee pharmacist Accuracy Checking Evidence (PACE) training programme in Wales**

Treharne CM†, Gilbertson J†, Coulman SA† and John DN†
Prince Philip Hospital†, Royal Glamorgan Hospital† and Welsh School of Pharmacy, Cardiff University†

Before registration the pre-registration trainee pharmacist (pre-reg) must learn to “effectively check prescriptions dispensed by others.” In 2008, a new programme, PACE, was introduced in hospital pharmacy departments across Wales to help pre-registration tutors to assess the competence of preregs to become accredited to accuracy check prescriptions.

PACE includes collection of an evidence log of accuracy checks made by the pre-reg on at least a 1000 items. If an error is made during this process the pre-reg completes an error reflection form, incorporating a risk assessment, and subsequently agrees an action plan for progress with their tutor. When the tutor is satisfied with the evidence collected, the pre-reg undertakes a checking test and proceeds to final accreditation.

**OBJECTIVE**

To evaluate the PACE programme in terms of its acceptability to pre-reg tutors and dispensary managers.

**METHODS**

Ethics approval was not required but R&D registration was granted for this evaluation.

All hospital pre-registration tutors and dispensary managers in Wales were identified through the Education & Training and Dispensary subgroups of the Welsh Chief Pharmacists. A semi-structured interview was held with a small group of tutors and dispensary managers (n=3) to inform the development of a self-completion questionnaire. The questionnaire was piloted and a small number of minor amendments made. Questionnaires were distributed to pre-reg tutors and dispensary managers in July, at/towards the end of the pre-reg year. The results were coded, entered into an SPSS database and analysed.

**RESULTS**

A response rate of 90% was achieved (n = 45/50) with at least one response from every acute hospital site in Wales. All respondents (100%) agreed that the evidence collected during PACE demonstrates the competency of the pre-reg to accuracy check. Forty-three respondents (95%) agreed that being able to accuracy check increased the pre-reg’s sense of responsibility and 38 (84%) agreed that it...
An evaluation of the Preregistration trainee pharmacist Accuracy Checking Evidence (PACE) training programme: views of preregistration students

Treharne CM*, Gilbertson J†, John DN‡ and Columan SA:
Prince Philip Hospital*, Royal Glamorgan Hospital† and Welsh School of Pharmacy, Cardiff University‡

Preregistration pharmacists (preregs) in hospital pharmacies in Wales are required to complete the Welsh Pharmacy Technician Accredited Checking Training Scheme (ACT). However, in spring 2008 an informal review confirmed that there was significant variation in practice between hospitals.

A task and finish group, set up under the auspices of the Wales Chief Pharmacists, concluded that the current ACT scheme did not fully meet the outcomes required for preregs and so developed a new training programme; PACE. In addition to collecting an evidence log of 1,000 accuracy checked items, the programme requires that when the prereg makes an error they stop collecting evidence and complete a reflection form, incorporating a risk assessment on the error made, and agree an action plan for progress with their tutor. The prereg therefore engages with the concept of reflective learning and how it is used to change practice. Further their awareness and understanding of risk management is heightened and they are provided with an insight of the possible effects of errors on patients and colleagues.

This programme was introduced across Wales for the cohort of hospital preregs who initiated their training programme in July-August 2008.

OBJECTIVES
- To establish how many preregs in the 2008–09 cohort were undertaking PACE.
- To assess the feasibility of the programme in terms of its acceptability to preregs.
- To explore the views of preregs on the reflections on errors.

METHODS
Ethics approval was not required but R&D registration was granted for this evaluation.

A semi-structured interview was held with a small group of preregs (n=6) to inform the development of a self-completion questionnaire. The questionnaire was piloted and a small number of minor amendments made. The questionnaire was distributed to the preregs during a residential course in May 2009. The results were coded and entered into an SPSS database and analysed.

RESULTS
All 35 preregs, from all the hospital pharmacy training sites in Wales, completed the questionnaire and all 35 had started PACE by May 2009. Twenty preregs (57%) had completed PACE at this time point with 15 still collecting evidences.

The month in which PACE was started varied widely (Figure 1). Twenty-two out of 35 (63%) felt that the time they started collecting evidences was about right. Eleven (31%) felt they started too late, of these 7 started in February or March. Twenty-two out of 34 (65%) increased the pre-reg’s status in the pharmacy department. Thirty-five respondents (78%) agreed that the checking test demonstrated to other staff in the pharmacy that the pre-reg was competent to accuracy check.

Forty-three subjects (96%) agreed that completing the reflection log made the pre-reg think about the implications of the error. Forty-one respondents (91%) reported that reflecting on the error helped the pre-reg to identify how to change their way of working.

A total of 39 respondents (87%) believed that pre-regs filling in the reflection form made them consider aspects of the error which would not have previously occurred to them. Thirty-two subjects (71%) indicated that the quality of the reflection should influence a tutor’s decision for progression with the programme following an error.

Following completion of PACE and final accreditation, 40 (89%) said that their pre-regs would be performing the final accuracy check in the dispensary, two (4%) would not and three (7%) did not know. Twenty-eight (62%) said that their pre-regs would be performing the final accuracy check in the dispensary at least daily and 11 (24%) would be doing so at least once a week (Figure 1).

There was clear support for the PACE programme to be continued in Wales with 44 (98%) of tutors/ dispensary managers agreeing that they would recommend PACE for future cohorts of pre-regs, one commenting “It seems to be a more structured approach to pre-reg training involving accuracy checking than in previous years which seems to work very well”.

DISCUSSION
The results suggest that pre-reg tutors and dispensary managers are satisfied with the PACE programme as a means of collecting evidence of a pre-regs’ competence to accuracy check prescriptions. Further, most pharmacy departments had permitted their pre-reg to perform this role prior to the end of their training.

The results show widespread support for the use of reflection as a method of learning for pre-regs.

A strength of the current study is the high response rate and one limitation is that the results relate to a single cohort. Further work could involve the development, implementation and evaluation of further All-Wales programmes, for example, clinical checking.

ACKNOWLEDGEMENTS
Pharmacy Practice Development Scheme grant from the Welsh Assembly Government. Rowena White, Richard Wynne and Sarah Wilcox for their work in development of the PACE programme Dr Rhian Deslandes, Dr Karen Hodson and Dr Louise Hughes for their comments and support.

REFERENCES
agreed or strongly agreed that it would be beneficial to have a target date set for completion.

Thirty-one out of 35 (91%) felt (or hoped to feel if they had not yet completed PACE) more confident to accuracy check prescriptions after finishing PACE. Thirty-one out of 35 (89%) agreed that undertaking PACE had changed the way they dispense medication. One respondent commented: “I am more aware of what the person checking looks for so I check those things myself as I am dispensing.”

Thirty-one out of 35 (89%) had completed a reflection on at least one error. All 31 (100%) of these respondents agreed that completing the reflection made them think about the consequences of the error. One respondent commented: “It made that error stand out in my mind and helped me not make the same mistake again.” Twenty-four out of these 31 (77%) agreed that risk assessment of the seriousness of the error was useful and 29 (94%) agreed that the reflection log increased their awareness of factors that contribute to dispensing errors.

Twenty-nine out of 31 (94%) agreed that reflecting on the error helped them to identify how they needed to change their way of checking. Several preregs commented that undertaking PACE had “improved my confidence at checking.”

DISCUSSION

All hospital pharmacy departments in Wales had implemented PACE indicating widespread support for the programme. Although, the questionnaire was given to preregs in the last quarter of the year only 57% had completed PACE. The month in which the programme was started showed a wide variation. The fact that 89% agreed that PACE also changed the way the dispensed medication suggests that it maybe beneficial to start PACE earlier in the prereg year.

Reflective learning is an accepted method of learning but has not been greatly researched in pharmacy practice. The results show support for this method of learning and that it helped them to identify ways to improve their practice.

The main strength is that all preregs in Wales in 2008/09 completed the questionnaire, although one limitation was that not all preregs had finished PACE when they completed the questionnaire. A number of recommendations for consideration by sites were made for the next cohort of preregs including starting the programme earlier in the prereg year. Future work would include a repeat of the evaluation in a cohort of preregs including starting the programme earlier in the prereg year. Future work would include a repeat of the evaluation in a cohort of preregs including starting the programme earlier in the prereg year. Future work would include a repeat of the evaluation in a cohort of preregs including starting the programme earlier in the prereg year. The results show support for this method of learning and that it helped them to identify ways to improve their practice.

The objective would be met by increasing the diversity of evidence sources, associated evidence. The written statements and evidence gathered are beneficial to start PACE earlier in the prereg year. Future work would include a repeat of the evaluation in subsequent years. These findings may be useful to prereg employers outside Wales.

REFERENCES

1 All Wales Dispensary Services Subgroup. All Wales Dispensary Competencies. December 2005.

Transferring paper based portfolio into the digital age

Kemp S
South West Medicines Information & Training. Bristol

Portfolios of evidence are often used to document ones learning and development over a period of time. Documented learning, in the case of National Vocational Qualification (NVQ) level 3 pharmacy services has traditionally been in the form of written reflective statements completed by the candidate and supported by a collection of associated evidence. The written statements and evidence gathered are assembled into a portfolio and, following assessment, demonstrated that a candidate is capable of performing a given role over a period of two years. The evidence is assessed by a local assessor, their work is then scrutinised by an internal verifier (external to the candidate’s base trust hospital), followed by evaluation of the process by an external verifier.

Electronic and digital forms of documenting evidence have increased in popularity, and it was felt that pharmacy services would benefit from this new direction. Awarding bodies for the NVQ level 3 pharmacy services have approved several providers specialising in electronic vehicles in which to host a competency based portfolio. The transition towards e-portfolio within the South West was a brave move, with most products available on the market having very little experience or testing with pharmacy services. Consideration of essential criteria required within such a system was given and several providers were short listed for interview. The product was launched in September 2009 with 40 first year preregistration student pharmacy technician candidates. Uptake has been successful and after a few minor technical glitches assessors are finding their job easier and the students are benefiting from the new system.

OBJECTIVES

The objective of the implementation of electronic portfolio (e-portfolio) was firstly to improve the experience of the candidate. This objective would be met by increasing the diversity of evidence sources, meaning the emphasis on written reflective statements could be reduced and replaced with media such as video or audio formats and improving sometimes complicated cross referencing systems by including electronic prompts for the user. The objective for assessors was to improve assessment turn around time and to help with assessment planning for the candidate. The objective for the internal verifier was to maximise time used for verifying and improve the efficiency of the system.

METHOD

South West Medicines Information and Training (SWMIT) is a regional centre for the delivery and certification of NVQ level 3 pharmacy services. The decision was made by SWMIT and the Senior Pharmacy Managers Education Working Group that there would be a move from paper based portfolio to e-portfolio with a full cohort of NVQ level 3 pharmacy services preregistration student pharmacy technicians. This was approved by the Senior Pharmacy Managers committee. An evaluation of e-portfolio providers was carried out. Providers who were already linked and approved by the awarding body (City & Guilds) were short listed for consultation. SWMIT developed a paper with essential criteria to meet the project objectives from an e-portfolio system. This was developed with the guidance of JISC (Joint Information Systems Committee) info-net. The consultation (June 2009) included members of all stake holder groups.
including senior pharmacy managers, assessors, internal verifiers and previous candidates. From the consultation process the provider Skillwise was chosen with their product VQManager. Development work started immediately with the aim of going live in September 2009. Skillwise worked closely with SWMIT loading the NVQ level 3 pharmacy services qualification onto the system and rigorous quality checks and tests were carried out prior to the system going live. All stake holders were kept in the loop with developments through regular email updates, newsletters, meetings and presentations. All staff groups that would be working with the new system were given the opportunity to attend training days and SWMIT made appointments with all hospital trusts to have one to one training with individuals. Comfort questionnaires were sent out after one month to assess how well assessors were adapting to the new system.

RESULTS
The system was launched on 20 September 2009 with 40 preregistration student pharmacy technicians. Initially, using a scale of 1 being very comfortable and 5 being very uncomfortable, most assessors felt uncomfortable or very uncomfortable. This has since changed and assessors are finding they are very comfortable with the system. Assessors are finding the planning easier and on-line prompts are helping to ensure set timeframes are adhered to. Candidates have taken to the new system well not having the experience of a paper based portfolio they have not had to deal with any change. All candidates are uploading evidence, including documents (word processed and scanned in), photographs, and assignments from the BTEC in pharmaceutical science. Thus combining knowledge with practical based skills which rarely happened with the paper based system. Generally, the candidate experience has improved. Faster turn-around of assessed pieces of evidence by the assessor is a motivating factor as well as the diverse sources of evidence that can be uploaded. Peer competition is also a motivator that was not apparent with the paper based system as the e-portfolio provides a very visual display of progression through the qualification. The internal verifiers are now able to do their assessment from their base, which in turn has reduced costs and travelling time. This move has enabled the internal verifiers to concentrate on quality and standardisation.

DISCUSSION
The implementation of the e-portfolio, VQManager, has been very successful. The success can be attributed to constant communication from the start of the project with stake holders and the e-portfolio provider. The initial reaction to change to e-portfolio by the assessors was cautious, as with any change there is always some resistance. But, as the system is becoming established the assessors, candidates and internal verifiers are very happy with the results. The system is achieving the initial objectives set. There have been some technical glitches during the roll out, but these have been dealt with well by Skillwise. There has been a real feeling of building the qualification and system to meet the NVQ level 3 pharmacy services needs. SWMIT are now uploading their other competency based qualifications onto the Skillwise system.

REFERENCES

Improving the discharge process from surgical wards within a teaching hospital
Staples A, Craven L, Wassel Y, Moore S, Firth J, Ripley J
Leeds Teaching Hospitals

The surgical bed base is a tight resource within most hospitals. The time taken to free surgical beds is therefore an important factor for a pharmacy service to consider. In recent years we have improved the discharge process by introducing a “one stop dispensing process”, prelabelled discharge stock and nurse-led discharge. This development utilises a satellite dispensing unit close to the surgical wards.

The “Surgical Remote Dispensary” (SRD) does not hold stock but uses ward stock which can then be labelled and dispensed to the patient on discharge. Dispensing medications locally has several advantages:

- Patients’ own medicines are more easily available for checking, facilitating quick identification of which medications require dispensing
- Patients can be asked about their own medication supplies to prevent duplicate or unwanted medications being supplied
- Reduced time in transit between ward and dispensary
- Cost saving on the dispensing of duplicate medicines

Not all TTO’s can be dispensed via the SRD; any TTO containing controlled drugs, fridge items or those that are needed in dosette box require dispensing through the main dispensary. The operational structure in relation to the main dispensary can be described as a “hub and spoke” approach. The SRD cannot function without main dispensary backup e.g. the SRD cannot supply any item not on the ward stock list.

OBJECTIVES
To determine the impact of the SRD on the surgical discharge process by:

- Measuring the effect of SRD on TTO dispensing time
- Measuring the effect of SRD on average cost of a TTO

METHOD
Measurement of TTO dispensing time: Each TTO dispensed via the main dispensary and SRD has the “ward”, “time in” and “time out” logged via an electronic system. The logs for the main dispensary were recorded for study wards over the three month period prior to the SRD becoming operational and for the observation period Nov 09 – Jan 10. Measurement of the cost impact of the SRD: All TTO’s from the surgical wards were collected for the study period 25 to 31 January 2010. The number of items dispensed and the cost of each item was recorded for each TTO. The average drug cost to dispense each TTO was compared between the main dispensary and the SRD. The cost comparison excludes dosette boxes. Cost analysis is based on current contract price and assumption of whole pack dispensing.

RESULTS
The results show that the median turnaround time within the SRD is consistently faster than the main dispensary (Table 1).

The average cost of the TTO dispensed from the SRD is lower than the main dispensary (Table 2). The average number of items dispensed / TTO is also lower.

Available at: http://www.cityandguilds.com/44912.html [accessed February 2010]
Development of a web-based antimicrobial resource to improve antimicrobial prescribing

Leeds Teaching Hospitals NHS Trust

The Trust had an antimicrobial pharmacist and had just allocated a consultant microbiologist for Improving Antimicrobial Prescribing on a sessional basis. A business case was in place for a Consultant Antimicrobial Pharmacist, and another Consultant Microbiologist.

OBJECTIVES
The aim of the project was to build a web-based infection management resource initially for secondary care, but to roll out to primary care. The website aimed to provide:

- Evidence-based, peer reviewed, infection treatment & prophylaxis guidelines
- An educational resource for prescribers
- An audit resource incorporating plans, tools and results
- Links to the British National Formulary and Electronic Medicines Compendium

METHOD
The city already had an intranet website for guidelines: Leeds Health Pathways. There was an infrastructure in place for guideline approval, and upload onto the intranet.

For antimicrobial guidelines, templates were developed to standardise guideline development. Each guideline team had a lead clinician (from the main specialty where the guideline would be used), a consultant microbiologist and the specialty pharmacist. They would undertake a literature review and use local antimicrobial resistance patterns to inform antimicrobial choice. Each guideline included a summary, algorithm, aims and objectives, background, diagnosis, investigations, treatment (antimicrobial and non-antimicrobial), choice of agents for empiric and directed therapy (in routine, penicillin allergic and special populations e.g. over 65 years), IV to oral switch (IVOS) guidance, duration of therapy, criteria for specialist referral, provenance, references & review dates. All recommendations stated the evidence level.

Draft guidelines were put on Leeds Health Pathways peer review site for four weeks. Reviewers had three choices, plus encouraged to leave feedback: endorse the guideline without changes; minor revision needed; or major revision needed.

