**PFIZER PATIENT SAFETY AWARD 2012**

**Improving oxygen management: a patient safety initiative**

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Oxygen should only be used to treat patients who are hypoxic. Breathlessness is not an indication for oxygen therapy. In many acute hospitals throughout the UK oxygen is often neither prescribed nor adjusted to achieve specific target saturations. The National Patient Safety Agency rapid response report 2009 states that underuse or overuse of oxygen can be extremely harmful and have potentially fatal outcomes. This report recommends adjusting oxygen therapy to achieve appropriate oxygen saturations, prescribing oxygen on a drug chart and regularly monitoring patients’ oxygen therapy to achieve targets. These recommendations are supported by the British Thoracic Society guideline on emergency oxygen.

At the study hospital, trust guidelines were developed for using emergency oxygen in adult patients. Guidance included information about which patients should receive oxygen, which delivery devices to use and how oxygen should be prescribed on drug charts. Before the guidelines were implemented a baseline audit was conducted to determine how oxygen was being used in all adult patients in the acute medicine department. In particular, this audit aimed to determine whether oxygen was used safely and prescribed on drug charts. Particular emphasis was placed upon respiratory patients, especially those with asthma and chronic obstructive pulmonary disease (COPD).

**OBJECTIVES**

- To determine how emergency oxygen was used at the study hospital, focusing on safe prescribing and administration compared with NPSA standards.
- Using NPSA and BTS guidelines to implement an emergency oxygen strategy to ensure patients receive oxygen therapy adjusted to targets (saturations of 94–98% for most patients and 88–92% for those at risk of hypercapnic respiratory failure).

**METHOD**

Data was collected for two weeks pre- and two weeks post-implementation of the emergency oxygen guidelines. All patients admitted to the Medical Assessment Unit (MAU) at the study hospital were included in the audit. Each patient was audited following the initial consultant review. This was to allow time for an appropriate plan of care to be implemented. Data was collected on presenting complaint, co-morbidities, oxygen saturations, flow rate and device used to administer oxygen. Information was also collected as to whether oxygen had been prescribed, if target oxygen saturations had been set, whether the oxygen was adjusted to achieve these targets and what the baseline saturations were before starting oxygen.

**RESULTS**

During the pre-implementation audit period 68 patients received oxygen out of 337 patients (20%). Fifty of these 68 (73.5%) had their oxygen saturations measured off oxygen and 67/68 patients (98.5%) had oxygen saturations measured while on oxygen. Of the remaining 50 only 25 (50%) actually required oxygen treatment.

For the post-implementation audit period only 24 patients received oxygen out of 308 admitted (7.7%). Twenty-two patients had appropriate oxygen targets defined and 20 of these patients achieved their targets. Only two patients did not require oxygen therapy. All patients had their oxygen saturations measured and 19 patients had their oxygen prescribed on an appropriate kardex.

**DISCUSSION**

Trust audit and ethical approvals were received for the project. Oxygen is often perceived as a simple treatment that does no harm if given inappropriately.
NPSA alert highlights that 281 serious incidents, 44 with fatal outcomes, were directly due to poor oxygen management. It is essential that all healthcare environments delivering emergency oxygen have a clear strategy to ensure safe delivery to hypoxic patients. To improve the management of oxygen at the study hospital a change of culture was required. Doctors, nurses and pharmacists needed to be educated and empowered to ensure that oxygen was used appropriately.

The project is limited because only two weeks were audited and the oxygen strategy has only been implemented on the MAU currently. The next stage of the project is to ensure that standards are kept high and that 100% of patients have oxygen prescribed appropriately. The aim is then to roll out to other acute areas such as the emergency department and surgical admissions.

By implementing a comprehensive oxygen stewardship programme, including guidelines, education and audit, the appropriate use of oxygen is improving at the study hospital. Benefits include improved patient safety, reduced cost and a multidisciplinary approach to the management of hypoxic patients.

REFERENCES

POSTER AWARD
Reducing unacceptable omitted doses: pharmacy assistant-supported medicine administration
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In response to a national problem with omitted doses, the National Patient Safety Agency (NPSA) published a rapid response report in February 2010 on the potential for harm from omitted and delayed medicines to hospital inpatients.1 Warne et al undertook a point prevalence study of 132 inpatients across four sites in the south-west of England; 104 patients (79%) were found to have at least one missed dose.2 Green et al identified omissions on medical wards at a UK hospital.3 This study reported that 17% of 271 patients had an omitted dose, with 19% of these doses not having any reason. An American study investigated missed bronchodilator doses for non-therapeutic reasons at a 1,000-bed tertiary care institution in Cleveland.4 Over 12 months, 3.5% (40/1,133) of 113,554 doses of bronchodilator medication were missed.

Despite the evidence that doses are omitted, few interventional studies have been undertaken to prevent this. An Australian study showed a significant reduction in missed doses when pharmacy technician facilitated the medication delivery process.5 To date there are no published studies on medicines administration being supported by pharmacy assistants and the impact of this on missed doses.

OBJECTIVES
To evaluate an innovative pharmacy assistant-supported medicines administration system on the rate of omitted doses for hospital inpatients.

METHODS
Pharmacy assistants were trained to support nurses on the 8am and 12pm medicines administration rounds, on two acute wards. Three study groups were: (A) pharmacy assistant-supported medicines administration on intervention ward (the assistant is part of the medicines administration round); (B) intra-ward control: single nurse administering medicines on the intervention ward, where the pharmacy assistant is based but does not actively support medicines administration and (C) inter-ward control: control ward that has no pharmacy assistant. The intervention involved a pharmacy assistant supporting nurses on a medication administration round by double checking medicines, identifying packs, striving to source medicines, reminding nurses to sign, and counter-signing the inpatient treatment chart.

The primary outcome measure was the number of patients with unacceptable omitted doses (UOD) in Group A (intervention) vs Group C (control). Secondary outcome measures were the number of patients with critical UODs (Group A, B, and C); patients with UODs in Groups A vs B and Group B vs C. UODs were defined as unintentional (dose administration not signed for) and intentional but unacceptable (medicine not available on ward and the “other reason” code used but no other reason given). Critical missed doses were defined as being the National Patient Safety Agency.1

Data were collected over two census weeks in December 2011 and February 2012 and entered into MS Access for analysis using SPSS statistical software (student t tests). Advice on NHS research ethics was sought from the Research and Development team at the trust and the project was registered with the Caldicott Guardian for the trust.

RESULTS
Over two weeks the charts of 778 patients were assessed, 308 were male (39.6%), and average age was 75 years (SD ±17.8). There were no significant differences between the groups in terms of gender (P = 0.075) or age (P = 0.084). Twenty-six patients (12.4%) had at least one UOD. The absolute risk reduction in UOD in group A and C was 17.4% (NNT = 59). The UOD rate in the intervention group (A) was 11.2% (two patients) compared with 18.5% (68 patients) in the control group (C) (P = 0.0001; 95% CI = -0.396 to -0.225). Group A had significantly fewer patients with critical UODs (1.1%; two patients) compared with group C (7.4%; 27 patients) (P = 0.03; 95% CI = -0.241 to -0.314). There were significant differences between groups A and B (P = 0.006; 95% CI = -0.181 to -0.023) as well as groups B and C (P = 0.029; 95% CI = -0.139 to -0.006) for number of patients with an OUD. However, no significant differences were found between groups A and B (P = 0.097) and B and C (P = 0.481) for patients with critical UODs (Table 1).

DISCUSSION
Medication safety is a priority for the NHS and omission of doses is a quality criterion against which NHS trusts are assessed. This study has demonstrated a significant reduction in omitted doses through the use of a novel intervention. Pharmacy assistants successfully prevented missed doses in over 98% of patients compared with nurses, where almost one in five doses were omitted. Pharmacy assistants have been able to source medicines and ensure that administrations have been signed for (or a code written), reducing risk of harm to the patient.

The study also showed a significant reduction in missed doses on the intervention ward even when the pharmacy assistant was not supporting the medicines administration process. This can be explained by the Hawthorn effect, with intervention on part of the ward having a positive outcome on the rest of the ward. This is the first study to show pharmacy assistants being used to enhance patient safety by reducing missed doses on general acute wards.

REFERENCES
allow storage of fluids in their original boxes (Figure 1). This stopped the ward drug cupboards. New shelving was constructed and labelled to perform the top-up undertook the delivery of stocks and put them into ward in a more timely fashion. Prior to this, an entry was made in a pharmacy ward book of any items required; this book was returned to pharmacy for dispensing when the pharmacist had finished their rounds. In addition, an ATO delivered and put away patients’ medication into their bedside lockers five times daily; previously a porter delivered these to the ward (five times daily) and nursing staff were responsible for ensuring this reached individual patient lockers.

2. Supply of drugs for individual patients (“dispensing for discharge”) A tablet PC that linked to the dispensary was introduced. This allowed the pharmacist to send “live” orders, thus enabling items to be dispensed earlier in the day, which smoothed workload and helped medication to arrive on the ward. Prior to this, an entry was made in a pharmacy ward book of any items required; this book was returned to pharmacy for dispensing when the pharmacist had finished their rounds. In addition, an ATO delivered and put away patients’ medication into their bedside lockers five times daily; previously a porter delivered these to the ward (five times daily) and nursing staff were responsible for ensuring this reached individual patient lockers.