The development team reviewed the comments, and responded individually to the author by either accepting the comment, or explaining the rationale for not including a suggested change. If the guideline changed significantly, a second peer review would occur. The guidelines were ratified by the Improving Antimicrobial Prescribing Group (a subgroup of Drug and Therapeutics Committee), then uploaded onto the Antimicrobial Guidelines website. This is searchable by specialty, body system or word (see figure).

The number of hits to each guideline is monitored, and a modification allowed comments to be made to the author once the guideline was in use. All antimicrobials in the guidelines link to the eBNF and eMC, drug dosing tools (gentamicin and vancomycin) or restrictive supply processes where appropriate.

RESULTS
Since the guideline development system has been in place, there have been:

- 104 guidelines developed; an average of 73 views and seven comments per draft guideline (three went for second review)
- The guidelines now get over 5,200 hits per month from primary and secondary care
- Antimicrobial guidelines accounted for seven of the top 10 guidelines accessed on Leeds Health Pathways intranet site last year.

<table>
<thead>
<tr>
<th>Table 1. Comparison of TTO dispensing turnaround times between the main dispensary and SRD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median time in minutes (standard deviation)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Main dispensary</td>
</tr>
<tr>
<td>SRD</td>
</tr>
</tbody>
</table>

DISCUSSION
The introduction of the SRD has produced multiple effects to the pharmacy service on the surgical wards. The TTO turnaround time was faster compared to the main dispensary. Since the TTO transit time between the SRD and the ward is likely to be less than between the ward and the main pharmacy there will potentially be further time savings that were not measured in this study.

The medicine costs per TTO were lower for the SRD than the main dispensary. We attributed the cost difference to pharmacy staff being close to the ward as they dispense the TTO allowing them to liaise with the patient directly regarding which medications they had at home or on the ward compared to the dispensary trying to gain the same type of information via nursing staff. This prevented the dispensing of high cost items (e.g. inhalers and statins) and reduced the risk of patients having duplicate supplies of medicines. The lower “ratio of items dispensed/items on TTO” for the SRD supports this hypothesis.

The SRD has not required any extra staffing (technician, SATO or pharmacist). The surgical team focused on adapting our roles to take into account the alternate discharge pathway. However the success of the SRD has resulted in its current capacity being reached. We are exploring ways to optimise staffing by altering the time of day staff members are available and reducing the elective surgical workload allowing the SRD to focus on acute patients. For elective patients we are developing a system where medications are dispensed prior to patient arrival.

REFERENCES
1 Labour-intensive team pays dividends; The Pharmaceutical Journal 2005; 275:21

Table 2. Cost comparison between main dispensary and SRD

<table>
<thead>
<tr>
<th></th>
<th>Main dispensary</th>
<th>SRD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of TTOs</td>
<td>49</td>
<td>76</td>
</tr>
<tr>
<td>Number of items prescribed</td>
<td>242</td>
<td>409</td>
</tr>
<tr>
<td>Number of items dispensed</td>
<td>153</td>
<td>175</td>
</tr>
<tr>
<td>Ratio of items dispensed to items prescribed</td>
<td>0.6</td>
<td>0.4</td>
</tr>
<tr>
<td>Total cost</td>
<td>£593</td>
<td>£364</td>
</tr>
<tr>
<td>Mean cost / TTO</td>
<td>£12.12</td>
<td>£4.80</td>
</tr>
</tbody>
</table>
The percentage of patients on antimicrobials on the monthly point prevalence survey decreased from ~35% to ~25%.

The incidence of CDI has decreased from ~80 cases per month to ~20.

DISCUSSION
Many Trusts have used pocket sized or credit card sized guides to improve antimicrobial stewardship. These often go out of date, and rarely contain information on diagnosis or investigations needed. Our approach has been to develop a pathway that has focused on accurate diagnosis and appropriate investigations, with antimicrobials recommended only if necessary. One concern was a potential lack of access to ward computers to access the guidelines; however, the monthly hits to the guidelines is doubling year on year.

The monthly antimicrobial point prevalence survey has shown a 10% drop in patients on antimicrobials at any one time. The monthly CDI rate is only 25% of the monthly rate for the same time last year. Changes in antimicrobial prescribing may have contributed towards this. This is despite some guidelines still using cefuroxime in patients under the age of 65 years, and co-amoxiclav being routinely used.

Most of the antibiotic prophylaxis regimens to reduce surgical site infection now use either single or 24 hour dosing only. Specialty specific summary posters have been developed for anaesthetic rooms and wards, so the “hits” to these prophylaxis guidelines are small.

The DoH Cleaner Hospitals Team insisted that the trust produce a handbook for prescribers. A small pamphlet with six key treatment algorithms was produced plus prescribing standards, allergy advice, IVOS, restricted antimicrobials list and the new vancomycin guidelines. This seems to have had no impact on accessing the web-based guidelines.

The Leeds Antimicrobial Resource (www.lhp.leedsth.nhs.uk/antimicrobials/index.aspx) also provides educational material, audit tools, performance data from audits & antimicrobial usage, electronic dosing tools for Hartford gentamicin regimen, creatinine clearance calculators, antibiotic specific guidance (shared-care, vancomycin, aminoglycosides, restricted antibiotics), and antibiotic allergy information. We have also introduced a link to the current primary care guidelines. The updates now include guidance for patients seen in primary or secondary care in all hospitals, GP surgeries, hospices and walk-in centres in the city. All specialities are required to audit their antimicrobial prescribing against the guidelines four times each year to confirm adherence using the tools provided on the website.

In conclusion, web-based, evidenced-based, peer-reviewed antimicrobial guidelines are an effective method to support prescribers in their treatment of infection, and possibly help reduce antimicrobial prescribing and healthcare acquired infection.

Regional approach to improve Hartford gentamicin prescribing
Frost K*, Garnett P†, Haigh A‡, Martin S¶, Howard P||
Airedale NHS Trust*, Scarborough & North East Yorkshire Healthcare NHS Trust†, Bradford Teaching Hospitals NHS Foundation Trust‡, Calderdale & Huddersfield NHS Foundation Trust§, University of Leeds||

The Hartford gentamicin dosing regimen has been in use since the early 1990s. However failure to use it correctly has been shown to have greater treatment failure and toxicity (NNT 4.84 and NNH 3.61). A number of audits within hospitals in the Strategic Health Authority (SHA) have shown poor compliance to current guidance, and probably compromising patient outcomes.

OBJECTIVES
The aim of the project was to improve the gentamicin prescribing using the Hartford regimen across all hospitals within the SHA.

The objectives were to:
• Develop a Hartford gentamicin prescription standardising on a 7mg/kg dosing regimen
• Produce a web-based electronic dosing and level interpretation tool
• Develop an e-learning resource on gentamicin prescribing
• Pilot the prescription at a single centre, then roll out to other 15 acute hospital Trusts
METHODS
A workgroup from the SHA Antimicrobial Pharmacists Group was established. It identified current practice, and produced an early draft of the new prescription form. This prescription was based on the standardised Medicines Prescription and Administration chart already in use within the SHA hospitals. The 2nd draft was produced following wider consultation with antimicrobial pharmacists and clinical microbiologists in all SHA hospitals. This required sign-up to the 7mg/kg dosing approach. The 2nd draft was piloted in one hospital, and further refined. The final prescription and dosing guidance was presented and endorsed at the first joint SHA Consultant Medical Microbiologists and Antimicrobial Pharmacists meeting. It was then to be registered at the individual Trusts.

A web-based version of the dosing tool was developed that allowed creatinine clearance to estimation using either imperial or metric units. This tool estimates the patient's ideal body weight from their actual height; their estimated creatinine clearance using the Cockcroft and Gault equation from their serum creatinine, age and ideal body weight. The maximum dose was capped at 560mg. This tool also interpreted the gentamicin level; recommended the dosing frequency, and the timing of the next level. The web-based dosing tool had previously been validated. A web-based e-learning resource for training and assessing the prescribers in the use of the prescription was developed.

RESULTS
After two years, there is now a standardised Hartford gentamicin prescription. It is A3 size. The first two sides of the A4 contain the prescription, and the right portion contains stepwise instructions. It is currently being registered with all the relevant Drug and Therapeutics or Medicines Safety Committees of the 12 Acute Trusts that agreed to use it. Two Trusts decided that they would continue to use a 5mg/kg gentamicin regime that was already established, and the other Trust was a Children's hospital, and so was not relevant to their practice. The prescription is already in use in two of the Trusts.

The web-based resource has been established for the e-dosing and level interpretation tool. One Teaching Trust has incorporated this into its web-based antimicrobial guidelines. This dosing tool is monitored for the number and location of “hits” each month for both the dosing & level interpretation tool. It approximately translates to the number of adult daily gentamicin tests requested each month (16–23).

The same Trust is piloting an interactive web-based e-learning resource developed to train doctors (and pharmacists) on all aspects of prescribing gentamicin. This includes Hartford gentamicin dosing, as well as traditional multiple daily dosing for excluded patients, and those being treated for endocarditis.

DISCUSSION
Failure to use Hartford gentamicin correctly (in Aberdeen) has shown greater treatment failure and toxicity. This project shows that it is possible to reach consensus across a region in the development of a standard antimicrobial dosing tool, rather than a plethora of variations on a theme. This means that doctors in training who rotate round hospitals within the region will be familiar with a high risk antibiotic
within a complex dosing regimen. Gentamicin prescribing is being re-audited to see if the planned improvement has occurred.

There are plans to introduce the e-learning into the local School of Medicine website to allow training before the doctors qualify.

REFERENCE

An assessment of medical student teaching at Royal Liverpool & Broadgreen University Hospitals NHS Trust
James S, McManus A, Ahmad, A.
Royal Liverpool & Broadgreen University Hospitals NHS Trust, Liverpool, UK

In 2007 the clinical sub-deans approached pharmacy for assistance in providing a formal pharmacy programme for CP3 (year 3 medical students). This had been prompted by a review which had shown that CP3 students had been coming to the hospital for two half days a week for six weeks for a number of years for a pharmacy module where there was no pharmacy or clinician input and students were not supervised.

Pharmacy, in collaboration with the sub-deans, devised a programme that involved a full day once a week for six weeks. Thirty-six students would attend at a time and there would be five blocks over the programme of an academic year.

The programme has evolved since its inception and is now in its third year. In January 2009 a full time substantive pharmacist medical teaching post was appointed due to the success of the programme. The post-holder has been able to adapt the programme based on qualitative feedback from the students in previous years and the programme has been made more relevant to the students and cover important pharmacy related issues.

The topics covered now include:

- Being familiar with how to take a drug history and putting it into practice
- Identifying and reporting adverse drug reactions
- Appreciate how to use the BNF and local policies or formularies to enable safe prescribing
- Be able to accurately complete a prescription sheet and be aware of common pitfalls
- Relate the clinical situation to the prescription
- Two therapeutic sessions on heart failure and insulins
- Drug dose calculations session

The programme consists of a mixture of lectures, group work, ward visits and practical exercises in order to achieve the objectives above. As a result of the changes we wanted to do a quantitative assessment of participants’ prior knowledge, subject content and delivery of the programme.

OBJECTIVE
To evaluate the pharmacy module delivered to CP3 medical students from the students’ perspective by them assessing their prior knowledge, subject content and overall presentation of the modules.

<table>
<thead>
<tr>
<th>Session</th>
<th>Your previous knowledge</th>
<th>Subject content</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacy Introduction</td>
<td>4.2</td>
<td>7.5</td>
<td>8.4</td>
</tr>
<tr>
<td>Drug history taking</td>
<td>5.4</td>
<td>8.5</td>
<td>8.6</td>
</tr>
<tr>
<td>BNF and prescribing</td>
<td>5.0</td>
<td>8.5</td>
<td>8.5</td>
</tr>
<tr>
<td>Ward Visit 1 drug history taking</td>
<td>5.6</td>
<td>8.5</td>
<td>8.7</td>
</tr>
<tr>
<td>Ward Visit 2 drug history taking</td>
<td>6.6</td>
<td>8.2</td>
<td>8.5</td>
</tr>
<tr>
<td>Prescription writing session</td>
<td>5.0</td>
<td>8.4</td>
<td>8.4</td>
</tr>
<tr>
<td>Therapeutics heart failure</td>
<td>5.5</td>
<td>8.8</td>
<td>8.8</td>
</tr>
<tr>
<td>BNF session</td>
<td>5.6</td>
<td>8.3</td>
<td>8.2</td>
</tr>
<tr>
<td>ADR session</td>
<td>5.3</td>
<td>7.6</td>
<td>8.0</td>
</tr>
<tr>
<td>Drug calculation session</td>
<td>5.6</td>
<td>8.3</td>
<td>8.7</td>
</tr>
<tr>
<td>Therapeutic diabetes</td>
<td>5.1</td>
<td>8.4</td>
<td>8.7</td>
</tr>
<tr>
<td>Prescribing quiz</td>
<td>6.1</td>
<td>8.3</td>
<td>8.3</td>
</tr>
<tr>
<td>Scenarios</td>
<td>4.6</td>
<td>8.5</td>
<td>8.5</td>
</tr>
<tr>
<td>Overall programme average mark</td>
<td>8.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

METHOD
A data collection form was developed to capture the responses of the medical students who had attended the programme from October 2009 until February 2010.

Previous knowledge, subject content and quality of presentation were assessed. Each was scored from 1 to 10, with 1 being no knowledge or poor and 10 as prior knowledge or excellent.

Forty-eight students returned completed the assessment forms which were completed at the end of two of the six-week modules.

RESULTS
The results are set out in Table 1.

DISCUSSION
Overall the module has been very well received with the average mark for subject and presentation being above 80%. Prior to starting the module students have a poor knowledge (<50%) of the subject content. One reason for the success of the programme may be the fact that the programme covers practical issues that are currently not taught in the medical undergraduate programme. The therapeutic sessions are a new addition this academic year and are again very well received. These are practical sessions identifying the potential for prescribing errors and interactions and involve casework. The programme is delivered by pharmacists, medics, and a specialist nurse and all the presentations were deemed to be of a high standard (>80%) and this information was fed back to the subject area leads.

The module is able to be delivered as a full time medical teaching pharmacist is in post in the trust and backed up by other pharmacists who do ward visits and therapeutic teaching sessions. The module would be easily transferable to other hospital settings to use as a model for teaching medical students about prescribing and pharmacy issues. The main implication on any pharmacy department to deliver the module would be time and resources.

Students are not formally assessed for this module so we cannot prove if the course has improved prescribing practice/ pharmacy knowledge. In the future it is hoped there will be less prescribing errors from students who have attended the course but as the students will not qualify as doctors for another two years this may be harder to prove. Future work is hoping to be done around this area.

The results tell us that the pharmacy module for third year medical students is very well received by the students, who prior to the module have a poor knowledge of pharmacy and related prescribing and practical issues. Feedback needs to be continually evaluated at the end of each module and changes made as is deemed necessary.
Does the process for considering new medicine applications affect the decisions made in a large NHS teaching hospital?

Herring C, Haque K
Royal Liverpool & Broadgreen University Hospitals NHS Trust

Medicines Management has been defined by the Audit Commission as encompassing “the entire way in which medicines are selected, procured, delivered, prescribed, administered and reviewed to optimise the contribution that medicines make to producing informed and desired outcomes of patient care”.

Effective Medicines Management optimises patient outcomes, reduces clinical risk and ensures value for money. It is a high priority for hospital Trusts and is a key element of both the Care Quality Commission and NHS Litigation Authority assessments. This process is generally managed within Trusts by a Medicines Management Group (MMG) (or equivalent).

The purpose of any MMG is to support the clinical governance agenda by ensuring effective policies are in place to promote best practice in prescribing, supply, administering and monitoring of medicines. This includes the introduction of new medicines into the Trust, assessing the clinical and cost effectiveness of the requested medication against current therapies.

The MMG at the Royal Liverpool & Broadgreen University Hospitals NHS Trust (RLBUHT) reviewed its process for considering new medicine applications and made the following changes in January 2009:

1. New medicine applications are now discussed monthly, as opposed to bi-monthly
2. Prior to the meeting an independent review of the requested medicine is circulated to all members of the MMG, co-ordinated by the Medicines Information department.
3. The applicant presents their case but then is asked to leave the meeting before the final decision is made. The Chair then informs the applicant of the decision in writing.

Following these changes it was apparent that the number of applications being approved had reduced and it was hypothesised that the change in the process for considering new drugs had contributed to this.

**OBJECTIVE**

To retrospectively review the outcomes of new medicine applications following the introduction of the new process and compare against other teaching hospitals in the region.

**METHODS**

MMG minutes from RLBUHT were retrospectively reviewed for the preceding two calendar years (January 2007 to December 2008) to determine the number of applications received and the decisions reached. Corresponding data for the year January to December 2009, after the new process was adopted was also reviewed.

Cost effectiveness of this new process was assessed by determining a cost avoidance figure for rejected applications. This was calculated by multiplying the number of patients that the applicant would have treated per annum by the extra drug acquisition cost for a year. This figure was balanced against the extra cost of producing the independent reviews, which was obtained by multiplying the hourly rate of a mid point band 8a pharmacist + 20% by the number of hours that it took to produce these reports.

Secretaries of other MMGs in five large teaching hospitals in the North West of England were contacted, asking them for their data relating to new medicine applications for the corresponding dates and the process for dealing with new medicine applications. This was done as a benchmarking exercise. Pairwise comparisons of acceptance rates for January to December 2009 were then made using Fisher's exact test for RLBUHT versus each of the other Trusts in turn.

**RESULTS**

Results are summarised in Table 1. Differences in acceptance rates from January to December 2009 between RLBUHT and each of the other five trusts were all statistically significant, with p values ranging from 0.005 to 0.033. The cost of producing the independent reviews in 2009 was £3,019 for 116 hours of work. The cost avoidance figure was determined to be at least £150,000 per annum, i.e. a cost avoidance of £49.67 for every £1 spent.

**DISCUSSION**

Since the introduction of the new process for reviewing new medication applications, RLBUHT has seen a statistically significant (p<0.001) decrease in the proportion of new medicines that have been approved (see Table 1). The Trust’s acceptance rate for new medicine applications is also now statistically significantly lower than other local Trusts. None of the other Trusts contacted had a significant change in their acceptance rates. This is not surprising as their processes did not change throughout the study period. It is apparent from the feedback that the review process differs between Trusts, with different procedures and documentation being used from Trust to Trust.

It is recommended that independent reviews are undertaken by all MMGs and that applicants are not present during the group’s final discussions when the decision is taken. New applications need to be reviewed on a monthly basis, which allows more time to consider each application and reduces the number of applications approved via Chairman’s action.

There are several limitations to this piece of work. Local political and financial factors may have played a role in the change of acceptance rates; an attempt was made to minimise these influences by comparing against other local trusts. The data is purely quantitative and does not describe the clinical value of those medicines not approved. Lastly, drug acquisition cost is a crude indicator of cost avoidance. It does not take into account wider cost implications to the health economy, for example fewer hospital admissions, adverse drug reactions, reduced therapeutic drug monitoring, or saved nursing time. However these factors were considered insignificant at the time of application rejection by the Trust’s MMG.

**REFERENCE**

1. Audit Commission, A spoonful of sugar; Medicines management in NHS hospitals, Audit Commission, 2001
Pharmacy based risk assessment process for clinical trials

Parbutt C
Leeds Teaching Hospitals NHS Trust*

In 2006, the Medicines and Healthcare products Regulatory Agency (MHRA) inspected the Leeds Teaching Hospitals NHS Trust as a sponsor of clinical trials. One of the actions resulting from this inspection was that a formal pharmacy risk assessment process should be implemented for every study involving medicines and a “green light” given, before the study commences. In response to this, the Trust Research and Development (R&D) department and Medicines Management and Pharmacy Services (MMPS) put together a new step in the organisational clinical trials assessment process for those trials involving medicines. This paper describes the development of the pharmacy Clinical Trials Authorisation Group (CTAG) and the interventions made as a result of this process.

OBJECTIVE
To ensure that adequate arrangements and resources to meet research governance standards and safe prescribing practices are in place before a Clinical Trial with an Investigational Medicinal Product (CTIMP) opens in the Trust.

METHOD
Under the new system, researchers submit protocols to the MMPS clinical trials team and request that they are reviewed by CTAG. The Advanced Clinical Pharmacist (ACP) for the speciality is asked to review the protocol, identify any key pharmaceutical issues and complete a summary, which they then present at the next scheduled CTAG meeting. The Pharmacists are asked to look at all the medicines related aspects of the trial to ensure that the investigational medicinal products can be handled safely and appropriately. They are also asked to consider broader organisational implications such as the potential for excess treatment costs. Following the presentation from the Advanced Clinical Pharmacist, the issues highlighted are discussed and a decision is made as to whether MMPS can or cannot support the trial. The investigator or sponsor.

RESULTS
During 2009, CTAG reviewed 131 CTIMPs, which originated from a number of different clinical areas as shown in Table 1.

Of the 131 studies discussed, 51 were supported, 52 were supported providing that actions suggested in the letter were completed prior to study opening and 28 studies were initially not supported. Table 2 outlines the reasons why these 28 studies were not supported, and indicates that 20 have subsequently been supported on re-assessment following changes to the protocol or provision of further information by the investigator or sponsor.

DISCUSSION
As the CTAG process has evolved, a number of common themes have emerged relating to why studies cannot be supported and issues that must be addressed before a study can open. The most common reasons why CTAG has been unable to support a study are that the investigational medicinal product requires bespoke aseptic preparation, using agents or techniques that are not standard practice, or that the expiry of the product once prepared is so limited that it makes safe delivery logistically impossible. Another major issue which has resulted in several oncology studies not being supported is when the method of supply indicated by the protocol results in an oversupply of cytotoxic medication, which contravenes the NPSA guidance on oral chemotherapy.

One of the main problems that we have encountered with the CTAG process is insufficient information being available for preparation of the summaries, particularly relating to COSHH, aseptic preparation, labelling and pack sizes. This has prompted us to appoint a Quality Assurance (QA) clinical trials technician, who is responsible for preassessing the information available and requesting additional materials such as investigator brochures and pharmacy manuals from the sponsor, where necessary. This has enabled us to make more informed judgements, and improve our governance process.

The CTAG process has completely changed the way in which MMPS manage clinical trials. Medicines management problems are highlighted much earlier in a trial’s life cycle, which gives time whilst other regulatory approvals are being obtained to resolve these issues prior to a trial opening. It also means that ACPs have greater informed judgements, and improve our governance process.

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REFERENCES

Table 1. Numbers of studies reviewed for different clinical areas

<table>
<thead>
<tr>
<th>Clinical area</th>
<th>Number of studies reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oncology</td>
<td>48</td>
</tr>
<tr>
<td>Haematology</td>
<td>23</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>15</td>
</tr>
<tr>
<td>Chronic Pain</td>
<td>7</td>
</tr>
<tr>
<td>Paediatric Oncology/Haematology</td>
<td>6</td>
</tr>
<tr>
<td>Diabetes</td>
<td>4</td>
</tr>
<tr>
<td>Other (including cardiology, renal, respiratory, etc)</td>
<td>28</td>
</tr>
</tbody>
</table>

Table 2. Outcome of studies initially not supported by CTAG

<table>
<thead>
<tr>
<th>Reason for initial not supported status</th>
<th>Number of studies studies accepted after changes or additional information</th>
<th>Number of studies never re-submitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bespoke aseptic preparation/ short expiry/aseptic capacity</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Risk issues associated with oversupply of oral chemotherapy</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Risks associated with prescribing or labelling of trial material</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Risk issues associated with inadequate monitoring</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Exit strategy not clear for patients with ongoing medication needs</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Logistics (protocol does not fit with Trust pathways)</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>8</td>
</tr>
</tbody>
</table>
Medicines reconciliation on discharge: implementation of a new model of working on the cardiology unit at the Leeds Teaching Hospitals NHS Trust

Khatib R, Bala M, Hall A
The Leeds Teaching Hospitals NHS Trust (LTHT), Leeds

Medication errors (ME) account for around 10 to 20% of all adverse events and the direct cost in NHS hospitals may be £200m–£400m per year.1 Many ME are made during transition between health care settings.2 Between November 2003 and March 2007, the National Patient Safety Agency (NPSA) reported 7070 incidents of ME involving admission and discharge.2 Poor communication at the interface between care settings has been shown to put patients at risk and hinder continuity of care.2,3 According to the National Institute for Health and Clinical Excellence (NICE), undertaking medicines reconciliation on admission to hospitals and when patients are transferred between different care settings reduces the risk of ME.4 Currently all patients admitted to our Trust have their medicines reconciled on admission. In this study we introduce a new model of working where medicines are also reconciled on discharge – “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.1,4

OBJECTIVE(S)
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 which was attached to the drug chart. All DANs had a specially designed sticker added to prompt prescribers to reconcile medicines on the DAN against the medicines on admission (on the green card). An educational session was delivered to doctors, pharmacists, pharmacy technicians and nurses on the cardiology unit on the importance of medicines reconciliation on admission and discharge. Reminder posters about medicines reconciliation were displayed across the cardiology unit.

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

RESULTS
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.

<table>
<thead>
<tr>
<th>Standards</th>
<th>Audit</th>
<th>Re-audit</th>
<th>P value* (two-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. (%) of DANs that met all 4 standards</td>
<td>9 (14%)</td>
<td>28 (42%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>No. (%) of DANs that met all 3 standards (but NOT standard 4, reasons for changes)</td>
<td>12 (18%)</td>
<td>23 (35%)</td>
<td>&lt;0.0045</td>
</tr>
<tr>
<td>No. (%) 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>
<tr>
<td>Totals</td>
<td>66</td>
<td>66</td>
<td></td>
</tr>
</tbody>
</table>

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 re-audit 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 which reminded 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,8 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 medications 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
The need for provision of a smoking cessation service to patients in the cardiorespiratory directorate at Glenfield Hospital

Edwards H, McKechnie E, Perry M, Yoong LS
Glenfield Hospital, University Hospitals of Leicester NHS Trust

Smoking remains the main cause of preventable mortality and premature death in England. Smoking cessation services have been identified as playing a key role in helping smokers to quit, so reducing mortality from conditions such as cancer and heart disease. Nicotine Replacement Therapy (NRT) has been shown to be an effective intervention to assist smoking cessation.1

Currently at University Hospitals of Leicester (UHL) NHS Trust, patients are expected to obtain their own supplies of NRT for use whilst in hospital. NRT is supplied by the hospital pharmacy to patients only in certain circumstances, such as patients who are suffering with severe nicotine withdrawal symptoms and who are unable to obtain their own supplies of NRT including patients on Intensive Care Units.2 Although staff at UHL are encouraged to refer suitable patients to community stop smoking services on discharge, this is often not carried out. This proposed change of service provision aims to address the aforementioned issues by providing a smoking cessation service at UHL for inpatients in the Cardiorespiratory directorate at Glenfield Hospital. The Cardiorespiratory directorate is a tertiary referral centre.

OBJECTIVES
1. To gauge potential need for provision of smoking cessation for inpatients within the Cardiorespiratory directorate at Glenfield Hospital
2. To facilitate patient follow up in primary care by handover of patients on discharge from hospital

METHOD
All patients seen in preadmission clinics prior to cardiac surgery and those on the cardiorespiratory wards were included in the pilot. The community stop smoking advisor trained all pharmacists and cardiac rehabilitation nurses to give them the skills to interview and advise patients regarding smoking cessation. Ward staff were notified about the scheme and encouraged to refer suitable patients to trained personnel for assessment. A smoking cessation guideline was created to allow appropriate selection of NRT after discussion with the medical team looking after the patient. NRT provided was limited to lozenges and patches. The provision of NRT was funded by the local Primary Care Trust (PCT). A referral form was completed for each patient who had consented to be in the pilot and this information was handed on to the community stop smoking service upon the patient’s discharge to allow for follow up in primary care.

RESULTS
One hundred and eight out of 110 patients interviewed were referred between September 2008 and August 2009 to the community stop smoking service. Two patients did not consent to referral.

Table 1 shows the number of referrals increased from the start of the project. The majority of patient assessments and referrals, 92%, (n=99) were completed by pharmacists. 100% (n=108) of referral forms were sent on discharge and followed up by primary care.

DISCUSSION
This project has shown that there is a need for provision of a smoking cessation service within the hospital setting. As awareness of the smoking cessation service increased, more patients were referred to a pharmacist or a trained nurse and offered NRT with subsequent referral to the community stop smoking services on discharge. The proactive utilisation of the pharmacist by ward staff has also increased. This has had educational benefits for pharmacy staff who have been able to develop patient counselling skills. Communication between primary and secondary care was facilitated as the community stop smoking advisor met every week with one of the hospital pharmacists to ensure all patients discharged were handed over and followed up appropriately. The majority of patients interviewed were willing to be referred to the community stop smoking service on discharge. However, this service was targeted at those smokers who had been highlighted by ward staff. Additional staff and funding for this service had not been provided and so not all of the smokers on the ward were assessed. Provision of this service to all smokers who are inpatients would be a future extension. This service is still established at Glenfield Hospital and it is hoped to increase provision to other directorates in the future. Long term follow up of these referred patients is occurring to confirm the usefulness of this service to the hospital. Currently NRT is supplied by the PCT. There may be a case for commissioning this service in the future.

REFERENCES
The development of a risk assessment tool for the prioritisation of ward pharmacy services in the event of staff shortages

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

Since the emergence of the current strain of ‘Swine Flu’ in April 2009 and the subsequent declaration of pandemic status in June 2009, the need for robust contingency plans for service provision in the event of significant staff shortages was identified. In terms of Pharmacy service as a whole, this contingency plan was wide ranging including dispensing and manufacturing services and the impact on staff shortages in our supplier’s organisations and financial services was also considered. In terms of clinical pharmacy it was possible that routine ward pharmacy services would not be sustainable. It would be necessary to prioritise ward areas for who the pharmacy service was essential both in terms of safety and supply. There are obvious clinical areas which must be prioritised eg ICU, Paediatrics but when the general wards were considered it became apparent that the decisions as to priority had to be based on an objective assessment of need rather than a subjective decision. The following describes the evolution of the risk assessment tool on which contingency plans for ward pharmacy services were based.

OBJECTIVES
1. To complete a literature search to identify tools developed and used by other organisations
2. To identify objective criterion on which a risk management tool could be based
3. To develop a risk management spreadsheet which could be updated electronically and recalculate risk if circumstances change
4. To implement and assess effectiveness against Datix reporting and pharmacy intervention monitoring within the ‘Trust

METHOD
A literature search failed to identify any published information on this subject. However, a shared document from Sheffield Teaching Hospitals Trust contained an appendix on risk management of ward services. This was used as the basis of the development of the risk assessment tool. The suggested criteria were applied and a spread sheet developed and the wards scored against the checklist (see Panel 1). This resulted in a broad identification of risk which could allow prioritisation. However it was felt to not be sensitive enough and still resulted in significant subjectivity in decision making. The tool was refined by the addition of a patient element to the risk criteria and critical care rating of the beds (see Panel 1). In addition criteria were identified relating to the risk management activity of provision of pharmacy services and the balance between the two elements allows an assessment of service risk.

This risk assessment tool was presented and accepted by the Pharmacy Clinical Governance Group and formed part of the Department’s Swine Flu Contingency plan.

Fortunately this tool was not required to be activated for Swine Flu, but due to extreme pressures on the Trust’s A&E services, the department was required by the Medicine Division to increase pharmacy services to the admission portal, by relocating staff from other ward duties. The risk assessment tool was used and a ward (D) identified for which the pharmacy service (daily ward visit by junior pharmacist) was removed. The impact of the decision was monitored via the Datix reporting system and the issue was placed on the Pharmacy and Medicine Division risk register. This decision and the process behind it was fully discussed with and accepted by the Divisional management team and reviewed on a regular basis.

RESULTS
Datix reporting for the Medical Division during the period of staff relocation was monitored and compared with the prioritisation scores assigned using the risk assessment tool (see Table 1).

DISCUSSION
Our analysis of the data supported the lower risk nature of the identified ward. Removal of the pharmacy service did not appear to increase the number of Datix reports relative to other areas. Whilst it is recognised that Datix reports may not fully reflect the real life ward environment, major incidents are recorded and the Trust has robust clinical governance processes to investigate a review those reports made. Pharmacy intervention data would be an alternate source of assessment data but was not used on this occasion as interventions were only recorded at ward level during the period in question, due to dispensary workload/workflow issues, and the affected ward had no service and so no interventions were recorded. This would not have allowed robust appraisal of the tool.

This risk assessment tool provides an objective method of prioritising ward services. It is used in conjunction with the ‘pharmacy referrals’ system in times of vacancies to maintain services at a level relative to the risk. It allows us to identify where our risk areas remain and where service developments are required. However, if used to remove pharmacy services from a ward area it has been identified that this should be for a short term crisis basis only and monitored carefully as the absence of pharmacy input adds another risk that is not accounted for by this tool. In summary, this risk assessment tool, while still requiring further refinement, has provided us with an objective method of prioritising our ward pharmacy services when used with discretion and appropriate fail-safes.

REFERENCES
1 Clinical pharmacy standards – Sheffield Teaching Hospitals NHS FoundationTrust (unpublished)
2 Intensive care society. Levels of critical care for adults. ICS standards 2009
What is the cost of a modern clinical pharmacy service? Part One: First stage of developing a model

Blackshaw C, Simcock V
Department of Pharmacy, University Hospital of North Staffordshire

As a result of the cuts in NHS spending predicted over the next three years hospital pharmacy departments face a huge challenge, and will need to be creative to maintain services during this time. As resources become scarce, pharmacy departments need to be able to react quickly to business opportunities and to facilitate new management systems. In addition correct skill mix is essential. Having the right grades of staff available in the right areas at the right times to reduce clinical risk and ensure cost effective quality of pharmaceutical care for our patients.

The University Hospital of North Staffordshire (UHNS) is undergoing an ambitious modernisation scheme. In addition UHNS is transforming the way it delivers its medicines management services through automation and wireless technology. As a result we needed to accurately cost out our clinical pharmacy service allowing us to be responsive to the demands upon it, whilst providing evidence in support of our figures. Previous studies have demonstrated the resources required for hospital dispensaries. However we found it difficult to access studies since Ron Purkiss which provided a methodology to convert clinical pharmacy workload to manpower. In the past any change or development in the service would have been based on intuition and although this has a place in any workforce planning we set about developing a template which we could use to cost out each aspect of the clinical pharmacy service.

OBJECTIVES
1. Create a manpower activity data collection Template for clinical pharmacists to use on the wards
2. Use the Template to collect data on clinical pharmacy activity on four acute medical wards and two surgical wards at UHNS over a four week period.
3. Use the data collected to calculate an average cost of the main roles undertaken by Clinical Pharmacists on the wards at UHNS

METHOD
The Clinical Pharmacy Department at UHNS has an established mechanism to collect clinical pharmacy activity data. This activity database is designed to capture each element of the pharmacist’s role on the ward. The database was used to design an activity data collection template which could be used to record time in minutes of each individual clinical pharmacy activity.