3. Administration of drugs to patients by nursing staff The ward operates with three nurse teams, where each team is responsible for a group of patients. The system of having one drug trolley shared by three nurses was ended. Three lockable portable cases stocked with the most commonly required drugs, such as antibiotics and analgesics, were introduced. This allowed simultaneous drug rounds to take place in a safe and efficient manner (Figure 2).

RESULTS
The average time spent on a medication round was reduced from 87 to 46 minutes. Direct nursing contact time was measured by the trust Optimal Ward Project team and was found to be higher on D21 than the other wards (65%, range 15–65%).

Availability of medication on the ward was an essential indicator, as this would help prevent missed doses. This was audited in terms of complete medication rounds, where the aim was that on each medication round all of the medicines required for all of the patients on the ward were available and therefore administered. The percentage of medication rounds where all medication required was available on the ward rose from 60% to 86%. This was seen even though the monetary value of stock held on the ward was reduced by 21%.

The overall time spent by the ATO on ward services was reduced by 15 minutes per week, even though the frequency of visits increased. The number of ad-hoc orders received from the ward reduced from a mean of 26 to 10 per month.

DISCUSSION
Over the past 10 years within the NHS there has been a great emphasis on ensuring an appropriate skill mix of staff - ensuring that the most suitable person is allocated to a specific role or task. This has resulted in the introduction of MMTs to deal with the supply of medication to individual patients on a surgical ward.

METHOD
Ward D21 (Vascular Surgery and ENT) was chosen as the pilot ward. This ward had been identified as an “optimal ward” by the trust’s Optimal Ward Project which aims to improve the experience at ward level for patients, staff and visitors. Discussions between pharmacy and ward staff identified areas where improvements could be made. In addition, the pharmacy team visited other hospitals, to see their systems of work, service design and share practice and ideas. The following areas were identified as requiring attention:

1. Supply of stock items The frequency of the pharmacy top-up service was increased from once to twice weekly and the stock list was reviewed and streamlined in light of this increase. Instead of the supplies being delivered to the ward by porters and left for nurses to put away, the assistant technical officer (ATO) who performed the top-up undertook the delivery of stocks and put them into the ward drug cupboards. New shelving was constructed and labelled to allow storage of fluids in their original boxes (Figure 1). This stopped the previous practice of nursing staff decanting fluids onto a racking system, which did not meet health and safety standards. Where a stock item was required outside of top-up (ad-hoc order), the existing system of nurses ordering in their stock requisition was maintained.

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OBJECTIVES
1 Redesign the process for supply and administration of medication to patients on a surgical ward
2 Streamline and improve all aspects of ward medicines management and safety
3 Measure the impact on pharmacy and nurse resources, and patient care

The Optimal Ward Project: Impact of re-engineering pharmacy services
Gill C, Brooks J, Hughes T, Lyndon J, McDonald H, McGgettigan A, Rollason D, Whiles H
Sandwell and West Birmingham Hospitals (SWBH) NHS Trust, Birmingham

Over recent years hospital pharmacy has moved towards adopting a greater patient-focused approach and more effective use of technical staff. This has allowed pharmacists to concentrate on the clinical aspects of patient care, while medicines management technicians (MMTs) take responsibility for the supply of medication. Although this has improved both the discharge process and pharmaceutical care, it was felt that there was still a need to improve the supply and administration of medicines at ward level.

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An audit of thromboprophylaxis in obstetric patients following delivery

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Pulmonary embolism is the leading direct cause of maternal death in the UK and is the second most common cause of maternal death overall (11% of maternal death). Some cases may be prevented by the appropriate use of thromboprophylaxis. The Royal College of Obstetrics and Gynaecology (RCOG) guidelines state that, early on or before their pregnancy, all patients should undergo an assessment of their risk factors for thromboembolism, which should be reviewed after delivery. Depending on the number of risk factors the patient has, she should receive either no treatment, seven days of prophylaxis with low molecular weight heparin (LMWH) or extension of thromboprophylaxis to six weeks as needed.

Although most of the hospital uses an e-discharge system that produces an electronic discharge prescription, the obstetric unit at COCH has not taken up this option at this time, thus all prescription information has to be added by hand. To validate a prescription for thromboprophylaxis, the patient’s weight at the first antenatal appointment, VTE score and method of delivery for each patient, is required. Without this, an accurate assessment is not possible and requires the pharmacist to contact the prescriber or the ward. Feedback from the pharmacy dispensary identified a large number of interventions on discharge prescriptions (DPs) for obstetric patients.

OBJECTIVES
The aim of the audit was to retrospectively review all DPs for thromboprophylaxis in obstetric patients and the objectives were to quantify the interventions made by pharmacists and to identify the most common causes of error on the prescriptions, particularly with regard to appropriate thromboprophylaxis.

METHOD
All DPs issued by the obstetric ward over a four-week period were audited; ethics approval was not required. The prescribing of thromboprophylaxis was audited against the COCH Obstetric VTE prophylaxis policy, which is based on the RCOG guidelines mentioned above. More generic prescribing standards with regard to the inclusion of patient and prescriber details and details of regular medication were audited against the COCH Medicines Policy prescribing standards.

RESULTS
A total of 132 DPs were reviewed, of which 40 (30.3%) were dispensed at ward level, 92 (69.7%) were dispensed in the pharmacy dispensary and 19 (14.4%) were for women who had not yet given birth. Of the 132 DPs reviewed, 131 (99.2%) had the prescriber’s name and signature, 116 (87.9%) had their bleep number, 111 (84.1%) had the patient’s address, 68 (51.5%) had the consultant name, 54 (25.7%) had the patient’s hospital number and 20 (15.1%) had the patient’s date of birth.

Information from the first antenatal appointment showed that 11 (8.3%) patients had other medications prescribed regularly, such as inhalers, but none of the DPs had any additional patients’ own regular medications prescribed on them.

Of the 113 DPs for post-partum patients, 69 (61.1%) contained tinzaparin, 62 (89.9%) of these being dispensed in pharmacy. More detail about these prescriptions is described in Table 1. Twenty-nine post-partum DPs (25.7%) did not have tinzaparin prescribed at all and it was unclear whether this was appropriate due to the lack of VTE scores recorded both on the DP and electronically. Seven of the DPs (10.1%) containing tinzaparin were supplied from a ward level. However, in the absence of a label, it is unclear what, if anything, was actually supplied. For three DPs (2.7%), the patient’s VTE score indicated the need for tinzaparin, but in each case none was prescribed.

DISCUSSION AND CONCLUSION
This audit identifies opportunities to improve thromboprophylaxis prescribing for obstetric patients. These patients differ from other patient groups because of the change in weight following delivery and the influence of delivery method on discharge prophylaxis regimes. If these parameters are not accounted for, the patient is at risk of receiving the incorrect prophylactic regime. Central to this would be the adoption of the electronic discharge prescribing system which would immediately address a number of issues around patient and prescriber demographics and other clinical parameters including patient weight. However, this is soon to be superseded by the introduction of electronic prescribing. In the interim period, a stamp or sticker may be introduced for paper prescriptions which allows the prescriber to confirm the patient’s weight, VTE score and method of delivery to improve the inclusion of this information on the prescription.

To facilitate pharmacist clinical checks, speed up the process and reduce interruptions to the ward, a new Meditech screen is being designed and piloted which pulls all the information together in one place; the intention is to roll this new screen out in the near future. The obstetric ward has requested prelabelled DP packs to issue to patients; clearly on the basis of this audit, it would be inappropriate to provide these until the standard of prescribing improves significantly and the supporting process is more robust. Prescribers also need to be reminded that in addition to newly prescribed items, all patients’ previously prescribed regular medications must be included in the DP.

Since this audit was completed, COCH has been rolling out electronic prescribing and therefore feedback will be carried out once electronic prescribing is in operation on the obstetric unit.

REFERENCES
3 Countess of Chester Hospital. Medicines Policy, 2011.

Table 1: Clinical quality of prescriptions for VTE prophylaxis (n=113)

<table>
<thead>
<tr>
<th>Item</th>
<th>Available on Meditech</th>
<th>Included in the DP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method of delivery</td>
<td>104 (92.0%)</td>
<td>73 (64.6%)</td>
</tr>
<tr>
<td>VTE score</td>
<td>21 (18.6%)</td>
<td>44 (38.9%)</td>
</tr>
<tr>
<td>Weight</td>
<td>109 (96.5%)</td>
<td>8 (7.1%)</td>
</tr>
<tr>
<td>Tinzaparin incorrectly prescribed</td>
<td>n/a</td>
<td>16 (23.1%)</td>
</tr>
<tr>
<td>Incorrect dose of tinzaparin</td>
<td>n/a</td>
<td>8 (11.6%)</td>
</tr>
<tr>
<td>Incorrect course length of tinzaparin</td>
<td>n/a</td>
<td>8 (11.6%)</td>
</tr>
<tr>
<td>Incorrect dose not identified by pharmacy</td>
<td>n/a</td>
<td>1 (4.3%)</td>
</tr>
</tbody>
</table>

*Prescriptions either had the wrong dose or wrong course length, but none had both.