This template was tested and evaluated by undertaking a clinical pharmacy time in motion study. Over a four week period three pairs of Pharmacists recorded individual times to complete clinical ward based activities on four medical and two surgical wards using the template. In order to produce, test and evaluate this generic template in the first instance all pharmacy time in motion study.

One: First stage of developing a model

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This template was tested and evaluated by undertaking a clinical pharmacy time in motion study. Over a four week period three pairs of Pharmacists recorded individual times to complete clinical ward based activities on four medical and two surgical wards using the template. In order to produce, test and evaluate this generic template in the first instance all pharmacy time in motion study.

Table 1. The average time for a sample of clinical pharmacy activities (This does not include all aspects measured)

<table>
<thead>
<tr>
<th>Description of activity</th>
<th>Average time in minutes per visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete ward visit</td>
<td>140</td>
</tr>
<tr>
<td>Review the medical notes</td>
<td>13</td>
</tr>
<tr>
<td>Reviewing medication histories</td>
<td>9</td>
</tr>
<tr>
<td>Reviewing U&amp;Es</td>
<td>3.5</td>
</tr>
<tr>
<td>Clinically checking and endorsing charts</td>
<td>34</td>
</tr>
<tr>
<td>Counselling patients</td>
<td>2</td>
</tr>
<tr>
<td>TDM</td>
<td>3.5</td>
</tr>
<tr>
<td>Completing interventions</td>
<td>3.3</td>
</tr>
<tr>
<td>Giving advice to staff</td>
<td>5</td>
</tr>
<tr>
<td>Checking TTOs</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Table 2. A sample of the average cost of clinical pharmacy activities (costs calculated in minutes to allow costing of even the shortest activity)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Pay per minute*</th>
<th>Average time on ward</th>
<th>Average cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical pharmacist visit to a 28-bedded ward at UHNS</td>
<td>29.4p</td>
<td>140mins</td>
<td>£41.17</td>
</tr>
<tr>
<td>Checking and endorsing charts</td>
<td>29.4p</td>
<td>34mins</td>
<td>£10.00</td>
</tr>
</tbody>
</table>

*Using the Band 7 midpoints of pay scale, assuming 37.5 hours per week from NHS pay circular 1 April 2009

RESULTS
Using the average time taken in minutes to undertake each individual activity from Table 1 multiplied by the pay rate per minute of the appropriate band of pharmacist the cost per unit for the aspects of the clinical pharmacy service can be estimated, Table 1 and 2 show a summary of the results for this abstract, all activities were timed and costed in the overall project.

DISCUSSION
This study demonstrated that data can be easily collected to calculate the cost of clinical pharmacy services. The template produced in this study will enable us to tackle issues relating to the resource requirements and costs involved with providing each component of the clinical pharmacy service and so the overall cost of the service. The limitations of this study are in regard to the range of grade of pharmacy team members and clinical speciality of the wards. The data will become more robust as it is collected across different types of wards with different grades of staff. The next stage of this work will involve testing this template more broadly and to include other fixed pay costs and non pay costs. The future aim would be to produce a tested and evaluated robust model which can be used to estimate cost of clinical pharmacy services with confidence across a range of specialities and grades of staff.

REFERENCES
5. Purkiss R. How to get the staff you need, calculation of pharmacy manpower requirements. Pharmacy in Practice, September 1997, 393–6.
Evaluation of the addition of pharmacists’ comments to the hospital discharge summary

Power B, Goatley H
Wirral University Teaching Hospital NHS Foundation Trust, Wirral

Communication across healthcare interfaces is very important in maintaining continuity of care. Upon the discharge of patients from hospital, General Practitioners (GPs) expect a discharge summary that details the main interventions performed in hospital, the diagnosis, a current list of medications and allergies as well as an explanation for any medication changes. Many studies have shown dissatisfaction with the quality and timeliness of discharge information including inadequate explanations for medication amendments.1,2

Feedback from Wirral GPs has flagged up to the hospital that better information needs to be provided about medication changes in discharge letters. The hospital trust working with the local Primary Care Trust decided to undertake a study looking at the effectiveness of pharmacists contributing medication related information to the discharge summaries.

OBJECTIVE
Evaluate the introduction of pharmacist comments to the discharge summary and to get feedback from primary care as to the usefulness and quality of the information.

METHODS
The hospital’s electronic patient record system was modified to enable pharmacists to add discharge comments. The criteria for the addition of pharmacists’ comments were defined. These stipulated that pharmacist comments would be made to explain alterations to a patient’s admission medication, relevant additions to a patient’s prescription and to inform the GP of any adverse drug events or monitoring requirements for drug therapy.

The project was carried out on two acute wards, one medical and one surgical orthopaedic, over a two month period. These wards were covered by senior clinical pharmacists. They contributed to the design of the project and were trained in the use of the new electronic pathway. Project evaluation consisted of data collection forms that were completed by the clinical pharmacists and a questionnaire to GPs.

The pharmacists aimed to complete a data collection form for every patient discharged from the study wards during this period. At the end of the study the pharmacists’ data was analysed to determine which pharmacists’ interventions helped with the clinical management of patients. The main issue raised by GPs was around the formatting and explanation for any medication changes. The majority of pharmacist comments were entered on medical patients because these patients are likely to have more medication changes. Also the pharmacists are more likely to participate in consultant ward rounds and so are often more aware of the rationale for changes. The majority of pharmacist comments were entered in a timely manner but robust systems will need to be introduced to ensure any discharge comments are reviewed at discharge to ensure they are all still current and accurate.

GP feedback was generally positive with most agreeing that the pharmacists’ interventions helped with the clinical management of patients. The main issue raised by GPs was around the formatting and presentation of the medication comments and it was felt that these may be overlooked if they are interspersed with the rest of the summary. This is not something that can be rectified with the current electronic patient record system but it needs to be considered as the trust moves to a new system. The study also illustrated the delays some GPs face before receiving a hospital discharge summary. This needs to be studied in more detail to see how these delays can be reduced.

In summary this pharmacists’ discharge comments help with the clinical management of patients. This service should be rolled out to other wards but pharmacists need to be adequately resourced so this service can be delivered in a consistent manner.

RESULTS
Table 1 shows the number of patients discharged from the study wards over the two month period, the number of data collection forms completed and the number of discharge comments added. The time taken to complete these comments ranged from 1 to 20 minutes and averaged at 5.4 minutes. The main reasons for the pharmacists not adding discharge comments was that there were no medication issues that needed to be communicated to the GP or there was insufficient time to complete them. Comments were mainly added on an ongoing basis or at discharge with only three instances of them being added after discharge.

Questionnaires were sent to 54 GPs who had received at least one discharge summary with medication comments. There were 32 returned, a response rate of nearly 60%. This response represented 40 patient summaries. The time between the date of discharge and the date of receipt of the discharge summary was recorded for 16 patients and ranged from 0 to 52 days with a median of 15 days. The pharmacists’ medication comments were noticed by 22 of the respondents and similar numbers found the format acceptable with the content clear and understandable. There were 12 GPs who expressed concerns about the format of the comments. The majority of GPs felt that the medication comments helped with the clinical management of patients. There were many comments commending the project. There were also suggestions proffered encouraging the hospital to improve the overall quality and timeliness of its discharge information.

DISCUSSION
The project showed that pharmacists can make a useful contribution to discharge summaries by adding medication comments and that overall this service was well received by GPs. The majority of comments were entered on medical patients because these patients are likely to have more medication changes. Also the pharmacists are more likely to participate in consultant ward rounds and so are often more aware of the rationale for changes. The majority of pharmacist comments were entered in a timely manner but robust systems will need to be introduced to ensure any discharge comments are reviewed at discharge to ensure they are all still current and accurate.

GP feedback was generally positive with most agreeing that the pharmacists’ interventions helped with the clinical management of patients. The main issue raised by GPs was around the formatting and presentation of the medication comments and it was felt that these may be overlooked if they are interspersed with the rest of the summary. This is not something that can be rectified with the current electronic patient record system but it needs to be considered as the trust moves to a new system. The study also illustrated the delays some GPs face before receiving a hospital discharge summary. This needs to be studied in more detail to see how these delays can be reduced.

REFERENCES
Pharmacist assessment of safe prescribing by foundation year 1 doctors

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Safe prescribing by junior doctors has been an ongoing issue that was given further publicity recently with the results of the EQUIP study.1

The pharmacy department of our large teaching hospital trust has always played a part in the training of foundation year 1 trainees (F1s). Until recently this involved formal teaching delivered during the shadowing period, and at lunchtime meetings during the early months of the F1 year. However in 2009, following discussion between the foundation year leads and pharmacy, a formal assessment of F1 prescribing was proposed, that would be undertaken by clinical pharmacists.

OBJECTIVES

○ To design a safe prescribing assessment tool that accurately records the quality and standard of junior doctor prescribing
○ To grade assessments using a consistent scoring scheme
○ To compare clinical supervisor prescribing scores with those allocated by the clinical pharmacists
○ To determine whether formal assessment is a more appropriate method of reviewing safe prescribing than clinical supervisor observation

METHOD

A safe prescribing data collection tool was designed. This was based on the Trust guide to prescribing and included clinical as well as practical measurements. The tool was agreed by the pharmacy department and the lead consultant for foundation year training.

Each pharmacist was allocated no more than five junior doctors and the assessments were intended to be carried out during the first rotation of the foundation year. It was the responsibility of the F1 to ensure that their prescribing assessment had been undertaken. The assessment involved the pharmacist reviewing drug charts and recording the legibility, accuracy and clinical safety of at least 30 items prescribed by the junior doctor. Pharmacists were of varying grades and experience but were all clinical pharmacists working within the same policies and procedures. A copy of the completed assessment form was given to the F1 to share with their clinical supervisor. Any feedback was given to the F1 either by the pharmacist, or via their clinical supervisor, if the pharmacist felt it more appropriate.

Clinical supervisors must comment on their F1’s prescribing skills as part of the foundation year e-portfolio but this is usually a more subjective mark based on observation during ward rounds, rather than referring to the safe prescribing assessment.

The results of both the pharmacist-rated and clinical supervisor-rated assessments were reviewed to see if there was correlation between the two, and to determine the most accurate method of assessing F1 safe prescribing.

RESULTS

Over half of the current F1s (39/69) were assessed but several have yet to approach the pharmacists. They have been instructed by the foundation year lead that they must be assessed in order to successfully complete their year.

The assessments have been reviewed independently by a clinical pharmacist and consultant and assigned a mark between 1 and 7 (Panel 1). This corresponds to the scale used in domain six of the e-learning portfolio for prescribing assessment.

Initial results show some correlation between the two scores but on average the F1s seem to have scored slightly lower in the clinical pharmacist assessment (Table 1).

DISCUSSION

The assessment marks were compared with those awarded by the clinical supervisors. Not all the clinical supervisor marks are available at this time, as these are not automatically sent to pharmacy.

In the future, it may be useful for clinical supervisors to meet with the assessing pharmacist to discuss the prescribing of the F1, rather than working independently of each other. The comparison between allocated scores identified that pharmacists tend to rate prescribers slightly lower than their clinical supervisors. This may be due to a more objective assessment form rather than a subjective observation.

There are processes in place for trainees whose prescribing is deemed unsatisfactory. Clinical pharmacists can provide extra safe prescribing training and supervised ward visits before further assessment is carried out. In some cases it may be prudent to remove the individual’s prescribing rights or to ensure that all prescriptions by the individual are countersigned by another, more senior, doctor.

The assessment tool is seen as a more appropriate method of assessment as evidence is provided for the score given and it has proved to be a valuable method of reviewing safe prescribing and validating the more subjective approach used in previous years.

REFERENCES

Assessing Christmas trees: changing the skill mix within Southampton University hospitals NHS Trust (SUHT)

Millen S. Tizard J, Steel L
Southampton University hospitals NHS Trust

Over the last 10 years pharmacy technicians have become an integral part of the clinical pharmacy team within SUHT. However their role was limited. Technicians were responsible primarily for the use of patients’ own drugs and some re-supply of medication. Within SUHT it was considered that by increasing technician numbers and extending the role, pharmacist’s time could, ultimately, be released to take on extended clinical roles to support patient care more fully and generate quality, innovation, productivity and performance (QIPP) savings. However technician posts were limited and plans were developed to create a new infrastructure. Roles were also identified which were more appropriate for a senior assistant technical officer (SATO) e.g. transferring medication and so these posts were included within the re-structure.

As a result of a national shortage of both pharmacists and technicians' a technician recruitment and retention plan was developed. The clinical team considered how the technician role could be extended to increase staff satisfaction, sustain the delivery of pharmaceutical care and support care groups in achieving targets and ultimately delivering QIPP.

It has been established that intensive medicines management provides a valuable contribution to patient care. However the skill mix required to deliver this most efficiently has not been evaluated. This project was designed to allow SUHT to re-set the baseline for technical staff to support vacant pharmacist posts and to begin to evolve traditional roles and activities.

OBJECTIVE
To increase the number of technicians and SATOs, by identification of the financial benefit to SUHT.

METHOD
Data was gathered for two key activities: Number of TTO’s issued directly from wards and the cost of medication ‘lost’ on wards and not transferred with the patients so consequently resupplied. Data was captured for each activity over a month. The in-house e-discharge system was used to determine the number of TTO’s issued directly from ward areas. JAC reports were used to quantify the amount of duplication in supply. In addition lost medication was collected directly from wards during the audit period and the costed at hospital tariffs.

RESULTS
Reducing length of stay: An audit of electronic discharges showed that 31% of discharges were sent to dispensary. If the technicians reduced the volume of TTOs sent to dispensary by issuing discharge medication directly from the ward, this would increase patient turn around time. A reduction in TTOs sent to dispensary to 5% would save 252 bed days, representing approximately £75,000 per calendar month across SUHT recurring. (At the time of analysis savings were calculated using 12 mins as the average time for a supply directly from the ward in comparison with the four-hour turnaround time from dispensary. A bed was valued at £300 per day.)

Reducing waste: The results showed savings of £1801 within the medical care group alone. This equated to a saving of 22k per annum in direct drug costs and excluded the saving in staff time by both nursing and pharmacy staff duplicating orders and re-supplying.

“Lost” medication: JAC data on duplication of supply was found to be unsuitable for analysis and could not be included.

DISCUSSION
Developing the role of the technician and integrating technicians within the clinical teams has financial benefits to SUHT. A saving of 22k was identified in direct drug waste alone within medicine, this is more than the cost of the band 3 employed. This saving excludes the quality and risk aspects of a reduction in ‘lost’ medication. In addition there is less medication awaiting return to pharmacy at ward level in patient accessible areas. This not only provides conformity to the trust safe storage of medication policy but it reduces the risk of patients gaining inappropriate access to medicines in these ward areas. A reduction in missed doses has not been investigated but would be expected. The cost saving in terms of reduced length of stay is debatable but was accepted as suitable methodology by the organisation to provide support at the time.

Through audit and broad consultation the baseline requirements for technicians was reviewed and reset. It was agreed that 0.5 wte band 5 per ward was appropriate to deliver the role and 1 wte band 3 per division. The complement of posts increased from 14 wte (mainly band 5) to 24 wte (mixed grades) under the new job descriptions. In addition the team infrastructure was revised to allow career progression for staff members and promote staff satisfaction. Band 6 divisional technicians were employed to support pharmacists with project work and monthly reports and band 6 pharmacist posts (previously vacant) were lost.

There are still huge inroads to be made in this area by our organisation. However by re-setting the baseline we now have the flexibility to revise how we deliver our service and where activity should be focussed. We have plans in place to investigate the safety of patient referral between technicians and pharmacists and supported by the technician level framework and benchmarking activity we can be confident in the competency of our staff and the activities performed.

REFERENCES

An evaluation of in-house compatibility data on intensive care wards

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Intensive care patients are often prescribed as many as ten different medicines that are given as continuous intravenous (IV) infusions and additionally a number of bolus infusions. The local practice is to insert a triple lumen central line for each patient where up to three drugs can be administered separately. Unless compatibility data is available to
administer the medicines concurrently down the same line (y site compatibility), another IV line would be required for any additional IV medicines prescribed.

To minimise the number of IV access routes some of these medicines have to be administered concurrently down the same IV line. Compatibility of these medicines is normally decided by referring to Trissel's Handbook on Injectable Drugs, however the concentrations in this reference source are often weaker than the dilutions used in practice, limiting the usefulness of the information.

In 2004 two pharmacists at Addenbrookes Hospital, produced and published y-site compatibility guidance in the form of a triangle. This recorded the results of compatibility tests for all one plus one combinations of 35 medicines at concentrations normally used in the intensive care units. The purpose of the publication was to reduce the number of lines required per patient. In 2009 we decided to evaluate the use of this triangle in terms of the current utilisation to find out its impact on patient care.

**OBJECTIVE**

To determine whether Addenbrooke's developed guidance is being utilised, and establish its potential effect if implemented fully. Via audit methodology we sought to establish the frequency of potential and actual combinations supported by the 'in house' triangle that were not supported by Trissel's Handbook on Injectable Drugs for patients on the critical care wards.

**METHOD**

During July 2009 a preregistration trainee pharmacist (CH) visited our intensive care units. Prior to data collection, several accompanied ward visits were undertaken with CH and training provided by the Medicines Information manager (TH) to ensure the data collection method was robust and reproducible. Eleven consecutive patients receiving more than two IV medicines had their drug administration charts reviewed. It was ascertained from the nurse caring for that patient which IV drugs were being administered down the same line. The following data was collected for each patient; IV drug name, strength, diluent and which medicines were being co-administered through a single IV access.

For each patient all combinations were checked for compatibility evidence from Trissel. Where there was no evidence in Trissel (including medicines being used at concentrations higher than in Trissel) the in house compatibility triangle was referred to. In patients where medications were administered individually, the potential for safe co-administration utilising the compatibility triangle was identified.

**RESULTS**

During the review, eleven patients received 100 IV medicines in total (9 on average). One patient was being administered two medicines down the same line which was supported by in house data but not Trissel. Among the other results we found 23 incidences (in five patients) of potential y site co-administration that was not being utilised, which were supported by our in house data but not Trissel. In four of these five patients our additional information could have released at least one line for administration of other medicines. In the other patient, an unsupported combination could have been replaced by a combination proven safe by our data. This would have potentially reduced the risk of IV access route complications such as infection and phlebitis.

**DISCUSSION**

This study showed that there is potential for simple in house research to provide flexibility of intravenous medication in intensive care patients. Even though only a small number of patients were reviewed; it is apparent that there is potential for this research to have simplified the IV therapy of critically ill patients. The study also highlights a greater role for the ward pharmacist to promote use of the compatibility triangle to the ICU nurses and limit the number of extra IV access routes inserted in addition to the standard central triple lumen line.

The additional benefits of easy access to and utilisation of this compatibility research is time saved for the nurses as they can consult the compatibility triangle at the bedside. It is also time-saving for the Medicines Information department and the ward pharmacist as repeated requests for compatibility information included in the triangle are avoided. It is also of benefit to the doctors as utilisation of the triangle allows more concentration solutions to be administered that we would otherwise not have published information to support.

This research also demonstrated the need for further work to be undertaken; particularly for propofol where there is currently no information on the y-site compatibility of the commonly used 2% strength. In the case of propofol, more sophisticated analysis of compatibility would be required due to its presentation as an emulsion.

Limitations of this study include the small number of patients reviewed due to time constraints. Recommendations are that a much larger sample of patients at multiple intensive care units is undertaken to determine the potential benefit and generalisability to other centres.

**ACKNOWLEDGEMENTS**

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**REFERENCES**


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**Re-engineering out-of-hours pharmacy services for a new decade**

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From our experience there is significant variation in provision of quality out-of-hours pharmacy services throughout secondary care teaching hospitals in England, including residency and shift-working. Our Trust has, over many years, met the demands of its four sites with an emergency duty commitment (EDC) service requiring two pharmacists at home each night, operating independently of one another. A total of 45 pharmacists participated on the rota, each receiving EDC payments with lieu time and travel costs. In 2009, a significant investment was made in clinical pharmacy services, including an increase in the numbers of rotational (band 6) pharmacists from four to 14. This allowed us to radically rethink how the out-of-hours service should be delivered.

**OBJECTIVES**

To re-engineer the out-of-hours pharmacy service, incorporating:

- increased clinical provision, recognising the requirements of service users and providers
METHODS

We sent an electronic survey to nursing and medical staff with Trust email access, who had recently worked on the Emergency Admissions Unit (EAU). The 35 responses confirmed that, whilst the day service provided to EAU was well received, a clinical pharmacy presence was also required out-of-hours. From these results we developed some key clinical themes for incorporation into a consistently delivered and patient-focused ‘extended-hours’ service, seven days a week. Activities include: participation in consultant-led post-take ward rounds; conducting medicines reconciliation processes; prescription monitoring including antibiotic review; offering advice to patients; supporting staff; and supplying discharge medications where there is a valid need for immediate discharge, as per agreed Trust guidance.

To deliver these services we designed a EWTD-compliant shift-working rota in consultation with the pharmacists. This ensures pharmacy presence on EAU is doubled, from 8am to 5pm weekdays, to a daily late night service. Clinical activities are undertaken for new admissions until 10pm, in addition to emergency calls being taken for the rest of the Trust. After 10pm the pharmacist continues to provide an EDC service from home through to the start of the next morning shift. The rota provides minimal disruption to daytime services whilst incorporating a five-day break in compensation for working late shifts. Home-based, senior pharmacists provide ‘back-up’ support, including provision of emergency chemotherapy. We supported implementation with an extensive training programme for the band 6 pharmacists, taking the form of tutorials, workshops, a shadowing period and dispensaries orientation.

Four months after implementation we repeated the electronic survey in order to gauge satisfaction of seven key out-of-hours clinical activities and identify whether we had met the expectations expressed in the original survey. Participants were asked to score each activity on a scale of 0 (very poor) to 4 (excellent). In addition, a separate email survey was sent to the band 6 pharmacists to determine their experiences of working the extended-hours system. Finally a financial review was conducted, taking into account the cost of EDC payments, lieu time, travel and antisocial-hours pay enhancements.

RESULTS

We had 34 responses to the post-implementation survey. The results indicated a substantial improvement in the perceived quality of the out-of-hours service, bringing this to similar levels seen with the daytime service in September (Figure 1). Comments indicate that clinical aspects of the service are more highly valued than previously, with 91% of staff stating that extended-hours has had a positive impact on their practice.

The band 6 pharmacists have also responded positively, stating that working the extended-hours has increased confidence, allowed integration into the multidisciplinary team and improved clinical knowledge (Panel 1). Although shifts were seen to be tiring and busy, all responders said they would recommend the extended-hours system to others.

Financially, the costs of providing an out-of-hours service have dropped by £47K, due to reduced numbers of pharmacists participating in on-call, and a decreased incidence of callouts from home warranting lieu time and travel expenses.

DISCUSSION

We met all the objectives of the project. Although re-engineering the out-of-hours service took a considerable amount of energy and training, it has been positively received and highly valued by staff on EAU. As discussed, pharmacists participating in the service have identified a number of personal and professional advantages. The introduction of an innovative out-of-hours service has improved clinical pharmacy provision and also demonstrated significant cost improvements.

REFERENCES

Audit on the use of pharmacological agents for venous thromboembolism (VTE) prophylaxis following elective total hip and knee replacements

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Pharmacy Department, Royal Liverpool and Broadgreen University Hospitals NHS Trust

Each year 25,000 people in England die from VTE. In orthopaedic surgery specifically, deep vein thrombosis (DVT) occurs in more than 40% of patients and orthopaedic surgery itself carries a high risk of VTE even before individual patient risk factors are taken into account. If DVT occurs, it often presents one to two weeks after the operation, usually when the patient has been discharged from hospital.

Pharmacological recommendations from The National Institute for Health and Clinical Excellence (NICE) in clinical guideline CG46, Venous thromboembolism: reducing the risk of venous thromboembolism in inpatients undergoing surgery, recommended extended prophylaxis (for 4 weeks) in all patients following surgery for hip fracture and those with any patient related risk factors following elective hip replacements. The final draft of the updated NICE clinical guideline CG92, Reducing the risk of venous thromboembolism in patients admitted to hospital retains these recommendations and also includes recommendations to extend prophylaxis (for 10 to 14 days) following knee replacement surgery.

AIM
To ascertain if prescribing is compliant with current and pending recommendations for VTE prophylaxis in NICE CG46 and CG92 following joint replacement surgeries. Specifically assessing choice of pharmacological agent and duration of prophylaxis.

METHODS
Data was retrospectively gathered from each discharge prescription issued in the month of October 2009, post elective TKR and THR surgery at Broadgreen Hospital (BGH).

The procedures undertaken (THR or TKR), the pharmacological prophylactic methods (LMWH, aspirin, warfarin) and their duration were recorded. Treatment with antithrombotic agents or anticoagulants prior to admission were also noted.

From this information, the different regimens of pharmacological prophylaxis used at BGH were then classified into groups and the numbers of patients within each group ascertained.

RESULTS
A total of 83 patients were discharged following elective joint replacement surgeries during the data collection period, 26 THRs and 57 TKRs. The various VTE prophylaxis regimens and number of patients within each group are summarised in Tables 1 and 2.

DISCUSSION
Pharmacological prophylaxis following orthopaedic surgery is notoriously subject to huge variability and the cause of great debate among surgeons. NICE CG46 was released in 2007 and intended to standardise treatment in this area and encourage the use of evidence based agents and duration. This audit confirms its limited compliance within the trust (6%) and the massive inconsistencies in practice have also been demonstrated from these results. The use of aspirin either alone or in addition to a course of low molecular weight heparin (LMWH) occurred in 85% of cases with 6% of patients receiving no pharmacological prophylaxis at all.

The final draft of NICE clinical guideline CG92 which will supersede its predecessor recommends that VTE prophylaxis should continue for 28 to 35 days after THRs and 10 to 14 days post TKRs with LMWH. It also clearly states that antithrombotics such as aspirin should not be used as a form of VTE prophylaxis alone. Compliance with this new guidance presents a new challenge which may be expected to face a degree of resistance indicated by the results of this audit. Reflection on the previous implementation methods and their shortcomings may be able to identify potential methods of improving compliance with the updated recommendations. Within the NHS the spotlight on VTE is being focused through its inclusion in the first four NICE quality standards due in April 2010 and the National CQUIN goals on VTE.

Since this audit was conducted two interventions have occurred that aim to improve compliance with these guidelines. Firstly, the clinical director for orthopaedics has written to all of the orthopaedic surgeons to halt current variable practice and insist on management in accordance with NICE recommendations. Secondly, NICE CG92 has been published and well publicised. A re-audit is planned imminently to assess the impact of these interventions.

REFERENCES
1 NICE guidance on Venous Thromboembolism Reducing the risk of venous thromboembolism in inpatients undergoing surgery) April 2007
2 Draft NICE guidance on Reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients admitted to hospital January 2010
Audit of a patient group direction of enoxaparin sodium for the treatment of deep venous thrombosis in accident and emergency

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To enable more rapid and consistent management of Deep Venous Thrombosis (DVT) in patients presenting to the Accident and Emergency (A&E) department at University Hospital Lewisham a number of emergency department nurse practitioners (ENPs) were trained to manage this condition in October 2008. An essential component of this innovation was a Patient Group Direction (PGD) for the administration of Enoxaparin Sodium so that the ENPs could initiate treatment. Under the PGD suitably qualified ENPs were permitted to administer to patients with a suspected DVT a single dose of Enoxaparin Sodium 1.5mg/kg by subcutaneous (SC) injection. Patients are subsequently referred to the Trust’s DVT Clinic for ongoing management.

Although the A&E department has considerable experience of ENPs and nurses using PGDs, the majority are for oral and topical preparations for the management of a range of common conditions. The introduction of the Enoxaparin Sodium PGD introduced a range of important clinical issues, which potentially gave rise to increased patient risk. These included the use of a parenteral drug, calculation of a weight based dose, a number of drug interactions and contra-indications to be considered and the necessity for an accurate diagnosis to be made.

A regular audit of A&E PGDs is conducted annually, however, due to the innovative nature of the PGD and the potential risks it was decided that the use of Enoxaparin should be audited in detail. The criteria against which the audit would be conducted were the legal requirements for PGDs and the good practice requirements laid down in the local treatment management protocols contained within the Patient Group Direction.

OBJECTIVES
Two objectives for the audit were identified:

- To determine if the administration of Enoxaparin Sodium using a PGD complies with the legal requirements laid down in HSC 2000/026
- To identify if the administration of Enoxaparin Sodium using a PGD complies with good clinical practice requirements as laid down in the local protocol.

METHOD
Data for the audit was obtained from the hospital’s Patient Information Management System (PIMS) and database. The search criteria ‘Patient attendance at A&E October 08 – January 09, analyzed by outcome of ‘MAU DVT clinic and patients seen by ENP’ provided 114 patient records. Six sets of patient notes could not be located due to hospital number printing processes. The audit was conducted on 83 patient records. The data collected was as outlined in Tables 1 and 2 and the standard set after consultation with the A&E nurse consultant and pharmacy non medical prescribing lead was 100% for all criteria. The study was approved by the Clinical Governance and Audit Committee at University Hospital Lewisham.

Table 1. Compliance with statutory requirements (n=83)

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<th>Criterion</th>
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<th>Percentage of standard met</th>
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<tr>
<td>Dose</td>
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Table 2. Compliance with good practice requirements (n=83)

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<td>Follow up action advised</td>
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RESULTS
Good compliance with legal requirements for all criteria was achieved with the exception of the dose. Dosing was non compliant in 25 (30%) patients. The results are summarised in Table 1. Compliance was also good for the majority of good clinical practice criteria, with the exception of the documentation/evidence that appropriate action had been taken in case of contra-indication (C/I) or the patient given relevant warnings where this information was lacking for 16 (19%) patients. Good practice results are summarised in Table 2.

In 48 episodes there was a deviation from the PGD and for some episodes more than one deviation was identified, there being 74 deviations in total.

DISCUSSION
The prime cause for concern was that in nearly a third of episodes the dosage laid down in the PGD was not being adhered to. On 25 (30%) occasions an incorrect dose was given or potentially given as no weight was recorded or the dosage chart was incorrectly interpreted; there were five (6%) occasions when an exact weight based dose was given instead of a banded dose and 12 (14%) occasions where a dose of greater than 150mg was not double checked, which is a requirement of the PGD. There were also eight (10%) occasions when a second or third dose was administered and the PGD is only for the first administration. The PGD has been clarified to underline the necessity of recording the patient’s weight and using the dose banding, along with further training for the ENPs. A repeat audit has been planned and is currently being conducted to determine whether this remedial action has been effective.

CONCLUSION
Audit of the administration of Enoxaparin Sodium for the management of DVT in the A&E department by ENPs has shown that there are concerns over the practitioners’ ability to determine the correct dosage and remedial action has been instituted.

REFERENCES
2. University Hospital Lewisham (2008), Patient Group Directions – Emergency Department.
A re-audit on prescribing practice of venous thrombo-embolic prophylaxis in medical oncology patients at St Bartholomew’s Hospital

Nguyen T, Saha A, Mills S, Slater S, MacCallum P
St Bartholomew’s Hospital, London

Venous Thrombo-Embolism (VTE) is a major cause of death and disability in cancer patients. The American Society of Clinical Oncology (ASCO) guideline1 recommends routine VTE prophylaxis with low molecular weight heparin (LMWH) to all hospitalised patients without contra-indications. However, published evidence2 and a two-week audit of VTE prophylaxis prescribing in medical oncology patients at St Bartholomew’s Hospital in July 2008 showed that these high-risk patients were not receiving adequate VTE prophylaxis.

Several interventions were introduced from July 2008:

- Regular education to ward staff by Clinical Nurse Specialists
- A reminder system on patient’s drug chart (Figure 1);
- Role extension of ward pharmacists to help risk assess patients and prompt medical staff in the event of inadequate prophylaxis.
- Annual audits would be carried out to assess the compliance of prescribing practice to ASCO guideline.

OBJECTIVES
This re-audit was performed to assess the outcome of the interventions. Criteria are as follows:

- Hospitalised patients, unless contra-indicated, are prescribed LMWH (Tinzaparin)
- In the presence of contra-indications to LMWH, appropriate mechanical prophylaxis (graduated compression stockings - GCS) is prescribed
- Assessment of patient’s VTE risk is documented on VTE stickers and/or medical notes

Standard is set at 100% compliance.

METHOD
All solid tumour in-patients were audited over a two-week period in July 2009. Ambulatory cases and patients on Liverpool Care Pathway (LCP) were excluded. Patients were assessed when they had been on the ward for greater than 24 hours to permit senior review. Drug charts, medical notes and blood results were audited to see whether a VTE risk assessment had been documented and if appropriate prophylaxis had been prescribed. Ward pharmacist would prompt medical staff to perform a VTE risk assessment if absent. All variances from the national guideline were noted, as well as any pharmacist interventions.

RESULTS
Demographic data of audited patients in 2009 were similar to 2008 audit in terms of total number, sex, age, range of tumours and number of patients with history of VTE event. There were 103 patients admitted over a two-week period; of which 30 were excluded. There were 11 patients (15%) with history of VTE event and five patients (7%) who were already on VTE treatment. 16 patients (22%) had contra-indications to LMWH. Of 52 patients eligible for prophylactic LMWH, 46 patients (88%) were prescribed. Ward pharmacist prompted for prescribing in remaining eligible patients (12%). Interventions were also made on three occasions for wrong calculation of treatment dose and for a dosage reduction in severe renal impairment. No patients had contra-indications to GCS. Of 16 patients eligible for GCS, only one patient (6%) was prescribed and worn correctly. Only 6% of patients had documentation of VTE risk assessment. Comparison between 2008 and 2009 audit results was shown in Figure 2.

DISCUSSION
The interventions implemented after the 2008 audit have significantly improved the prescribing practice of LMWH (88% vs. 22% respectively). In the presence of contra-indications to LMWH, the prescribing practice of GCS has not changed. However, recent trial data3 suggest that GCS may not be appropriate for medical patients. National guidelines are currently being updated to address this issue.

Future efforts should concentrate on improving practice to 100% compliance, in particular improving documentation of VTE risk assessment. Recommendations include preprinted risk assessment tool on drug charts; continual education to ward staff; regular re-audits and comparison with other intervention systems within the Trust.

Auditor is the ward pharmacist, which poses a limitation that the outcome of ward pharmacists’ extended role to help risk assess and prompt medical staff was not audited.

REFERENCES
Are controls put in place four years ago following the safer practice notice for high strength morphine and diamorphine still working effectively?