**Table 1: Clinical quality of prescriptions for VTE prophylaxis (n=113)**

Evaluation of factors influencing hospital vocational training (VT) programme objective structured clinical examination (OSCE) assessment performance

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The hospital vocational training (VT) programme is a two-year competency-based training and assessment programme. It was introduced in Northern Ireland in October 2008 to provide workplace-based training primarily for newly qualified hospital pharmacists. Pharmacists undertake four workplace rotations covering the full breadth of hospital pharmacy practice in Northern Ireland, and, on completion, they are assessed using an objective structured clinical examination (OSCE). A formal summative assessment such as this at the end of the programme is important in the health professions, as there is a professional obligation to the public to ensure that practitioners are competent to practise.1

Unfortunately, the performance of pharmacists sitting the VT OSCE assessments to date has not met expectations. Of the 11 pharmacists who sat the VT OSCE assessment in May 2010, none passed all six OSCE stations on the first attempt (range 2 to 4 stations passed). Some improvement in performance was seen in May 2011 when seven of the 20 pharmacists (35%) sitting the assessment passed all six OSCE stations (range 3 to 6 stations passed). It is common for the number of pupils who pass a competency test on the second attempt to rise dramatically, as both students and teachers become more familiar with the format of the test.2 However, a previous evaluation conducted by the author questioned whether other factors could be influencing performance, and recommended exploring this further.

OBJECTIVE
To evaluate factors influencing VT OSCE assessment performance.

METHOD
In September 2011, a link to a short online questionnaire was emailed to all 31 pharmacists who sat the VT OSCE assessments in May 2010 and May 2011. Demographic data and information regarding previous training and experience were collected. Responses were entered into SPSS (version 17.0) and multiple linear regression analyses were conducted to evaluate the influence of a number of factors on an individual’s VT OSCE performance.

The methodology was reviewed and approved by Queen’s University Belfast School of Education Ethics Committee. Additional NHS ethical review was not required, as this was considered to be a service evaluation performed to meet specific local needs.

RESULTS
Twenty-eight pharmacists (90%) responded to the online questionnaire, after two follow-up emails. The following factors emerged as having a positive influence on VT OSCE performance: (1) year of VT OSCE assessment (May 2011 > May 2010); (2) experience of OSCEs as an undergraduate (some OSCE experience > none); (3) preregistration hospital experience (12 months > 6 months > 0 months).

A synergistic effect was also found between the first two factors; thus, the beneficial influence of sitting the VT OSCE in May 2011 and doing OSCEs as an undergraduate was more than additive.

The following factors were found not to have an influence (positive or negative) on VT OSCE performance in this evaluation:

- Gender
- University attended as an undergraduate
- Degree class obtained
- Length of qualification as a pharmacist
- Perception of undergraduate, preregistration or VT training

DISCUSSION
The year of VT OSCE assessment had an influence on performance, with the second cohort who sat the VT OSCE assessment in May 2011 generally performing better than the first cohort in May 2010. A “Preparing for the VT assessment” workshop was held in March 2010, but participants indicated that they would have preferred a formal mock OSCE assessment, and this was implemented in March 2011. Therefore, the second cohort was more familiar with the format of the VT OSCEs than the first cohort. Previous OSCE experience as an undergraduate also had a positive influence on performance. In addition, the beneficial influence of sitting the VT OSCE in May 2011 and doing OSCEs as an undergraduate was found to be synergistic, adding support to the observation that increased familiarity with the format of a test improves performance.3 These two factors will be monitored on an ongoing basis to ascertain whether performance continues to improve as familiarity with VT and undergraduate OSCEs increases.

Preregistration hospital experience was the third factor to have a beneficial influence on performance. In general, pharmacists who did a full preregistration year in hospital performed better than those who did six months in hospital and six months in community; and those who did a split year in hospital and community performed better than those who did a full year in community. The hospital VT programme builds on hospital preregistration training, covering the same rotational areas in greater depth. Therefore, pharmacists who have done a full preregistration year in hospital are likely to have some experience of all the topics covered in the hospital VT programme. Interestingly, in medical education, OSCE performance is thought to be better if students have undertaken previous training courses covering the full breadth of topics included in the new vocational course.4 Therefore, the need for more extensive VT training for community preregistration pharmacists will be reviewed.

None of the other factors considered (gender, university attended, degree class, length of qualification, VT hospital trust, perception of undergraduate, preregistration or VT training) were found to have an influence (positive or negative) on VT OSCE performance. However, it must be noted that the number of participants involved in this evaluation was small. This can increase the chance of committing a Type II error, whereby a relationship does actually exist, but is not detected by the statistical test.5

REFERENCES
newly qualified hospital pharmacists. Pharmacists undertake four workplace rotations covering the full breadth of hospital pharmacy practice in Northern Ireland, and, on completion, they are formally assessed using a summative assessment. Formal summative assessments are important in the health professions as there is a professional obligation to the public to ensure that practitioners are competent to practise.  

Effective competency-based summative assessments should be criterion-referenced, dealing with the achievement of outcomes, rather than norm-referenced, dealing with the achievement of pass marks or norms which may be altered to ensure that a specified proportion of participants pass the assessment. The hospital VT programme uses an objective structured clinical examination (OSCE); a criterion-referenced assessment that is “unchallenged as the assessment instrument to assess clinical competence”. The VT OSCE assessment comprises six OSCE stations covering the main areas of hospital pharmacy. The pharmacist spends 15 minutes at each OSCE station and must pass all stations independently; no compensation is allowed between stations. 

Competency-based assessments in the health professions should focus mainly on validity, even at the potential expense of some reliability. To this end, a panel of subject experts and training specialists was convened to design realistic and, by implication, valid VT OSCE scenarios. However, the performance of pharmacists sitting the VT OSCE assessments to date has not met expectations. Of the 11 pharmacists who sat the VT OSCE assessment in May 2010, none passed all six OSCE stations on the first attempt. There was some improvement in performance in May 2011, when seven of the 20 pharmacists (35%) sitting the assessment passed all six OSCE stations. These disappointing results have prompted the need to formally evaluate the validity of the VT OSCE assessment, and make improvements where necessary.

**OBJECTIVE**

To evaluate the validity of the VT OSCE assessment, and implement improvements where necessary.

**METHOD**

A VT steering group meets twice a year to review the VT Programme. In July 2011, the group met to evaluate the validity of the VT OSCE assessment. The evaluation entailed applying a validation model1 to the 2010 and 2011 VT OSCE assessments. This validation model depicts assessment as a chain of eight conceptually distinct linked stages, with validity being constrained by the weakest link in the chain. Each link in the 2010 and 2011 VT OSCE assessments was examined for threats to validity. Ethical review was not required as this was considered under NHS Research and Development Forum guidelines to be a service evaluation performed to meet specific local needs, which is relevant only to the population or setting upon which it is based.

**RESULTS**

The results of the evaluation of the 2010 and 2011 VT OSCE assessments using the validation model are summarised in Table 1.

**DISCUSSION**

The first link (administration) was found to be the weakest. Pharmacists, especially those in the first cohort in May 2010, expressed anxiety about undertaking the VT OSCE assessment. In addition, the task was not communicated particularly well to this cohort. A “Preparing for the VT assessment” workshop was held in March 2010, but participants indicated that they would have preferred a formal mock OSCE assessment. This was implemented in March 2011 for pharmacists sitting the May 2011 assessment, in order to improve validity.

There may be a weakness in the fifth link (extrapolation). Fixed time limits were used for each OSCE task, so the conditions of assessment may have been too constrained. However, the VT steering group decided not to remove the time limit as this would make the conditions of the assessment too variable, weakening generalisation, and thus reliability.

There may also be a weakness in the sixth link (evaluation). The first cohort did not perform as well as the second, and the VT steering group attributed this to anxiety due to unfamiliarity with the OSCE assessment process. However, this assumption may have been a biased interpretation, and there could be other factors influencing performance. This will be explored further in a separate evaluation of VT OSCE assessment performance.

**REFERENCES**


**What factors influence the adherence of secondary care prescribers to antimicrobial prescribing guidelines?**

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The burden to society realised by the spread of antimicrobial resistant bacteria is immense. With a recognised link between antimicrobial resistance and antimicrobial prescribing, a key strategy in attempts to control the emergence of resistant bacteria, often related to excessive use of broad-spectrum antimicrobials, is the introduction of antimicrobial control policies, formularies and guidelines. There is little doubt that careful antimicrobial prescribing can curtail the emergence and reduce the prevalence of resistance. Despite this, many studies have shown poor levels of adherence to such guidelines.

This study surveyed the perceptions of prescribers in secondary care to the benefits and barriers of the successful implementation of antimicrobial prescribing guidelines.
AIMS AND OBJECTIVES

To evaluate the perceptions of prescribers and identify key themes, to the benefits of and barriers to, the successful implementation of antimicrobial prescribing guidelines in secondary care and to statistically determine if prescriber discipline, grade or level of experience affects these perceptions. In addition, to identify training and development needs of prescribing health practitioners in secondary care in relation to such guidelines.