Ali S, Ghair J, Rahbi B, McKechnie E
University of Leicester NHS Trust

The National Patient Safety Agency (NPSA) issued a safer practice notice 12 “Ensuring safer practice with high dose ampoules of diamorphine and morphine” in 2006. Following this alert the University Hospitals of Leicester NHS Trust (UHL) introduced controlled drug stock lists for all clinical areas. Only critical care units, theatres and oncology wards were allowed to keep morphine or diamorphine ampoules of 30mg or above as stock. If high strength diamorphine or morphine ampoules were required on a ward then the prescription chart had to be seen and the order authorised by a pharmacist prior to the ampoules being dispensed. As soon as possible after a patient had ceased to require the high strength opioid the ampoules were removed from the ward and returned to the dispensary.

OBJECTIVE
The aim of this audit was to discover if the recommendations within the safety practice notice were still being followed successfully and that high strength ampoules were only being kept on authorised wards.

1. 100% of clinical areas which have high strength diamorphine or morphine ampoules store them separately from other strengths.
2. 100% of clinical areas where diamorphine or morphine ampoules may be used have naloxone ampoules available.
3. 100% of clinical areas which have high strength diamorphine or morphine have been authorised (either as agreed stock or for use for a specific patient).

METHOD
All controlled drug cupboards across the Trust were audited during December 2009. The auditors checked to see which strength of ampoules were kept. If the ward was not listed as authorised to keep as stock then the ward was investigated to see if a patient was currently prescribed a high strength opioid and if this had been confirmed by a pharmacist. The storage of the ampoules was noted and if naloxone was readily available. Nursing staff in each area were also questioned about the requirements surrounding high strength diamorphine and morphine.

RESULTS
One hundred and fifty-nine controlled drug cupboards were checked within the Trust; see Table 1 for summary results of audit standards. One cupboard did not have any diamorphine or morphine ampoules within it at the time of the audit. Fifteen (9%) of areas had high strength morphine or diamorphine ampoules as part of an agreed stock list. Out of those 15 areas, five (33%) make a deliberate effort to store the ampoules separately from other strengths. Three (19%) wards had ampoules in the controlled drug cupboard which were not part of an agreed stock list, but only one of these was for high strength diamorphine 30mg. The patient was no longer on the ward and the ampoules had not been removed.

Naloxone ampoules were available on the majority of areas 128 (80.5%) mainly kept in an injection cupboard, although in three cases the ampoules had expired.

Table 1. Summary of results for all areas visited (n=159)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Standard achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>High strength ampoules stored separately</td>
<td>33% (n=15)</td>
</tr>
<tr>
<td>Naloxone ampoules available</td>
<td>80.5%</td>
</tr>
<tr>
<td>High strength ampoules only kept for authorised use (agreed stock or for use with specific patient)</td>
<td>99.4%</td>
</tr>
</tbody>
</table>

Nursing knowledge of the safer practice alert was poor and the requirement to keep the ampoules separate was not widely known. 85% nurses stated that they would refer to the ‘Trust controlled drug policy or injectable guide for their guidance but did not know of any further information.

DISCUSSION
The control of high strength diamorphine and morphine ampoules is well maintained with wards and pharmacists following the restrictions put in place. Storage in often small crowded ward cupboards is an issue and a simple method to ensure that the different strengths are kept separately in areas which keep them all as stock is being revisited in those areas not complying.

At the time of the alert a one sided information sheet on high strength diamorphine and morphine was developed highlighting the alert and the issues surrounding the use of high strength opioids, monitoring and storage requirements. This was given to areas where ampoules were kept as stock but then supplied by pharmacy with ampoules when sent to other areas. Almost 4 years later and this information has disappeared, although there is a section in the controlled drug policy. Nurses were unaware of the distinction in strengths.

This audit demonstrates that systems introduced to restrict access to high risk medicines are effective but that additional information which often supports the implementation of these systems can be lost and that it is useful to revisit on a rolling programme of audit. Incident data is monitored monthly but does not demonstrate where information, knowledge has been lost.

An information bulletin has been produced to increase nursing medicine knowledge of previous NPSA alerts and a medicines management module is being introduced to nursing preceptorship.

REFERENCES

Effective management of vaccines in primary care

McGovern EM*, Pawelczyk K*, Reilly V*, Ahmed S†, Bryson SM*
Pharmacy Prescribing Support Unit* and Public Health Protection Unit†, NHS Greater Glasgow and Clyde (GG&G)

Vaccines are biological substances and storage outside of the recommended temperature range may accelerate loss of potency, which cannot be reversed. Maintenance of the cold chain for vaccine supply, storage and administration is essential to ensure product quality and patient safety, thereby avoiding serious consequences for both the patient and the NHS, the importance of which was raised in a recent safety report.

Following the identification of a vaccine incident in Grampian, the Scottish Government Health Department prompted a review of
vaccine storage in GP surgeries across NHS Scotland. In this Board a detailed review including a criteria based inspection (audit) of all GP practices was undertaken during May to November 2007. All required improvements in their practice, usually in the areas of temperature monitoring or equipment. Subsequently, funding for a one year ‘spend to save’ project was obtained to establish improved quality assurance processes for vaccine management in primary care, commencing January 2009.

**OBJECTIVE**

To establish a programme of self audit for all GP premises and identify the optimal approach to effective management of vaccines

**METHODS**

1. The previous project had established support for a self audit approach and the previous criteria based tool was adapted for self audit (42 criteria). Engagement with Public Health Facilitators, prescribing leads and lead clinical pharmacists encouraged practices to undertake self audit. In addition practices were asked to place an electronic temperature logger in each fridge to monitor hourly temperatures for 48 hours. Practices could also exceptionally request a practice visit. Following the visits, practices received individualised feedback reports and were asked to return a signed copy to confirm acceptance of the recommendations.

A Steering Group was established to monitor the project and review any practices referred for risk management. The project team reviewed individual audit results and provided individualized feedback to practices

2. A retrospective review of all incidents reported during 2008 was undertaken to assess whether these might have been preventable, number of repeat incidences and associated costs. After March 2009 an individualised report for each affected GP practice was generated detailing the incident reported, potential reasons, recommendations to minimise the risk of recurrence and an invitation to undertake self audit where appropriate. This report was copied to the appropriate Clinical Director and lead clinical pharmacist.

3. Guidance and standards relating to vaccine handling and storage is available nationally.1 Previous local guidance circulated to practices in May 2007 was reviewed.

**RESULTS**

1. To the end of January 2010, 188 practices (73%) had undertaken audit activity (173 self audits, 15 audit visits, 317 fridges), submitted one month’s practice records and undertaken a 48 hour temperature logging exercise of all fridges. The main area for improvement was aspects of temperature monitoring (Figure 1). Where necessary, follow-up actions were arranged e.g. further submission of temperature records. This was required for 76 practices (40%). The Steering Group advised revaccination for three children in one practice.

2. A reduction in the extent and cost associated with incidents was observed (Table 1).

3. The previous local guidance was revised to provide additional background, information on suitable fridges, supplier’s details and NHS discount code.

**DISCUSSION**

The project was successful in motivating practices to improve their processes, as indicated by their active participation in self audit, follow-up actions and return of signed summary reports. Limitations were identified to the self audit process and review of the submitted records and logging exercise revealed some inconsistencies.

Prior to March 2009, no attempt was made to identify contributory factors, provide advice on prevention of future incidents or investigate if repeated incidents occur in the same practice. This feedback process is having a positive effect on the number of incidents overall and GPs reporting repeat occurrences, resulting in cost savings of £70k as a result of reducing preventable incidents (from £106.5k in 2008 to £36.5k in 2009).

The project methodology and results were successful in raising awareness of the importance of the cold chain, establishing a self audit programme and identifying the priority areas for improvement. Our experience has prompted an application for recurring NHS staffing resource to meet the ongoing service needs.

**CONCLUSION**

This project has addressed SGHD concerns and has brought fundamental local change to vaccine management, thereby strengthening health protection, improving risk management and reducing vaccine wastage in GP practices.

**REFERENCES**

3 NHS (General Medical Services Contracts) (Scotland) Regulations 2004, Schedule 5, paragraph 8
Current prescribing and documentation of PCA and epidurals: an assessment on a surgical ward

Gadher N, Sanghera I
Central Middlesex Hospital, North West London Hospitals NHS Trust

Patient controlled analgesia (PCA) and epidurals are forms of analgesia used postoperatively in patients undergoing surgical procedures. Both methods of analgesia should be prescribed and documented on the patient drug charts as per Trust PCA and Epidural protocols.1,2 The protocols state the minimum prescribing and documentation standards agreed by the Trust.

According to the Department of Health, NHS organisations should have local guidelines in place to ensure safe prescribing, dispensing, administering and monitoring of opioid analgesics in order to help reduce the risks of errors.3 This audit was aimed at assessing current practice of prescribing and documentation of PCAs and Epidurals on a surgical ward.

OBJECTIVES

- To measure the level of adherence on a surgical ward to prescribing PCAs and epidurals on drug charts over a two month period. It is expected that 100% of patients are prescribed these as per Trust policy. (Standard 1)
- To measure the level of adherence on a surgical ward to documentation of PCAs and epidurals on drug charts over a two month period. It is expected that 100% of patients have these documented as per Trust policy. (Standard 2)
- To ascertain whether on 100% of occasions no other opiate is prescribed whilst the patient is on PCA or an epidural containing an opiate. (Standard 3)

METHOD

The audit was conducted over a two-month period (November to January), with data being collected five days a week (Monday to Friday) on a surgical ward by pharmacy staff. A tick box data collection form which had been piloted and approved was used to record whether all the relevant information with regards to prescribing and documentation were annotated as per the Trust protocol. Relevant information included the start date of the PCA/epidural administration, the drug dose, if appropriate sections were signed and whether opiate medications were also prescribed on the drug chart.

RESULTS

Over the two-month period of data collection a total of 51 drug charts were analysed, 46 were prescribed PCA and five were prescribed an epidural.

Table 1 shows that, of the 46 charts with PCAs, 39 (85%) were prescribed the PCA correctly. Of the five charts with epidurals, three (60%) were prescribed an epidural correctly; therefore the first standard set for the audit was not met.

Of the 46 PCA drug charts, 39 (78%) were documented correctly. Out of the five epidural drug charts, three (60%) were documented correctly, therefore the second standard was not met.

Out of the 51 drug charts analysed, 100% of patients were not prescribed an opiate while on a PCA or epidural that contained an opioid, therefore meeting standard 3.

DISCUSSION

The results show that the PCA and epidural drug charts were not completed to the full prescribing and documentation standards as the policy states. Therefore standards 1 and 2 were not met. The diluent not being specified was the most common prescribing error found. Other prescribing errors included the bolus or lockout time not being recorded.

Commonly encountered documentation errors included two signatures not always written to represent any remaining solution left in the destroyed epidural or PCA. Also in a few cases, the time and date the PCA or epidural was stopped was not documented, therefore not complying with Trust standards.

Other issues were also identified during the audit. Examples included information written in the incorrect sections of the drug chart and unclear or illegible handwriting. Such errors impose an obvious risk to the patient. Opiates are one example of high risk drugs where incorrect doses or where prescription directions are unclear can lead to overdose and serious harm.

As part of the NPSA alert on Epidurals, there should be formal training and updates for staff involved with prescribing, preparing and administering epidurals.1 This has highlighted a key area such as prescribing, where training should be implemented. Therefore this audit will be presented in the Grand round and the Anaesthetics’ clinical governance meetings, which could form part of the recommended training.

In conclusion, it can be said that the prescribing and documentation of PCAs and Epidurals is not fully meeting the standards required to ensure patient safety. Recommendations can be made in order to help make the prescribing and documentation of PCAs and epidurals more complete and accurate, ensuring overall safety:

- Updating the PCA and epidural policies to be more specific and detailed in regards to prescribing and documentation and emphasising the importance of this.
- Ward based training to the nursing staff on clear documentation.
- Outcomes of the audit being presented to ward staff (nurses and doctors) to increase awareness.
- Audit being done on both sites of the Trust to give a clearer indication of the problem.

A multidisciplinary approach involving nursing, pharmacy and the medical teams is therefore needed to prevent errors in administration of PCAs and epidurals, ensuring that the priority of patient safety is met effectively.

REFERENCES

4 North West London NHS trust: Controlled Drugs policy December 2009
Pharmacy documentation of medication changes to improve communication at discharge

Patel N*, Thakkar K*, Dickson E1
Pharmacy Department* and Medicine for the Elderly Department1, Imperial College Healthcare NHS Trust, London

A patient’s electronic discharge summary (“to take away”; eTTA) from hospital should include details of changes made to medication during the hospital stay.1 Otherwise, discrepancies between pre- and post-admission medication result in the GP having to guess whether these are deliberate or inadvertent. This issue has been highlighted in recently published NICE/NPSA guidance on the process of medicines reconciliation.2 Recent local audits showed that hospital doctors documented details of medications started and stopped in only 16–50% of TTAs, and that pharmacists had no involvement in the communication of these medication changes.

Patients on the Medicine for the Elderly ward at Hammersmith Hospital may have their medications adjusted during their admission. Examples of adjustments include initiation of new medication, cessation or alteration in the dose of a preadmission medication, a recommendation regarding the duration of treatment or a recommendation to initiate medications following discharge. The aim of this work was to find out if pharmacists pro-actively documenting medication changes on eTTAs improves communication and reduces inadvertent error by GPs.

OBJECTIVES

- To report the proportion of medication changes documented on eTTAs by doctors
- To inform the screening pharmacists to proactively document details of all changes on eTTAs
- To report the number of changes subsequently implemented by the patient’s GP
- To report the potential number of errors averted by pharmacists documenting details of medication changes

METHODS

The following standards were set:

1. 100% of medication changes will be documented on eTTAs by the pharmacist
2. 50% of medication changes will be documented on eTTAs by the doctor (based on maximum changes documented in previous audits)
3. 80% of the total number of medication changes will be implemented following discharge (not set at 100% as unlikely to be achieved for various reasons including over-the-counter preparations that may not be listed on repeat prescriptions or rejection of the change by the GP)

The Medicine for the Elderly ward is covered by one of the pharmacists from the Admissions and Discharge team. The pharmacists were asked to document details of all medication changes on the eTTA, even if already specified by the doctor. All eTTAs clinically screened by a pharmacist during their morning ward visit were included in the audit. The number and type of changes documented by the doctor and the pharmacist were recorded on a data collection form. The GP surgery was then telephoned at seven and 14 days post discharge. Where a copy of the eTTA letter was received by the surgery, questions were asked regarding whether the medication changes had been implemented and the computer record updated with the change. If the eTTA was not received after the 14-day period, it was assumed that the risk of inadvertent error and potential harm to the patient was increased due to lack of communication, inability for patient to obtain a re-supply of new medication and an increased risk of continuation of ceased medications. A six-week data collection period took place following a one-week pilot. The doctors were not informed that this work was being undertaken.

RESULTS

A total of 23 eTTAs were included in the study. 16 were received by the GP surgery by day seven, five by day 14 and two were not received by day 14. A total of 119 medication changes were documented by the pharmacist on the 23 eTTAs (average five changes per eTTA). The two eTTAs not received included details of ten medication changes. One hundred percent (n=119) of medication changes were documented by the pharmacist i.e. standard one was achieved. Of these, only 17% (n=20) had been documented by the doctor on the eTTA i.e. standard two not achieved. Seventy one percent (n=77) of medication changes were implemented by the GP, standard three was therefore not achieved. Of the changes implemented, 92% (n=71) were documented by the pharmacist only (Table 1).

DISCUSSION

This audit confirms that documentation of medication changes by hospital doctors is poor with only 17% compliance against standard two. There were 99 medication changes not documented on eTTAs by hospital doctors and therefore 99 possibilities for inadvertent errors. Some examples of these changes not documented by the doctors included aspirin, clopidogrel and bisoprolol being newly started, doxazosin and clopidogrel being stopped and digoxin and furosemide doses being increased. One hundred per cent compliance with standard one demonstrates that pharmacists are well placed to document changes on eTTAs. Standard three was not achieved, with 29% of changes not updated on GPs’ records. A possible reason for this may have been due to four eTTAs which were scanned into the GPs’ computer but the patients’ prescription lists not updated. Maybe the GP had the intention of updating the record later or maybe they wanted to review the patient first. If updated, compliance of 87% would have been achieved. Furthermore, some changes may have intentionally not been accepted by the GP and some included over-the-counter medicines that may not have been needed on the GPs’ list of prescriptions. Limitations of our methodology were that we were not able to ascertain if changes were intentionally not accepted by GPs or whether or not patients intended to purchase medication that was available over the counter. Future work could also look at whether reasons for changes are documented on eTTAs and also carry out a risk assessment on the severity of drugs omitted. The study demonstrates that a pharmacist proactively documenting medication changes on eTTAs improves communication with primary care and reduces the risk of inadvertent error by GPs.

REFERENCES


<table>
<thead>
<tr>
<th>Type of medication change</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newly started medication</td>
<td>41</td>
</tr>
<tr>
<td>Medication stopped</td>
<td>14</td>
</tr>
<tr>
<td>Missed from drug history</td>
<td>10</td>
</tr>
<tr>
<td>Dose adjustment</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1. Types of implemented medication changes documented by pharmacist but not hospital doctor
Venous thromboembolic prophylaxis for medical in-patients—an audit

Gibson DA, McCulloch A
Darlington Memorial Hospital. County Durham and Darlington Foundation Trust

In September 2008 the Department of Health published venous thromboembolism (VTE) risk assessment tools for all patients admitted to hospital. The guidelines associated with this tool recommended a local assessment be conducted looking at current practice in individual hospitals. NICE guidelines were published in January 2010 for the management of VTE prophylaxis in hospitalised patients. It was felt following the publication of these two documents that re-examining the study hospital needed auditing and brought in line with best evidence based practice.

OBJECTIVE
Review the current VTE prophylaxis practices for medical patients at the study hospital and establish compliance with best practice national guidance.

METHODS
Data was collected retrospectively for patients admitted to medicine at the study hospital during a two-week period. Patients admitted to CCU or had a stay of less than 48 hours were excluded. The following data was retrieved from review of the drugs chart, patients’ medical and nursing documentation:

- Age, sex, hospital identification number, height, weight and mobility were obtained from nursing documentation
- Estimated renal function was calculated using Cockcroft and Gault.
- Whether the patient had enoxaparin prescribed and at what dose.
- The presence of risk factors Including Age>60 years, BMI >30, previous VTE, malignancy, CCF, recent MI, severe infection, IBD, rheumatic disease, nephritic syndrome, hormone therapy, pregnancy, immobility, recent surgery, thrombotic states and recent fracture.
- Contraindications to LMWH. Including anticoagulation, recent gastric ulcer, high bleeding risk (included haemophilia, low platelet count, recent stroke, high BP, severe liver disease, recent neurosurgery or lumbar puncture/ epidural/ spinal) bacterial endocarditis, end of life pathway and sensitivity to LMWH.

RESULTS
During the two-week period 178 patients matched the inclusion criteria: 79 male and 99 female. The average age was 67.8 with an age range of 16 to 100. The average weight of patients included in the study was 69.1kg.

The mean number of risk factors per patient was 2.46 (standard deviation 1.09, 95% confidence interval 0.198). Immobility was the most common risk with 73.6% of patients. Age over 60 years was not far behind with 70.0% of patients. Other significant risk factors included BMI >30 (16.9%), malignancy (7.9%), CCF (11.8%), severe infection (32.6%) and thrombotic state (10.1%). There were no pregnant patients and few patients who had either recent surgery (1.1%) or a recent fracture (3.4%). This is because these groups of patients would be more likely to be admitted to obstetric, surgical or orthopaedic wards.

Sixty-two patients (34.9%) had contraindications to thrombembolic prophylaxis with LMWH. As any of these contraindications means the patient should not be considered for thromboembolic prophylaxis they were excluded from further analysis. It is worth noting however that three of these patients did actually receive thromboembolic prophylaxis.

Table 1 Comparison of how many patients received enoxaparin with number of patients with each number of risk factors

<table>
<thead>
<tr>
<th>Number of risk factors</th>
<th>Number of patients CI to enoxaparin</th>
<th>Number of patients received enoxaparin</th>
<th>Percentage of patients received enoxaparin</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>13</td>
<td>1</td>
<td>7.69</td>
</tr>
<tr>
<td>2</td>
<td>36</td>
<td>9</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>39</td>
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<td>25.6</td>
</tr>
<tr>
<td>4</td>
<td>21</td>
<td>7</td>
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</tr>
<tr>
<td>5</td>
<td>4</td>
<td>3</td>
<td>75</td>
</tr>
</tbody>
</table>

One hundred and sixteen of the 178 (65.1%) patients were eligible for thromboprophylaxis. Of these 116 only 30 received enoxaparin (25.8%). As the number of risk factors individual patients had present increased so the likelihood of that patient receiving enoxaparin also increased (Table 1).

As can be seen from Table 1, there is a linear relationship between number of risk factors per patient and percentage of patients who received thromboprophylaxis. The Pearson’s Correlation Coefficient was calculated, r= 0.921, showing a strong correlation between number of risk factors and prescribing rates for LMWH. A correlation between risk and LMWH prescribing does not imply a causal relationship between the two variables.

DISCUSSION
This study demonstrated a low rate of VTE prophylaxis prescribing for medical patients, which is consistent with other studies.1–4 The strong correlation between number of risk factors and VTE prophylaxis prescribing may be because prescribers are performing a VTE risk assessment but have a high threshold for initiating treatment.

A novel opt out approach to risk assessment was developed by the study authors. As over 65 percent of patients were eligible for VTE prophylaxis a change in perspective was needed. It is not known how VTE risk factors combine and therefore no validated and simple VTE risk assessment tools are available. Wells score can be used to aid diagnosis of VTE but not to predict risk. Instead of thinking who needs treatment, a strategy assuming everyone was eligible for treatment was adopted. An assessment is conducted to determine which patients have contraindications to thromboprophylaxis. All members of staff are being encouraged to perform this risk assessment including doctors, nurses, pharmacists and technicians. Patients who were at low risk or had contraindications to thromboprophylaxis can have their thromboprophylaxis discontinued. There are a number of advantages to this including the fact that a complex VTE risk assessment is not required for all patients, all levels of staff can be empowered to participate in VTE prophylaxis and high rates of VTE prophylaxis should be achieved. Potential problems include that patients with contraindications to thromboprophylaxis may receive LMWH.

This policy is currently being introduced and will be re-audited after four months. The aim is to achieve high rates of thromboprophylaxis prescribing for patients who need it whilst ensuring a risk assessment is performed to make sure patients with contraindications are excluded.

REFERENCES
2. NICE. Venous thromboembolism—reducing the risk. January 2010
Audit of intravenous drug administration and arterial line infusions in Cheshire and Merseyside Critical Care Network (CMCCN)

Hughes D*, Barton G†, Gibson L‡,
Wirral University Teaching Hospitals NHS Foundation Trust (WUTH), Upton; St Helens and Knowsley Teaching Hospitals NHS Trust, Whiston; Southport and Ormskirk NHS Trust, Southport.

The intravenous route is the most common route of drug administration on critical care units. Intravenous drug administration can be particularly hazardous on critical care due to complex drug regimes, multiple concurrent infusions and the unstable nature of patients. In response to 800 incidents, the National Patient Safety Agency (NPSA) issued guidance on the safer use of injectable medicines, this specifically recommended regular audit in this area.

A recent multinational study of parenteral administration in critical care units found a prevalence of parenteral administration errors of 74.5 events per 100 patient days. Only 19% of the 113 units involved reported no parenteral administration errors in the 24 hour study period. 12 of 1328 patients enrolled in the audit experienced permanent harm or death as a direct result of an administration error highlighting that intravenous administration is a patient safety issue on critical care units.

The NPSA has also released an alert about arterial line infusions. Only sodium chloride 0.9% should be infused via arterial lines and this must be prescribed and checked. The Wirral University Teaching Hospitals Medicines Management Policy (MMP) and other Trust’s policies require all parenteral medicines to be prescribed and the drug to be labelled. The label must include the drug, dose, volume, diluent, patient’s name, date and time of preparation, expiry and the names of the people preparing and checking the infusion. Drug administration must comply with a legally valid prescription/authorisation and be signed for on the prescription chart.

OBJECTIVES

- To measure compliance with prescribing of arterial line infusions against NPSA recommendations.
- To assess accuracy of intravenous drug administration against the written instructions on the prescription, as required by MMP4.
- To assess labelling of intravenous drug infusions against the MMP4 standards.
- To determine whether administration of intravenous drugs is documented on the prescription chart in accordance with MMP4 requirements.

METHOD

The CMCCN pharmacist group decided to conduct the audit as a ‘snapshot’, and capture data only for drugs being administered at the time of the audit. A prospective audit would have been impractical and may have altered the outcome. A data collection form was designed and piloted in each unit. Modifications were made to reduce ambiguity. The aim was to collect data for 10 patients per site over a period of 4 weeks in May/June 2009.

The pharmacist or nurse completed the data collection form recording general patient data, the total number of intravenous drugs prescribed and the total running at the time of the audit. For each intravenous drug or arterial line infusion being administered, more detailed information was recorded: completeness of label, details of compatibility of reconstitution fluid and Y-site compatibility (if applicable), safety of administration including use of volumetric pump, documentation on the prescription chart and checking against prescription.

RESULTS

Seven critical care units took part in the audit and 71 patients were included. Seven hundred intravenous drugs or arterial line infusions were prescribed for these patients and data were collected for 345 running at the time the audit was conducted.

70% (30/43) of arterial line infusions running at the time of audit were not prescribed.

13% (44/345) of drugs running were not prescribed, this included three noradrenaline infusions that were prescribed but were running at a higher rate than the range authorised. Of the drugs not prescribed 68% (30/44) were arterial line infusions.

100% of all drugs being infused at the time of audit were given via an appropriate pump, diluted in a compatible fluid and administered via a central line if required. There was one incident of precipitation in the line; all other infusions running together were compatible.

69% of drug labels did not contain all of the required information. The majority of labelling errors related to expiry with 56% not recorded or incorrect, followed by 21% missing route and 23% missing second check signature. The dose of the drug was missing in 3% of labels and patient name was missing in 2%.

87% of drugs were documented on the prescription chart (26% were double signed).

DISCUSSION

Local education is needed for prescribers regarding the requirement to prescribe all parenterals including arterial line infusions and therefore comply with the Medicines Act 1968 and NPSA arterial line alert.

Drug labelling and drug chart documentation requirements need to be reinforced with nursing staff. Consideration should be given to double signing prescription charts; a second check is required by the NPSA arterial line alert and documentation of this check is essential to prove that it has occurred.

As a result of this audit practice has changed at one hospital which previously did not document continuous infusions on the drug chart. Another hospital has implemented a system for signing on shift changes that all infusions are running correctly and according to the prescription and there is an increased awareness of the requirement to prescribe arterial line infusions. The CMCCN group aim to re-audit later this year.

There are several limitations of this audit: the prescription that we audited against was frequently incomplete, some data collection forms were incomplete and the data collection form was also subject to ambiguity. The ‘snapshot’ nature of the audit meant intermittent infusions and boluses were likely to be missed, timing of data collection varied between units, the contents of the infusions bags could not be confirmed as preparation was not witnessed and not all Trusts in the region were able to participate in the audit.

REFERENCES

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Antimicrobial prescribing audit at Newham University Hospital

Krajnc A, Rosmarin C, Shaikh U, Davidson I, Wilson P
Newham University Hospital NHS Trust, London

Inappropriate use of antibiotics contributes to Clostridium difficile infections in vulnerable patients and emergence of multi-resistant bacteria. The Government has acknowledged this problem through the Winning Ways document, where it called for prudent antibiotic prescribing, and Saving Lives, where detailed strategies on antimicrobial policies were set out and regular auditing of local prescribing against local policy was recommended.

The purpose of this study was to assess antimicrobial prescribing in our hospital against the recommendations in our antimicrobial guideline and to compare outcomes to the previous year’s audit.

OBJECTIVES
The following audit standards apply for all prescriptions, expecting 100% compliance:

- Clinical indication will be recorded in the medical notes
- Duration of treatment recorded in the medical notes or the drug chart
- Adherence to the guideline for treatment of urinary tract infections (UTI) and community acquired pneumonia (CAP)
- Adherence to guidelines or microbiology recommendation

METHOD
A point prevalence audit was carried out on 12 May 2009 at Newham University Hospital in which pharmacists recorded details of all inpatients on systemic antimicrobials. Data was collected using an audit tool and details from patients’ medicine charts, medical notes and patients’ electronic records. Details recorded included patients’ demographic and clinical details, antimicrobial indication, dose, route and frequency and duration of treatment.

RESULTS
Bed occupancy on the day was 352 and total number of medicine charts seen throughout the day were 350. The number of patients treated with one or more antimicrobials was 107 (30.6%). There were 173 prescriptions for antimicrobials, therefore averaging 1.6 antimicrobial per patient. Of these, 64 (37%) were administered intravenously and 109 (63%) were administered orally. There were 137 (79%) antimicrobials prescribed for the treatment of infections; 22 (13%) were prescribed for prophylaxis of infections and the indications for use were not clear or unknown for the remaining 14 (8%). Metronidazole was the most commonly prescribed antibiotic (11%) followed by amoxicillin, clarithromycin (8% each), co-amoxiclav (6%) and fluclaxacillin (6%).

The clinical indication was documented for 159 (92%) prescriptions but the duration of treatment was stated for only 30 (17%), of which 27 (90%) were documented with appropriate length of antibiotic treatment.

The local antimicrobial guideline was followed for all seven patients with UTI (100%) and 11 of 12 (92%) patients with CAP were treated according to guidelines or microbiology advice.

First line antimicrobials accounted for 99 (57.5%) of prescriptions, with a further 35 (20%) recommended/approved by the microbiologist. There were 7 (4%) prescriptions that used second line antimicrobials.

The indication was not clear for 7 (4%) prescriptions, not stated for 14 (8.1%) prescriptions and deviated from guidelines for 11 (6.3%) prescriptions. Therefore it was not possible to confirm guidelines/recommendations were being adhered to for 32 (18.5%) prescriptions.

DISCUSSION
This year’s figures show that the patterns of antimicrobial prescribing remained very similar to the audit conducted last year and to those studies reported previously (see Table1).

The audit shows continued lack of documentation of the duration of treatment. The future plan is to implement a stop/review date policy in the Trust to address this issue.

The audit highlighted the inability to assess the appropriateness of prescribing in 18.5% of patients. Following last year’s audit we implemented a new antimicrobial guideline and had copies attached to the medical notes trolleys on the wards. This intervention made no difference to this year’s audit outcome. The Trust plans to implement a handheld antimicrobial guide as an aid to improve compliance to guidelines and will continue to educate prescribers on the importance of recording the indication clearly in the medical notes.

ACKNOWLEDGEMENTS
Dr Kieran Hand whose adapted audit tool was used in our audit and pharmacists in the Newham University Hospital that took part in the study.

REFERENCES

Table 1. Prescribing of antimicrobials across hospitals in the United Kingdom

<table>
<thead>
<tr>
<th>Number of patients</th>
<th>Patients on antimicrobials</th>
<th>IV antimicrobials prescribed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newham 2009</td>
<td>350</td>
<td>30.6%</td>
</tr>
<tr>
<td>Newham 2008</td>
<td>341</td>
<td>30%</td>
</tr>
<tr>
<td>London</td>
<td>2,656</td>
<td>33%</td>
</tr>
<tr>
<td>Southampton</td>
<td>904</td>
<td>34%</td>
</tr>
<tr>
<td>Scotland</td>
<td>3,826</td>
<td>28.3%</td>
</tr>
</tbody>
</table>

Table 2. Percentage achieved for the standards set

<table>
<thead>
<tr>
<th>Standard set for all prescriptions</th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical indication recorded in the medical notes</td>
<td>92%</td>
<td>94%</td>
</tr>
<tr>
<td>Treatment duration recorded in the medical notes or medicines chart</td>
<td>17%</td>
<td>18%</td>
</tr>
<tr>
<td>Adherence to local guideline for treatment of CAP</td>
<td>92%</td>
<td>100%</td>
</tr>
<tr>
<td>Adherence to local guideline for treatment of UTI</td>
<td>100%</td>
<td>80%</td>
</tr>
<tr>
<td>Adherence to guidelines or microbiology recommendation</td>
<td>81.5%</td>
<td>–</td>
</tr>
</tbody>
</table>
Prescriptions for restricted antibiotics: An audit of appropriateness at an acute general hospital

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Restricted antibiotics are generally broad spectrum antibiotics for which resistance develops rapidly. Patients treated with these antibiotics are often at increased risk of developing healthcare associated infections (HCAI), particularly Clostridium difficile infections. Prudent use of antibiotics and restriction of certain antibiotics will reduce the risk of antibiotic resistance and development of HCAIs.

Point prevalence antibiotic audit results within the trust (2007 to 2009) revealed that less than 53% of restricted antibiotics were appropriately prescribed. These audits also showed that documentation of indication for treatment (67%) and review of the antibiotic within five days (36%) was poor.

As a consequence of these findings, a new drug chart was introduced in December 2009. The drug chart includes a separate section for antimicrobials. Each antimicrobial prescription has a section for documenting clinical indication and administration limited to five days.

OBJECTIVES

- Assess the impact of the new drug chart on restricted antibiotic prescribing
- Determine the percentage of prescriptions for restricted antibiotics which
  - are appropriately prescribed (i.e. either according to specified indications or following recommendation by consultant microbiologists).
  - have documentation of clinical indication.

STANDARDS

1. 100% of prescriptions for restricted antibiotics must be according to the trust antimicrobial guidelines or following recommendation from the microbiology team
2. In every case (100%), indication must be documented and evidence of review within five days.

METHOD

From February 2010, pharmacists and near patient technicians (NPT) on all wards complete restricted antibiotic monitoring/referral form for every patient prescribed any one of the 10 restricted antibiotics within the trust. To ensure all prescriptions captured, a report is generated daily for all restricted antibiotics dispensed using the trust's medication dispensing system JAC. Restricted antibiotics are stocked on a limited number of wards: ITU (all antibiotics), GI surgery and GI medicine (meropenem), general surgical wards (teicoplanin). On these wards, full data was captured by asking the pharmacists and NPTs to be extra vigilant.

Data collected with antibiotic audits/monitoring include: patient details, antibiotic prescribed, dose, frequency of administration, indication, duration (if documented), sources of documentation (drug chart or notes) and whether there was evidence of micro approval recorded in the notes.

This report presents an analysis of the data obtained in the first two weeks of monitoring.

EXCLUSION CRITERIA

Patients on day surgical wards and outpatient clinics were excluded from the audit.

RESULTS

During the first two weeks, there were 63 prescriptions of restricted antibiotics within the trust. In 52 antibiotic prescriptions (86%) indication was documented on the drug chart or notes. The format of the new drug chart ensures that all antibiotics are reviewed within five days.

Of the 63 prescriptions, 41 (65%) were prescribed according to the trust’s antibiotic guidelines or had been recommended by microbiology.