METHOD

Self-administered questionnaires, comprising closed questions, two-way questions, Likert scales, ratings and checklists, were distributed to 606 prescribers within the Western Health and Social Care Trust on two separate occasions, three weeks apart, to be returned within two weeks. Six focus groups were also facilitated with volunteers from questionnaire recipients. Questionnaire data, coded and entered onto SPSS version 17, was explored and described via mean and standard deviation values. Likert scales were converted to numerical values (1–5; 1= strongly agree, 5= strongly disagree) and the Mann-Whitney U test applied to compare inter- and intra-discipline responses. Pearson's chi-squared analysis (or Fisher's exact test if expected values <5) was used to determine if prescriber characteristics were related to adherence to prescriber guidelines. Focus group audio recordings were transcribed, coded and entered onto NVivo9 by two investigators, and inter-investigator reliability determined by the Kappa statistic.

Ethical approval was obtained from the university's ethics filter committee and the Office for Research Ethics Committees Northern Ireland. Governance approval was obtained from the Western Health and Social Care Trust research and development office.

RESULTS

Ninety-two questionnaires (15.2%) were returned completed (44.6% consultants, 21.7% registrars, 27.1% junior doctors and GP's, 3.3% nurses, 3.1% dentists). Five pharmacists received the questionnaire but returned it uncompleted, stating that antimicrobial prescribing was outside their prescribing competencies.

Of the 91.3% of respondents aware of the guidelines, only 58.7% felt that there was enough information at launch. This was supported in the focus group discussions: "It’s quite poor, most information now we're told is available on trust intranet but, I think I do recall a trust communication to say that these guidelines were available. However, it's like everything, it gets lost in the void and people forget it's there."

While 97.8% felt that the guidelines were important for patient care, 59.8% had made a conscious decision not to adhere. This decision not to adhere had no relationship with accessibility, information at time of launch, improved training and feedback, or the grade and/or experience of a prescriber (p>0.05; Fisher's exact test or chi-squared test). However, there was a tendency towards a relationship between making a conscious decision not to adhere and being a foundation year 1 doctor (p=0.062; Fisher's exact test), and there was a relationship with prescribers believing that, where education and training was provided on taking up employment (29% of respondents), this training was sufficient (p=0.028; Fisher's exact test).

Inter-coder reliability for focus group transcripts was found to be 0.712 (Kappa statistic). All focus group medical volunteers were senior staff—consultants or registrars. Key themes identified in focus groups for improved awareness and adherence were: staff induction; improvement in intranet accessibility; use of posters, emails; champions and clinical leads; improved education in the form of talks, briefing sessions and reminders, including evidence-based, and individual ownership.

DISCUSSION AND CONCLUSION

One of the main themes derived from this project, supported by other studies, is that guidelines need to be positively enforced through raising awareness, education and regular feedback, and a knowledge of the evidence-base of guidelines. Pharmacist prescribers did not see antimicrobials as belonging to their competencies, a fact that requires further research into the perceptions of pharmacist prescribers on their role within secondary care.

Using a variety of methods for dissemination will ensure that prescribers receive the information that they require, including education and training on the evidence-base behind guideline development. This project has highlighted some of the issues that must be addressed to maximise the potential for guideline adherence.

REFERENCES


The use of patients’ own drugs (PODs) at discharge

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The use of patients’ own drugs (PODs) is an established practice in UK hospitals. They were strongly recommended by “A spoonful of sugar” and are now integral to medicines management systems in most acute hospitals.

“A spoonful of sugar” outlined a number of benefits of POD use that have been proposed including hospital drug purchase savings, reduced wastage, increased efficiency in the pharmacy leading particularly to speedier discharge and reductions in patient confusion and possible decreases in patient medicine administration errors. There is little research evidence for these and most published research deals with the potential or actual savings in drug acquisition costs.

The landmark research that their use is based upon is now several years old and is based on work in a single unit within a hospital and not hospital-wide. Although abstracts have been presented on the impact throughout a hospital, again they are now some years out of date. As the activity is a core activity of most hospital pharmacy services it is important to ensure that it continues to provides value for the NHS. This study was set up in a busy university hospital, which was an early adopter of the use of PODs, and was designed to determine whether savings on the use of PODs at discharge continue to be achieved.

OBJECTIVES

• To identify the number of patients having PODs at discharge
• To quantify the use of PODs at discharge
• To calculate the savings produced from the use of PODs at discharge
• To compare the use and value of PODs between hospital wards

METHOD

Lewisham Healthcare NHS Trust has an electronic discharge system (EDS) which has among its functionality the management of discharge medication. The system is used throughout the trust for nearly all discharge prescriptions (TTOs). Data was extracted from the electronic discharge system for a three-month period (September to November 2010) involving 5,709 patient discharges. At the time of the study all wards in the hospital, with the exception of the children’s medical ward, used the EDS. Using an Excel spreadsheet the ward, name, strength, dose and frequency of the drug, type of supply (amount dispensed, POD, etc) and number of dose units were recorded and collated. Each time a POD or the patient had their own useable supply at home (POSH) the value of the medicine that would
The inpatient use of patients’ own drugs (PODs)

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The use of patients’ own drugs (PODs) is an established practice in UK hospitals. They were strongly recommended by “A spoonful of sugar” and are now integral to medicines management systems in most acute hospitals.

“A spoonful of sugar” outlined a number of benefits of POD use, including hospital drug purchase savings, reduced wastage, increased efficiency in the pharmacy leading particularly to speedier discharge and reductions in patient confusion and possible decreases in patient medicine administration errors, although there is little evidence published to support these. Most published research deals with the potential or actual savings in drug acquisition costs.

In general, the research base is several years out of date, tends to concentrate on discharge or is based on small scale inpatient studies. No research has been done on the contribution of PODs during inpatient admission for a whole hospital. As it is a core activity of most hospital pharmacy services, it is important to ensure that it continues to provides value for the NHS. This study was set up in a busy university hospital, which was an early adopter of the use of PODs, and was designed to determine whether significant savings are achieved with the use of PODs during an inpatient admission.

OBJECTIVES

- To determine the number of inpatients using their own medication during an inpatient admission
- To determine the savings generated from the use of PODs during inpatient admission
- To estimate the annual savings generated from the use of PODs during inpatient admission
- To compare the use of PODs at two separate times

METHOD

Point prevalence methodology was used and conducted on all medical, surgical and care of the elderly wards. Critical care, paediatrics and obstetrics were excluded from the study. Prescription charts from all 15 wards were reviewed and the following data extracted for each regular prescription entry: patient ID, ward, drug name, form, dose, dosage and daily dose. Pharmacists’ endorsements were used to determine the mode of supply for each drug into, non-stock, individually dispensed or POD in use. The daily cost saving was calculated from the number of identified POD doses. British National Formulary (BNF 61) prices were used, as these are readily available and generalisable. Overall savings were estimated using the average length of stay (LoS) of 5.5 days, and the average saving per patient calculated from the total number of patients. The study was repeated two months apart and the data compared using chi-squared. Estimated annual savings were calculated from the average values between the two data collection periods. Data were anonymised on database entry with each individual patient being given a sequential numerical identifier.

RESULTS

The sample comprised 640 inpatient prescription charts, 320 in each period. In period A, 72 patients (23%) had at least one POD on their chart, while in period B it was 84 (26%). The number of PODs in use in period A was 214 (10%) while in period B this was 320 (15%) — a statistically significant difference (p<0.001). The value of PODs in period A was £235 daily and in period B £222 daily. The daily saving per patient was £0.74 in period A and £0.69 in period B. Overall estimated savings for a 5.5-day average stay was £1,295 in period A and £1,222 in period B — statistically significant difference (p<0.001). The data is summarised in Table 1.

The annualised estimate for savings was £85,517. This saving ranged from £81,096 to £85,919 dependent on the period chosen.

DISCUSSION

Tracking patients through their inpatient stay from admission to discharge is resource-intensive, hence the use of point prevalence methodology. This led to two possible sources of variation in the results. First, the use of point prevalence methodology gives a reliable snapshot of the situation at a single point in time, which may be used to characterise the activity over a longer period. A second data collection was carried out two months later to identify whether there was consistency over time. However, the fact that there was a significant difference in the number of PODs used and the value of the PODs used means that a single point prevalence survey is not the most reliable method to determine this data.

The fact that the number of PODs increased and the value decreased

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### Table 1. Use and value of PODs for inpatients

<table>
<thead>
<tr>
<th>Period</th>
<th>Patients</th>
<th>POD Items</th>
<th>Daily doses</th>
<th>Value</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>POD</td>
<td>POD</td>
<td>POD</td>
</tr>
<tr>
<td>A</td>
<td>320</td>
<td>72 (23%)</td>
<td>2,140</td>
<td>214 (10%)</td>
<td>£1,926</td>
</tr>
<tr>
<td>B</td>
<td>320</td>
<td>84 (26%)</td>
<td>2,196</td>
<td>320 (15%)</td>
<td>£1,876</td>
</tr>
</tbody>
</table>

Sig (chi2) P<0.001 P<0.001
demonstrates that there is considerable variation. The use of the average LoS to estimate savings over the period and subsequently annually makes the assumption that the distribution of LoS and POD use are normally distributed and no significant outlier groups that could influence these estimations exist. It is not possible from the methodology to confirm whether these occur or not. Overall, although the daily savings per patient are modest, these cumulate over the year over all patients to a considerable sum of over £80,000.