DISCUSSION

The results show that documentation of indication for prescribed antibiotics has improved with the introduction of the new drug chart. Documentation of indication for all antibiotics has now increased to more than 83% (in house data) compared to the previous value of 67%. This improvement is also reflected in current reported audit on restricted antibiotic prescribing (documented indication in 86% of prescriptions). This likely to be a result of the newly designed drug chart which includes a specific section for documenting the indication of each prescribed antibiotic.

Although the results indicated that standard 1 was not met, there was an improvement compared to previous years; 65% compared with < 53% of the restricted antibiotics prescribed were for the specified indications on the trust antibiotic policy or following recommendation by microbiology.

Although there has been a significant increase in the documentation of indication for antibiotics prescribed, this is still below the standard of 100%. This result is expected to improve further with continuous use of the new drug chart, feedback of audit results to medical, nursing and pharmacy staff and also divisional clinical managers and introduction of a specific restricted antibiotics guideline within the antibiotic policy.

CONCLUSION

Redesigning of the drug chart and regular feedback of audit results to prescribers has improved antibiotic prescribing with regards to documentation of indication and review of antibiotic prescriptions within five days. Although below the standard of 100%, appropriate prescribing of restricted antibiotics has also improved (65% compared to less than 53% previously). Further awareness training and introduction of a specific restricted antibiotic guideline is planned along with continuous analysis of data collected (re-audits) on restricted antibiotics and feedback to prescribers and clinical managers. A system of promptly reviewing all inappropriate prescriptions and an introduction of microbiology/antimicrobial pharmacist ward rounds is also being considered.

REFERENCES

Audit of anti-tuberculosis drugs toxicity monitoring – adherence to local trust guidelines

Hau TY, Capstick TGD
Leeds Teaching Hospitals NHS Trust

Treatment for tuberculosis (TB) and chemoprophylaxis for latent tuberculosis infection (LTBI) requires a long course of multiple antibiotics. For the treatment of TB, isoniazid, rifampicin, ethambutol and pyrazinamide are taken for the initial two months, with isoniazid and rifampicin continued for another four months. For LTBI, a three-month course of isoniazid and rifampicin, or six months of isoniazid alone is needed. Since isoniazid, rifampicin and pyrazinamide are potentially hepatotoxic, routine liver function tests (LFTs) are recommended for all patients. The British Thoracic Society1 and the American Thoracic Society2 both recommend that LFTs should be checked prior to treatment initiation, and frequently thereafter. Our Trust’s guidelines recommend that all patients prescribed TB treatment should have LFTs checked at week 0, 2, 4 and 8; and patients prescribed LTBI treatment should have LFTs checked at week 0, 4 and 8. This is because of previous cases of hepatotoxicity on treatment.

OBJECTIVES
1. To determine whether patients prescribed treatment for TB or LTBI have LFTs monitored according to the local trust guidelines.
2. To determine the mean time for hepatotoxicity to develop in order to determine the effectiveness of intensive LFTs monitoring.

METHOD
All TB and LTBI patients attending the Tuberculosis Clinic were included to check whether they have LFTs monitored accordingly. The Trust’s results server was accessed to record all LFTs performed by the Tuberculosis Clinic for current TB and LTBI patients. Patients diagnosed with multi-drug resistant tuberculosis were excluded from this audit. The LFT results recorded were then analysed using Microsoft Excel, to determine the adherence to the Trust guidelines, and to find out the mean time for hepatotoxicity to develop.

RESULTS
A total of 104 TB patients were included in this audit, and the percentage of patients with LFTs checked at each recommended time point is presented in Table 1. A total of 29 patients had raised LFTs during the period of this audit, of which 22 had normal LFTs at baseline. Fifteen patients had LFTs elevated to at least two times the upper limit of normal, of whom only one patient had LFTs raised more than five times the upper limit. Eleven patients (73.3%) with raised LFTs were identified within the eight-week period of intensive monitoring. The mean time to develop raised LFTs was 4.27 weeks; 41% (n=9) were first identified at week 2; 32% (n=7) at week 4 and 27% (n=6) at week 8. A total of 121 patients with LTBI were also included in this audit, and the percentage of patients with LFTs checked at each recommended time point is presented in Table 2. Nine patients who had normal baseline levels developed abnormal LFTs during treatment, and they were all identified at week 4 (100%).

DISCUSSION
Adherence to the local Trust guidelines for monitoring for hepatotoxicity with antituberculosis drugs was good at week 0 but started to decline as patients got further into the treatment course. This should be improved for TB patients because the importance of LFTs monitoring during the first eight weeks was demonstrated by the fact that three quarters of patients with significantly raised LFTs during TB treatment were identified in this period. Intensive monitoring of LFTs during TB treatment may potentially allow the prompt identification of patients developing early toxicity before serious hepatotoxicity results, although this audit cannot confirm prove this to be the case. For LTBI patients, as all abnormal LFTs were first identified at Week 4, it may be possible to omit the tests at Week 8.

REFERENCES
The role of the pharmacy technician in training inhaler technique for patients with chronic obstructive pulmonary disease

Lees CAL, Capstick TGD
Pharmacy Department, Leeds Teaching Hospitals NHS Trust

Chronic Obstructive Pulmonary Disease (COPD) is a major health care problem, affecting more than 900,000 people in the UK. The disease consists of inflammation, bronchoconstriction and airflow obstruction, which are irreversible or only partly reversible.

Treating COPD is vital to reduce symptoms such as shortness of breath and exacerbation frequency. Inhalers are used to deliver medication to the lungs; however, there are many types of device available, each requiring different inhalation techniques. In previous studies, up to 85% of patients were unable to use their inhalers correctly. Consequently, although patients might receive treatment, a lack of proper education and training in correct inhaler technique may result in suboptimal therapeutic benefit. This could potentially result in unnecessary changes to or increased medication, thereby increasing overall costs.

The National Institute for Health and Clinical Excellence (NICE) recommend that patients should have their ability to use an inhaler device regularly assessed by a competent healthcare professional and, if necessary, should be re-taught the correct technique. This is the first time that a pharmacy technician has audited inhaler technique in COPD patients.

OBJECTIVES
- To quantify how many COPD patients can use inhaler devices during hospital admission.
- To determine whether training by a pharmacy technician improves inhaler technique.

METHODS

Patients were included if they had a diagnosis of COPD, were English speakers, had an Abbreviated Mental Test Score above 4, and used at least one inhaler. All patients were assessed during hospital admission for an exacerbation of COPD and were stable enough to have inspiratory flow rate and inhaler technique assessed.

Inspiratory flow rate was assessed using an In-Check DIAL inspiratory flow meter and inhaler technique was assessed according to a checklist. Inspiratory flow rate and inhaler technique was assessed before and after training provided by the pharmacy technician for each device.

Patients were asked to demonstrate technique for all devices that they were familiar with. However for unfamiliar devices, a prompt card (based on technique described by individual patient information leaflets) was provided for the patient to read and demonstrate how they thought they should use the device. Inhaler technique was assessed as satisfactory or poor based on a checklist of essential steps required to use each device correctly. If technique was poor, the pharmacy technician demonstrated correct inhaler technique and the patient was asked to demonstrate inhaler technique again. This was repeated up to three times.

RESULTS

Data were obtained for 30 patients of whom 26 were female. The mean age was 67 years (range 44–78), and mean documented FEV1 (available for 11 patients) was 34%. The inspiratory flow rate before and after training is presented in Table 1. All patients were able to inhale through all dry powder inhaler (DPI) devices within the optimal range before and after training. However prior to training the mean inspiratory flow rate when testing for an MDI was too fast at 80 L/min, but after training was 46 L/min.

The percentage of patients able to use each device increased for all devices after training (Table 2). The biggest increase was for the MDI where the number of patients that were able to use this device increased from 7 to 25 after training. The absolute numbers of patients able to use each device after training increased from 16 to 30 for the Accuhaler, 16 to 29 for the Turbohaler, 13 to 16 for the HandiHaler and 6 to 9 for the Respimat.

DISCUSSION

Checking patients’ inspiratory flow rate for different inhaler devices is of prime importance as it identifies if they have sufficient inspiratory capacity to use a prescribed device. There was a profound trend for all patients to have a fast inhalation rates for all devices. This is appropriate for DPIs as patients are required to breathe in as fast and deep as possible, but not good for MDIs where the inhalation needs to be slow and deep. However training did improve the inspiratory flow rate in all patients such that they were able to inhale through the MDIs at the optimal inspiratory flow.

Prior to training only a quarter of patients could use MDIs and only a half could use Accuhalers and Turbohalers, demonstrating that many patients are prescribed devices without adequate education. After training, each patient could use all DPIs and the Respimat. However only 83% of patients could use MDIs adequately, which suggests that DPIs should be the preferred device for most COPD patients.

Large increases in the number of patients who could use different inhaler devices after training demonstrates that Pharmacy Technicians are competent at providing inhaler technique training, proving that they have the expertise to extend their role.

REFERENCES
An audit of the use of imatinib in patients with chronic myeloid leukaemia (CML) against national recommendations*

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Singleton Hospital, Swansea

Approximately 95% of cases of Chronic Myeloid Leukaemia (CML) exhibit the Philadelphia chromosome. Imatinib mesylate was the first in a new class of drugs called signal transduction inhibitors and was found to be a specific inhibitor of the BCR-ABL fusion protein that results from the Philadelphia chromosome.1

The British Committee for Standards in Haematology (BCSH)2 and European Leukaemia-Net (ELN)3 have published recommendations on the appropriate use and monitoring of imatinib in patients with CML. These recommend that patients presenting with CML in the chronic phase receive imatinib 400mg daily and those presenting in accelerated phase receive 600mg or 800mg daily. The guidelines also recommend that haematological monitoring is performed every two weeks until complete haematological response occurs (CHR), that cytogenetic monitoring is performed every three to six months until complete cytogenetic response (CCyR) and then that the mainstay of monitoring should be molecular monitoring for BCR-ABL transcripts performed every three months indefinitely.

This audit aimed to determine if Abertawe Bro Morgannwg (ABM) University NHS Trust is using imatinib in compliance with the recommended guidelines for patients with Philadelphia-positive CML.

OBJECTIVES
1. Identify all patients within ABM University NHS Trust who have received treatment for Philadelphia-positive CML during the period from 1 January 2007 to 30 June 2009.
2. Identify how many of the identified patients have received treatment with imatinib.
3. Determine if these patients received the appropriate dose.
4. Determine if haematological monitoring, cytogenetic monitoring and molecular monitoring for these patients has been performed in accordance with the BCSH and ELN guidelines.
5. If monitoring is not in accordance with the guidelines, determine the reason why.
6. For patients not receiving imatinib, identify what other treatments they have received and identify any documented reasons why they are on this treatment.

METHOD
Patients with a diagnosis of CML were identified by a haematology consultant, using clinical coding. A data collection form was developed. Patient medical records were obtained through the clinical audit office.

RESULTS
Twenty-six patients were identified who had received treatment with imatinib. The majority (92%) of patients presented in the chronic phase and of these, 96% were started on the correct dose of imatinib.

Less than half of the patients on imatinib (39%) had haematologic monitoring performed every two weeks until CHR was achieved. Just over half of the patients on imatinib (53%) had cytogenetic monitoring performed every seven to 12 months until CCyR was achieved, whereas only 24% of patients had cytogenetic monitoring performed at the recommended three- to six-monthly intervals. The total average interval of BCR-ABL molecular monitoring once CCyR was achieved was 11.1 months up to the end of 2006. Data from 1 January 2007 until 30 June 2009 showed that this had improved to every 4.7 months on average. Only five out of 19 patients had the recommended four BCR-ABL tests in the 12-month period 1 July 2008 to 30 June 2009.

At the end of the audit period, 18 of the 25 patients still alive were taking imatinib. Six of the other patients were being treated with either dasatinib or interferon-alfa and one patient was taking no treatment for CML.

DISCUSSION
This audit found that patients presenting with chronic phase CML are largely being started on the correct dose of imatinib. Haematological monitoring is being carried out less frequently than is recommended, as is cytogenetic monitoring. Molecular monitoring has shown improvement in practice since the BCSH and ELN recommendations were published in 2006/07, however in the 12-month period 1 July 2008 to 30 June 2009, just over 25% of patients had monitoring in line with the recommendations.

Some results were unable to be located in patient medical records, leading to the exclusion of patients for some aspects of analysis.

Following this audit, the auditor has developed a proforma which is designed to allow the recording of results from cytogenetic and haematologic monitoring. The proforma is to be placed in the medical records of patients receiving imatinib for CML and will enable clinicians to clearly identify when monitoring is due and will make the re-auditing of this topic much simpler.

REFERENCES
RESEARCH

Public awareness of the yellow card scheme for reporting ADRs

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School of Pharmacy and Chemistry, Kingston University, Kingston upon Thames

Monitoring of Adverse Drug Reactions (ADRs) is an essential component of a Pharmacovigilance framework and the scheme for spontaneous reporting of ADRs has been in operation in the UK since 1964. This scheme is commonly known as the Yellow Card Scheme (YCS) from the cards used to make the report to the regulatory authority. Up until 2005 reporting was restricted to health care professionals. Direct patient reporting was recommended in a review of the YCS in 2004.1 A limited pilot exercise was carried out in 2005, followed by a nationwide pilot from October 2005. In 2007 1,652 suspect reports were received from patients which were of equivalent detail to those provided by healthcare professionals and contained greater detail.2 Based on this YCS reporting was formally established for patients from February 2008.3 In 2008 10% of UK spontaneous suspected ADR reports were received from patients.2 Although encouraging these numbers are still relatively small. Under-reporting has been a feature of spontaneous reporting schemes for ADRs over many years.1

One potential reason for under-reporting may be a lack of knowledge of the existence of the scheme. The MHRA initially distributed forms for patients through community pharmacies and GP surgeries and since 2008 has had a communications campaign via community pharmacies. This study was carried out with a sample of the general public during the national pilot. It was set up to evaluate the awareness of the YCS in members of the public during this period.

OBJECTIVES

- To identify whether members of the public know that they are able to report an ADR to a regulatory authority
- To identify whether members of the public have heard of the YCS
- To determine whether low reporting of ADRs is due to lack of patient awareness.

METHOD

The study was carried out in a sample of members of the public employed in a large retail store. Those under 16 years were excluded, as were those who did not speak English or had lived in the UK for less than a year. A short questionnaire with 13 questions on the subject with a further three demographic (age, gender, educational qualification) was prepared. Closed questions were used to identify whether participants had knowledge of the YCS, if they had been previously informed of the YCS and their impressions now they were aware. Information was also collected on whether they were on medication and if they had suffered from a medicine side effect in the past. An introduction to the study was included in each questionnaire which fulfilled the role of participant information. The questionnaires were distributed randomly to staff with further verbal information. The questionnaires were completed anonymously and returned over the following week. A total of 260 questionnaires were distributed and 154 (59%) returned. The data collected was collated and tabulated using Excel. A number of the relationships were statistically tested using chi² and unpaired t-test. The study was approved by the store’s HR department and the Kingston University Science Faculty Research Ethics Committee.

RESULTS

There were 85 (55%) female participants, 64 (42%) male and five (3%) who did not state their gender. The mean age of participants was 32.4 ± 12.4 SD. There was no statistical difference between the age of men and women (unpaired t-test). Most participants, 130 (84%), were unaware that they were able to report a medicine to a government body, with a larger number, 137 (89%), unaware of the existence of the YCS. Of the 17 respondents who were aware of the existence of the YCS, 10 knew it was for the reporting of medicine side effects. Around a quarter (26%) of the participants were currently taking a medicine and 36 (23%) of participants reported that they had suffered a medicine side effect. One participant who had suffered a side effect had reported it using the YCS as well as to their GP, while the remainder had reported it to a healthcare professional or not at all. This data are summarised in Table 1.

Only four (10%) of the participants currently on medication reported that they had been informed of the YCS before taking their medicine. A large majority of participants; 133 (89%) indicated that they would now report a side effect using the YCS knowing that such a scheme is available to them, 61 (39%) would report using the YCS rather than reporting to their GP while 26 (17%) reported they would report to both. The YCS was felt to be a useful scheme by 141 (92%) of participants. Almost all; 147 (96%) felt that at that time there was not enough awareness of the YCS. Suggestions on how awareness of the YCS could be increased included TV/radio; 37%, posters; 19%, magazines; and 37% through the GP, pharmacist or nurse. There was no significant difference (chi²) between the responses of those participants on medication with respect to knowledge of the YCS.

DISCUSSION

The study findings have identified that the awareness of the YCS during the national pilot period was very low, almost 90% and there was no difference between those on medication and those not. The sample was relatively young and many were not on regular medication so they may not have been a representative sample and plans were made to conduct a similar study amongst patients. The participants did overwhelmingly agree that the YCS was valuable and they would use it.

The methods suggested by the sample were more diverse than the strategy used by the MHRA. In addition to using healthcare professional routes the sample suggested a range of media advertising routes such as TV, radio and posters magazines.

CONCLUSION

At the time of this study awareness of the YCS amongst a sample of the general public was very low, but participants were positive on the scheme’s value and would use it.

REFERENCES


Table 1. Participants’ reporting of side effect ( n=36)

<table>
<thead>
<tr>
<th>Health care professional/Agency</th>
<th>Number of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General practitioner</td>
<td>18 (48%)</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>4 (11%)</td>
</tr>
<tr>
<td>Nurse</td>
<td>5 (14%)</td>
</tr>
<tr>
<td>Yellow Card Scheme (+ GP)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Other healthcare professional</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Did not report side effect at all</td>
<td>8 (21%)</td>
</tr>
</tbody>
</table>

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