CONCLUSION
This study has shown that the use of PODs during admission leads to significant savings, but more refined methodology is required to investigate the situation further to confirm more accurately the level of saving.

REFERENCES

Table 1: Reasons for the pharmacist not prescribing medicines

<table>
<thead>
<tr>
<th>Reason for not prescribing medicines</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical review required or therapy not appropriate</td>
<td>41</td>
</tr>
<tr>
<td>Patient nil by mouth</td>
<td>21</td>
</tr>
<tr>
<td>Not enough information to assess clinical suitability</td>
<td>11</td>
</tr>
<tr>
<td>Non-compliance</td>
<td>10</td>
</tr>
<tr>
<td>Controlled drug</td>
<td>9</td>
</tr>
<tr>
<td>Non-formulary item</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
</tr>
</tbody>
</table>

Evaluation of the activities of a prescribing pharmacist in the emergency department — a pilot study

Noble H*, Buchanan M†
*lead admissions pharmacist and †emergency department consultant, Wirral University Teaching Hospital NHS Foundation Trust

Improving rates of medicines reconciliation1 and reducing harm from omitted and delayed medicines are two areas where pharmacists can make positive contributions. Pharmacist independent prescribing offers an opportunity to improve patients’ access to medicines and potentially reduce prescribing errors since pharmacists are often referred to as “experts in medicines”.

Although Wirral University Teaching Hospital (WUTH) offers an extensive pharmacy service to in-patient wards (with some examples of pharmacist independent prescribing), there is currently no pharmacist dedicated to clinical work in the emergency department (ED). Therefore a one week pilot study was approved by the WUTH non-medical prescribing committee. Ethical approval was not required. The pilot study was undertaken in October 2011 to evaluate the potential role of a prescribing pharmacist in the ED.

OBJECTIVES
● Identify how many of the patient’s regular medicines the pharmacist felt competent to prescribe
● Identify the reasons for not prescribing any medicines
● Determine the number of errors made by the prescribing pharmacist
● Identify other tasks undertaken by the pharmacist in the ED

METHOD
The ED staff helped identify patients who were likely to be admitted to hospital. A medicines reconciliation (MR) form was completed by the pharmacist independent prescriber and filed in the case notes before transfer to a ward. The pharmacist then reviewed the patient’s medicines and prescribed those they deemed suitable and felt competent to prescribe. An entry was made in the case notes to explain the pilot and why any medicines were not prescribed. Ward pharmacists were asked to identify the patients included in the pilot (indicated by a pharmacist note on the electronic prescribing system), check the prescribing of the independent pharmacist prescriber and report any errors via the trust’s incident reporting system. Qualitative data was also collected by the pharmacist independent prescriber on other contributions they made during the pilot.

RESULTS
Fifty-five patients were included in the pilot; 50 (91%) were subsequently admitted to hospital and 52 (95%) had a MR completed. One patient was transferred to ward before the MR was complete and two patients self-discharged after it was started. The pharmacist prescribed regular medicines for 29 (53%) of the patients included in the audit. The MRs completed yielded 359 medicines; 90 (25%) did not need prescribing by the pharmacist (eg, already prescribed) and 169 (33%) of the remaining medicines were prescribed by the pharmacist. Table 1 illustrates the reasons why the remaining 100 medicines were not prescribed by the pharmacist.

One error (a documentation error relating to the timing of isosorbide mononitrate) was reported by a ward pharmacist; however, the correct dose and frequency of the medicine were prescribed.

The other clinical contributions made by the pharmacist included changing a patient’s medicines to optimise treatment (within the limits of their prescribing competence), advising ED staff on formulary medicines, medicine doses, infusion rates, routes of administration and use of the electronic prescribing system. They also advised ED staff on medicines storage and ward stock issues and became aware of a potential major incident that allowed them to warn pharmacy colleagues in advance.

DISCUSSION
Most patients seen by the pharmacist in the ED were subsequently admitted to hospital, meaning that the system used by ED staff facilitated effective use of the pharmacist’s time. The pharmacist prescribed 63% of medicines that were not already prescribed, resulting in a reduction in the time taken to complete MR. Clinical issues (eg, medicines no longer being appropriate, patient needing a clinical review, nil-by-mouth or non-compliance) accounted for most reasons why the pharmacist declined prescribing particular medicines, while legal or trust policy issues accounted for a minority of cases. However, these patients still had the MR form completed in time for subsequent clinical review on the ward, thus benefiting the patient and saving the doctors and pharmacy staff time later on. Only one error relating to the pharmacist’s clinical activity was detected. However one limitation of the study was that it was not possible to confirm if all prescriptions were subsequently checked by a ward pharmacist. An area for future work would be to compare prescribing errors made by pharmacists and doctors working in the ED and to assess the impact of an ED pharmacist on omitted or delayed medicines.

As well as optimising the patient’s medicines by earlier MR and accurate prescribing, the pharmacist also supported the ED in other pertinent medicines management issues (eg, medicines storage). ED staff gave spontaneous positive feedback highlighting the benefits of pharmacist in the department.

As a result of the pilot a business case is to be submitted for a clinical pharmacist in the ED.

REFERENCES
Design of antimicrobial stewardship care bundles for use on the high dependency unit of a large teaching hospital

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*NHS Lothian Pharmacy Service, Royal Infirmary of Edinburgh, Edinburgh; †University of Strathclyde, Glasgow

Antimicrobial prescribing on the high dependency unit (HDU) of a large teaching hospital was suboptimal and challenged the clinical pharmacist in addressing deficiencies in the quality of prescribing due to input from a range of prescribers from different specialties and no agreed multidisciplinary systematic process. Development of a care bundle was proposed which consists of key evidence-based actions applied within a specific time frame. The Institute for Healthcare Improvement (IHI) “Save 5 Million Lives” campaign has demonstrated the successful use of care bundles as a structured approach to improve practice, patient care and patient outcomes.¹

OBJECTIVES
● To identify where in the pharmaceutical process (prescribing, monitoring and documentation) prompts may be required to assure the quality of antimicrobial management
● To characterise pharmaceutical care and inform the design of antimicrobial care bundles for initiation and de-escalation of therapy to standardise care and improve practice

METHOD
The study was a prospective quality indicator based cohort study of patients admitted to HDU and prescribed antimicrobials between 31 May and 15 July 2010. Quantitative evaluation of pharmaceutical process quality indicators relating to antimicrobial prescribing was undertaken. Quality indicators (n=30) were agreed through multidisciplinary team review with reference to the evidence base, national strategy and local policy. A full list of quality indicators is available from the author on request due to word limit constraints. The local research ethics service confirmed this audit did not require ethics approval.

Microsoft (MS) Access and MS Excel databases were designed for analysis of the study. To characterise pharmaceutical care, actions taken by the pharmacist to assess quality indicators were categorised as “check”, “change in drug therapy process” or “change in drug therapy” according to a recognised categorisation system.² All quality indicators were “checked” by the pharmacist and became a “change in drug therapy process” (monitoring and documentation) or “change in drug therapy” (prescribing) when the pharmacist’s action resulted in adherence to the quality indicator.

Percentage adherence (95% confidence interval (CI)) to the 30 quality indicators (total and individual) were calculated as the proportion of applicable adherent indicators before and after the pharmacist’s action. Non-adherence was “justified” when there was documented evidence in support of deviation from the quality indicator. Justified non-adherence (95% CI) was expressed as the proportion of the total number of applicable cases from the sample. Prescribing was considered appropriate either when quality indicators were met (adherence) or there was justified non-adherence to quality indicators. Identified areas of non-adherence were used to design the antimicrobial care bundles.

RESULTS
Within the study sample of 67 patients, there were 134 antimicrobial prescriptions. Overall, approximately 10 pharmaceutical care actions were required to optimise one prescription as this patient group were typically prescribed complex regimens. Quality indicator adherence was 53.5% (CI 50.9, 56.1) before the action of the pharmacist; following the pharmacist’s action quality indicator adherence increased to 85.3% (CI 83.5, 87.1) (p<0.001). Change in drug therapy process or change in drug therapy initiated by the pharmacist accounted for 31.9% (CI 29.5, 34.3) of adherence. For example, the dose/frequency of vancomycin was correctly adjusted (change in drug therapy) and timing of sampling was appropriate (change in drug therapy process). Justified non-adherence was 6.6% (CI 5.3, 7.9). The overall application of quality indicators was appropriate (adherence plus “justified” non-adherence) in 91.9% (CI 90.3, 93.1) of applicable criteria. In total, 1,447 pharmaceutical care actions were generated from 134 antimicrobial prescriptions. Most actions (68.1%) were “checks” (n=986), 280 (19.4%) were “changes in drug therapy process” and 181 (12.5%) were “changes in drug therapy”.

The pharmacist’s actions improved adherence to the quality indicator areas listed in Table 1. Areas of non-adherence to quality indicators informed pharmaceutical prompts required in this patient group to improve the quality of antimicrobial prescribing and inform clinical decisions in relation to initiation and de-escalation of antimicrobial therapy. Key pharmaceutical prompts were used to design the future quality improvement care bundle for initiation and de-escalation of antimicrobial treatment to assure the quality of antimicrobial management. The care bundles were designed to standardise documentation and quality of care.

TABLE 1: Main areas of pharmacist contribution to quality indicator adherence

<table>
<thead>
<tr>
<th>Main area of pharmacist contribution to quality indicator adherence</th>
<th>Change in adherence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review/adjustment of dosage regimens in renal impairment</td>
<td>93.5%</td>
</tr>
<tr>
<td>Identification and management of interactions</td>
<td>83.3%</td>
</tr>
<tr>
<td>Therapeutic drug monitoring</td>
<td>67.4%</td>
</tr>
<tr>
<td>Documentation of bacteriological specimen results</td>
<td>58.1%</td>
</tr>
<tr>
<td>Documentation of nature and severity of past allergic reaction</td>
<td>55.8%</td>
</tr>
<tr>
<td>Documentation of indication and length of course</td>
<td>45.6%</td>
</tr>
<tr>
<td>De-escalation</td>
<td>27.4%</td>
</tr>
</tbody>
</table>

DISCUSSION AND CONCLUSION
Quality assurance pharmaceutical care “checks” occurred more frequently than the need for a “change in drug therapy” or a need for a “change in drug therapy process”. The evidence-based antimicrobial prescribing quality indicators developed in this study were used to identify pharmaceutical care process prompts required in the prescribing of antimicrobial therapy in an HDU of a large teaching hospital. The pharmacist made a significant (p<0.001) contribution to improving adherence to evidence-based antimicrobial prescribing quality indicators agreed by the multidisciplinary team. Prompts have been identified from the pharmaceutical care process and applied in the design of two multidisciplinary antimicrobial care bundles proposed to support adherence with antimicrobial prescribing policies and guidelines. Further work is required in terms of care bundle implementation and post implementation evaluation.

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² Skogly S. A study of patient pharmaceutical care needs assessment in chronic obstructive pulmonary disease; as an example of a multidisciplinary intervention to reduce hospital re-admission in long term conditions. Glasgow: University of Strathclyde; 2009.

Discontinuing non-essential medication in patients taking erlotinib for advanced non-small cell lung cancer (NSCLC)

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Lung cancer patients often present with complex medication histories. Most are elderly, taking medicines to manage existing disease states and...
prevent future morbidity (eg, lipid-lowering drugs, antihypertensives and antplatelets for the prevention of cardiovascular disease). Guidelines for discontinuing these medications in life-limiting illnesses, such as advanced lung cancer, have not been produced despite the potential to reduce burden, in terms of cost and more importantly discomfort to the patient. These patients are managed by oncologists who may be reluctant to discontinue medications that have been prescribed by other doctors for non-cancer related conditions.

OBJECTIVES
1. Audit the number of medications patients receiving erlotinib for lung cancer take
2. Develop a draft tool that can be used to identify non-essential medications which could be discontinued

METHODS
This clinical audit was undertaken at an acute NHS trust in April 2011. A clinical audit tool was used to extract data from medical notes of patients receiving erlotinib for NSCLC. Medicines were recorded according to their BNF categories and then subsequently divided into essential, non-essential and uncertain categories. The criteria took into account whether the medications were being used to manage an existing disease or being used for prophylaxis of a future morbidity, and, ultimately, if the medication could benefit patients with terminal cancer. The audit was registered and Caldecott approval obtained. The results of the audit were discussed in an expert focus group with the lung oncology team (consultant pharmacist, lung nurse specialist and consultant medical oncologist). The focus group reviewed results and looked at what medicines they could have stopped. As this was a pilot investigation, patient numbers were small, but considered by the focus group to be representative of the general population.

RESULTS
Among 20 patients audited 19 (95%) were taking medications that could have been discontinued. The mean number of medicines was eight (range 1–16). Non-essential medications were regarded as those that provided no short-term benefit to the patients with respect to survival, quality of life or symptom control or any medicine that had potential to cause harm. Uncertain medicines were those that need to be reviewed and a decision made based on the patient’s condition.

- Seventeen patients (85%) were taking medicines that affected the CNS (eg, for pain, anxiety and depression), classified as essential for symptom control of the cancer
- Seven patients (35%) were taking medicines that affected the cardiovascular system (eg, beta-blocking drugs, lipid-lowering drugs), classified as uncertain
- Thirteen patients (65%) were taking drugs that affected the gastrointestinal system (eg, antisecretory drugs, mucosal protectants, antiinflammatory drugs, laxatives)
- Eleven patients (55% per cent) were taking erlotinib in combination with a proton pump inhibitor (PPI) — a clinically significant drug interaction

The focus group concurred that 93% of the medicines could have been discontinued.

DISCUSSION
Patients undergoing treatment for terminal lung cancer can be frightened, upset or angry, and so the issue of discontinuing medicines is not a priority. However, once the patient has come to terms with their prognosis, a discussion regarding their medications should be instigated. The focus group revealed that timing of this discussion is difficult, and may not occur while the oncology clinical team is establishing a relationship with the patient. The futile use of medication in terminally ill cancer patients has been reported in the literature and this work is in agreement with this by showing that patients with non-small cell lung cancer taking erlotinib are taking many unnecessary medications.

Discontinuing non-essential medication should be a shared decision between the patient and the oncology team with careful explanation of why it is necessary to discontinue medicines. Patients take medicines such as statins and antihypertensives in the belief that they will be taking them for the rest of their lives; therefore, if an appropriate explanation for discontinuation is not given, the patients and/or their families may misconceive this as a death-hastening intervention. A study by Nicholson et al, suggested that many patients do not object to having medicines withdrawn once the reasons have been explained to them.

This work also showed that a significant number of patients who are taking erlotinib also take a proton pump inhibitor (PPI). Indeed, while PPIs may be considered as “essential medication”, since they control patients’ GI symptoms, there is an established clinically significant drug interaction between erlotinib and PPIs where the absorption of erlotinib is reduced. Co-administration of erlotinib with omeprazole decreased the erlotinib exposure (AUC) and maximum concentration (Cmax) by 46% and 61%, respectively. The combined use of erlotinib and PPIs should be avoided if possible.

Patients taking erlotinib for the treatment of advanced NSCLC take many unnecessary medicines. The focus group concluded that written guidelines on what medicines can be withdrawn are needed. The literature includes reports of tools used for discontinuing medication in elderly patients, but none specific to lung cancer patients. We have developed a draft tool that will need further research to validate. There is definitely the potential for pharmacists to become involved in the review of patients with terminal cancer to facilitate discontinuing potentially unnecessary medicines.

REFERENCES

Investigating inappropriate prescribing in elderly patients living in a nursing home

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Inappropriate prescribing (IP) is defined as: prescribing medication that should be entirely avoided and unsuitable prescribing of excessive doses and durations. Examples of IP include prescribing for those with age-related contraindications or co-morbidities, patients with potentially harmful drug-drug or drug-allergy interactions and medical prescribing contraindicated with genetic profile. The term potentially inappropriate prescribing (PIP) is often used instead of IP as, in some select cases, the benefits of the inappropriate medication outweigh the risks.

IP is a significant problem in nursing homes as the patients pose as being particularly vulnerable due to a high level of physical and mental impairment. Nursing home patients take up to four times as much prescription medication than patients who live alone in the community, and evidence has shown that at least half of all nursing home patients are on one or more inappropriate drugs.

Until recently, Beer’s criteria had been the screening tool of choice among healthcare professionals and although these were the first criteria produced representing IP in older people, several flaws have been...
highlighted. Significant development has led to new geriatric IP criteria being devised and validated in the form of a screening tool called the "screening tool of older persons' prescriptions" (STOPP). It has been shown that medication reviews led by pharmacists can reduce the occurrence of IP, not only benefiting the patients without harm to their mental or physical health but also proving cost-effective for the NHS in the longer term.

**OBJECTIVE**

To quantify the extent of inappropriate prescribing in a nursing home setting.

**METHOD**

The study was undertaken in a 50-bed nursing home in the locality. The study was approved by the nursing home and general medical practice responsible for it. An audit tool was designed to incorporate the STOPP criteria.

Data were collected anonymously consisting of a list of each patient's repeat medication and major medical conditions. The STOPP criteria were applied to each patient's medication to highlight those deemed as inappropriate. Descriptive analysis was performed to identify trends, and recommendations were made to the practice pharmacist for those patients requiring medication reviews.

Project approval was submitted and approved through the University of Sunderland ethics committee and Caldicott approval was sought.

**RESULTS**

Forty-nine patients were reviewed, their average age was 81.8 years (SD = 8.4 years) and 39 (79.6%) were female. They were prescribed a total of 434 medicines (average 8.9, SD 4.1; range 1–19). The most prevalent medical conditions were cardiovascular disease, hypertension, dementia and Stage 3 kidney disease. Following application of the STOPP criteria, 31 patients (63.3%) were on at least one potentially inappropriate medication (PIM), with 58 PIMs prescribed (average 1.2; SD 1.3; range 0–5).

The most common inappropriate medicines were long-term neuroleptics and long-acting benzodiazepines, full-dose proton pump inhibitors (PPIs) for more than eight weeks, long-term opiates in those with dementia and tricyclic antidepressants in patients with constipation. This study highlighted that the current use of laxatives is a cause for concern as 32 patients (63.3%) were on at least one form of laxative, with 14 patients (28.6%) being regularly prescribed two or more.

The cost of the inappropriate medication for this particular nursing home is approximately £3,700 annually.

**DISCUSSION AND CONCLUSION**

Using a validated tool (STOPP), this study has identified that two thirds of patients living in a nursing home are currently prescribed potentially inappropriate medication. The results highlight the current issue regarding prescribing in the elderly and the need for regular medication reviews. Although many of the patients would require substitute medication or slow withdrawal, there is significant potential to reduce the cost implication inappropriate prescribing has on the NHS. The long-term use of laxatives in two thirds of patients is also a concern.

The results of this study will be used to undertake complex medication reviews aimed at reducing inappropriate prescribing and the "pill burden" on patients.

**REFERENCES**


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**Assessing the introduction of a secure storage system for patients’ own drugs, in the emergency care setting**


1. University Hospital of North Staffordshire (UHNS); 2. Undergraduate School of Pharmacy, University of Keele

Since the mid-1990s hospitals across the UK have introduced medicines management systems that facilitate the use of patients’ own drugs (PODs) and individual patient packs of medicines. The benefits of this approach are wide-ranging including improved patient care and positive financial impact in the reduction of drug expenditure and reoccurrence of waste. At the University Hospital of North Staffordshire (UHNS) the introduction of POD lockers commenced in 2002, with full implementation of one-stop dispensing (OSD) commencing in September 2009. This has proved to be a success in terms of both financial savings and patient care. In more recent years NICE and NPSA alerts have identified the benefits of increased use of PODs for medicines reconciliation and avoidance of missed doses. It was recognised locally that these further benefits could be gained if more patients could be encouraged to bring their medicines with them when they attend the emergency portal. Due to the close scrutiny of local press there were concerns about running publicity campaigns to this effect if there were no robust storage and transfer processes established within the emergency department (ED). To this end the pharmacy team worked closely with the ED to design a suitable secure POD locker and develop a robust standard operating procedure (SOP) for its use within the emergency care setting. This paper describes the solution found, the assessment of its impact and the identification of future work directions.

**OBJECTIVES**

1. Design and procurement of POD lockers fit for purpose within the ED setting, the essential criteria being: (a) ability to attach to ED trolleys without impeding their mechanical actions or obstructing access to a patient during treatment; (b) ability to be cleaned to infection control standards following patient treatment; (c) ease of access for significant numbers of nursing staff, while maintaining security; (d) ease of use by nursing staff – requiring a visual prompt that medicines are available for the individual patient
2. Development of SOP for the use of the POD lockers
3. Implementation of project with accompanying publicity through local media and health care organisations
4. Assessment, by audit, of the success of the project increasing the availability of PODs for use both within the ED and wider Trust

**METHOD**

The pharmacy implementation team worked closely with the ED team, including nursing staff, porters, health and safety representatives, estate officers and trolley manufacturers to establish a full specification for storage boxes that would meet the essential criteria identified above. Once completed it was necessary to commission a bespoke unit, as no commercially available product was suitable. These were purchased and fitted to the ED trolleys in a rolling programme. The SOP was developed in

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**Table 1: Availability of PODs and their transfer, pre- and post-project implementation**

<table>
<thead>
<tr>
<th>Date</th>
<th>Patients</th>
<th>Patients who could have brought in their own PODs</th>
<th>PODs, ie, not road traffic accidents</th>
<th>Patients with PODs</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 2011</td>
<td>145</td>
<td>89 (61%)</td>
<td>59 (64%)</td>
<td>95 (64%)</td>
</tr>
<tr>
<td>November 2011</td>
<td>95</td>
<td>64 (67%)</td>
<td>57 (59%)</td>
<td></td>
</tr>
</tbody>
</table>
conjunction with the ED team and training provided in the process of identification of the availability of PODs on arrival of a patient within the ED. The availability for use and onward transfer to inpatient wards. An audit project (requiring no ethics approval) was established to assess the level of POD availability in the ED and onward transfer to wards both prior to implementation and six months after. Once training was complete the launch date was set for July 2011 and full local media coverage was gained and advertising throughout local health care providers was commenced.

RESULTS
Bespoke POD lockers were attached to 116 trollies throughout the ED, and 145 staff were trained in the SOP prior to the project implementation. Audit data collected before and after implementation are shown in Table 1. The results demonstrate a significant increase in the availability of PODs within the ED. If these figures are extrapolated from the sample to an average daily attendance (350 attendances/day) this project has resulted in 56 more patients every day bringing their medicines with them into the hospital.

DISCUSSION
This was a huge undertaking and one we believe to be a novel approach to improving the availability and security of PODs within the ED setting. It has demonstrated how effective inter-disciplinary working can overcome seemingly insurmountable obstacles, to improve both patient care and financial performance of a large teaching hospital. This is a challenging environment in which to attempt such close control on medicines management. Large numbers of staff and a high turnover result in a significant on-going training burden. Pressures of patient attendance and four-hour targets result in inevitable lapses, but significant steps have been taken to improve the care of patients in times of timely administration of medicines and accurate documentation of drug histories. The audit data will be further analysed to identify the improvement in onward transfer of medicines to inpatient wards.

REFERENCES

Table 1: Reasons why patients were not referred for a tMUR

<table>
<thead>
<tr>
<th>Reason</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility</td>
<td>131</td>
<td>28.4</td>
</tr>
<tr>
<td>Care home/carer/sheltered accommodation</td>
<td>82</td>
<td>17.8</td>
</tr>
<tr>
<td>Too young until (PDSA 1 and 2)</td>
<td>55</td>
<td>11.9</td>
</tr>
<tr>
<td>Confused/asleep/too ill</td>
<td>49</td>
<td>10.6</td>
</tr>
<tr>
<td>Cancer (ongoing treatment)</td>
<td>42</td>
<td>9.1</td>
</tr>
<tr>
<td>Does not handle own medicines/dosette</td>
<td>37</td>
<td>8.0</td>
</tr>
<tr>
<td>No change to medication, or no regular medication</td>
<td>18</td>
<td>3.9</td>
</tr>
<tr>
<td>Terminal Illness</td>
<td>10</td>
<td>2.2</td>
</tr>
<tr>
<td>Patient declined, or staff declined on patient’s behalf</td>
<td>8</td>
<td>1.7</td>
</tr>
<tr>
<td>Dispensing GP</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>AGREED</td>
<td>30</td>
<td>5.8</td>
</tr>
<tr>
<td>Total</td>
<td>463</td>
<td>6.5</td>
</tr>
</tbody>
</table>

OBJECTIVE
To evaluate the targeting by hospital pharmacists of patients for post hospital discharge medicines use review by community pharmacists.

METHODS
PDSA (plan, do, study, action) improvement methodology was used to develop this project. A project steering group (hospital, community and inter-disciplinary care representation) was set up to manage the project and monthly reviews. Community pharmacies serving the local population were invited to participate by the local pharmaceutical committee, followed by a launch event. Patients on elderly medical wards at the acute hospital were assessed by the ward based pharmacy team for inclusion into the project. Suitable patients were asked if they were willing to attend a community pharmacy MUR post-discharge. An appointment was made at the community pharmacy of their choice. On discharge, a summary and other relevant information were faxed to the community pharmacy. Reasons for not referring patients were documented. Community pharmacists were contacted two weeks after the referral to assess the number of patients who attended. For the first PDSA cycle, patients from two elderly care wards were assessed; exclusions included terminal illness, cancer, not consenting and housebound. The project was registered with Clinical Audit and the Caldicott Guardian.

RESULTS
76/77 (98.3%) of community pharmacies agreed to participate. During the first PDSA cycle (1m), 55 patients were assessed, three of whom (5.5%) were referred. Changes were made to the inclusion criteria: reduction in the age limit to 60 years and moving the assessment wards from elderly care to acute medical wards. During the second PDSA cycle, 220 patients were assessed; nine of whom (41%) were referred. Further changes were made to the age limit removed and patients were included even if there had been no changes to their medication. A total of 188 patients were assessed during the final cycle; 18 (9.6%) were referred to community pharmacy. In total 463 patients were assessed on the ward. Of these, 30 (6.5%) were referred for a MUR. Reasons for non-referral are shown in Table 1, the most prevalent being mobility problems, affecting 131 patients (28.4%). Of the 30 patients who were referred, only 11 patients (36.7%) attended for the MUR. Of the 19 patients who did not attend, no reason was given for 11.

DISCUSSION
Hospital pharmacists’ referral of elderly patients to community pharmacists for targeted MURs (tMUR) was logical, in view of the high rate of hospital admissions for this group. PDSA methodology enabled practical changes to be implemented responsively. Despite this, uptake to the project remained low, with only 9% patients assessed in the final cycle eligible for referral. From all patients referred, only 36% attended their community pharmacy. Although the process works in principle, the patients who are at greatest risk of re-admission (ie, housebound) are excluded. The premise of tMUR is a positive step, but until it includes those patients who are unable to get to their community pharmacy, it is unlikely to have much impact on patient outcomes such as hospital re-admission rates. In conclusion, this method

Identifying inpatients for a targeted medicines use review: barriers to uptake

Baqir W*, Desai N*, Harker N*, Vyas A*, Copeland R*, Burdon M†, Gunn A†, Barrett S*, Frankland N‡, Campbell D*

*Northumbria Healthcare NHS Foundation Trust; †North of Tyne Local Pharmaceutical Committee; ‡North of Tyne Primary Care Trusts

In 2010, in primary care, 926.7 million items were dispensed in England costing £8,834.4m, representing a 4.6% and 2.6% increase in items and cost, respectively, from 2009.1 Prescribing for elderly patients (>60yrs) accounted for 58.9% of items prescribed (469.1 million items) and 53.5% of costs (£4,479.1m) in 2007.2 Elderly patients with co-morbidities and on multiple medicines are at higher risk of hospital admissions.3 In conclusion, this method...
describes how hospital pharmacists can effectively identify patients for a MUR by community pharmacists. However, the nature of the exclusion criteria which reflect national criteria for tMURs and what can be practically delivered by community pharmacies results in significant numbers of patients being excluded. A broader overall approach that would allow the most vulnerable patients to be included within the targeting criteria is required if this process is to fully realise its potential.

REFERENCES

Table 1: Types of interventions proposed by the pharmacist independent prescribers during the data collection period

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Number of times proposed by pharmacist</th>
<th>Number of times intervention accepted by medical staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication inadvertently omitted</td>
<td>83</td>
<td>83 (100%)</td>
</tr>
<tr>
<td>Medication prescribed incorrectly</td>
<td>45</td>
<td>45 (100%)</td>
</tr>
<tr>
<td>Medication recommended by other</td>
<td>4</td>
<td>4 (100%)</td>
</tr>
<tr>
<td>healthcare professionals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medications prescribed twice</td>
<td>3</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>3 (100%)</td>
</tr>
</tbody>
</table>

RESULTS
During the data collection period, details relating to 138 potential medication changes for 65 patients were recorded. Of these changes, medical staff agreed with all of the pharmacist independent prescribers’ suggested interventions and the suggestions were prescribed accordingly. A summary of the types of changes made is presented in Table 1. The time taken to obtain medical opinion was recorded for 59 of the 65 patients (90.8%). The average time taken was 8 minutes (range 2–60 minutes).

DISCUSSION AND CONCLUSION
This study clearly indicated that pharmacist independent prescribers can successfully extend their role from a clinic-based setting to a ward-setting within Antrim Area Hospital. The proposed changes to the medications were acceptable to medical staff and the use of independent prescribers’ skills could potentially lead to significant time savings with regards to ensuring the correct prescriptions for patients. Better use of skill mix by increasing the frequency of pharmacist prescribing at ward level will also lead to time saving for pharmacy staff as less time is spent seeking the input of medical staff in order to make changes to prescriptions. The results of this study will be used to draft a revised policy on pharmacist prescribing throughout the trust. It is hoped that this policy will be adopted and rolled out across the trust in the near future.

ETHICAL APPROVAL STATEMENT: This was a quality improvement study and ethical approval was not required.

REFERENCES

Extension of pharmacist independent prescribing within a district general hospital in Northern Ireland

Hutchinson G, McCallan G, McBride E, Asfiehld L, Scott MG, Fleming GF
Pharmacy and Medicines Management Centre, Northern Health & Social Care Trust, Antrim Area Hospital, Antrim

In 1999 the Crown report¹ recommended an extension of prescribing authority for a number of healthcare professionals, including pharmacists. In Northern Ireland, the Department of Health, Social Services and Public Safety has a policy to extend non-medical prescribing in order to improve patient care and report that some 120 pharmacists are qualified as prescribers.² Despite the national and regional policy towards increasing pharmacist prescribing, recent research has indicated that many pharmacists within Northern Ireland are not currently prescribing in practice with approximately 50% of those qualified not currently prescribing.³ Within the Northern Health and Social Care Trust, there are currently 14 pharmacists registered as independent prescribers. Of these only eight are currently prescribing within their role and their prescribing activity is limited to prescribing within specific medicines management clinics. When working on wards, pharmacist independent prescribers often identify issues with prescriptions however changes to the prescriptions must still be made by the doctor.

OBJECTIVE
The objective of this study was to gather evidence on potential pharmacist prescribing in order to lead to an increase in prescribing at ward level by pharmacist independent prescribers.

METHOD
The study was conducted over a six-week period during May and June 2011 on a 24-bedded cardiovascular ward in Antrim Area Hospital (a 426-bed district general hospital in Northern Ireland). Data was collected at time of admission during the medicines reconciliation process, by pharmacist independent prescribers who regularly prescribed at wards’ clinics but who did not prescribe routinely at ward level. During the data-collection period, the pharmacist independent prescribers recorded details of occasions when the input of medical staff was required to change a patient’s admission medication that the independent prescribers could have changed themselves. In addition to the nature of the change required, the time taken to obtain medical input and if the medical staff agreed with the proposed changes were also recorded. Details were not recorded on changes required to Controlled Drug prescriptions or unlicensed drugs as pharmacist independent prescribers are not authorised to prescribe these products. In addition, detail was not collected on proposed changes to medicines related to the management of the patients’ acute conditions as it had been agreed with the medical consultants on the ward that this would not be considered during this study.

DISCUSSION AND CONCLUSION
This study clearly indicated that pharmacist independent prescribers can successfully extend their role from a clinic-based setting to a ward-setting within Antrim Area Hospital. The proposed changes to the medications were acceptable to medical staff and the use of independent prescribers’ skills could potentially lead to significant time savings with regards to ensuring the correct prescriptions for patients. Better use of skill mix by increasing the frequency of pharmacist prescribing at ward level will also lead to time saving for pharmacy staff as less time is spent seeking the input of medical staff in order to make changes to prescriptions. The results of this study will be used to draft a revised policy on pharmacist prescribing throughout the trust. It is hoped that this policy will be adopted and rolled out across the trust in the near future.

ETHICAL APPROVAL STATEMENT: This was a quality improvement study and ethical approval was not required.

REFERENCES

Potential clinical significance of variations between pharmacist- and doctor-obtained medication histories

Gaffney G, Weidmann AE, Conyard E
Pharmacy Department, Our Lady of Lourdes Hospital, Drogheda, Co Louth. Republic of Ireland

An Audit Commission report of 2001 found 30% of patients in some hospitals had incorrect or incomplete medicines or allergies recorded on admission; this can lead to poorer quality care and longer hospital stays.¹ The National Institute for Health and Clinical Excellence recommends pharmacists to be
involved in obtaining medication histories. Presently in Our Lady of Lourdes Hospital, pharmacists are not routinely involved in this process. Previous studies have shown that pharmacist-obtained medication histories are more accurate and complete than those obtained by a doctor with unintentional medication history discrepancies found in 22–62% of patients. These relate to incorrect drug/dose/frequency, drug/dose omission or no dose. 1,4

OBJECTIVES

- To review and critically appraise literature for pharmacists’ role in taking medication histories
- To compare medication histories obtained by a pharmacist with those obtained by a doctor
- To assess the extent and potential for harm of any unintentional variations found
- To formulate recommendations on how to improve the recording of medication histories

METHOD

The study was granted ethical approval by a research ethics committee and a research advisory committee. Data was collected during March and April 2011. Sixty adult patients admitted via the emergency department (ED) within the previous 72 hours between 9am and 4.30pm from Monday to Friday and able to provide informed consent were included in the study. A power calculation showed that 60 participants achieved a power of 1.0.

Patients were interviewed by the researcher (a pharmacist) to obtain a comprehensive list of their current medication. Information provided by the patient was corroborated by a second source, eg, the patient’s medication record from a community pharmacy or general practitioner.

The pharmacist-obtained medication history was compared to the prescription chart. Any variations found were assessed using patient’s medical notes to ascertain if these variations were intentional. An unintentional variation was defined as an inconsistency between the prescription chart and the medication history obtained by the pharmacist, not documented in the notes, which, on contacting the medical team resulted in the prescription being amended.

Unintentional variations were independently assessed by a consultant and clinical pharmacist for their potential clinical significance (to cause patient harm), using the National Co-ordinating Council for Medication Error Reporting and Prevention index. Assessors did not use a consensus method when grading the significance of the variations. Variations were graded as “having no potential for patient harm”, “potentially requiring monitoring or an intervention to preclude patient harm” or “having potential to cause patient harm”. A statistician performed statistical analysis of results.

RESULTS

Much research in this area has been published describing variations found between pharmacist- and doctor-obtained medication histories. 1,4

Additionally, studies have assessed the potential severity of these variations using different grading tools. 1,3

This study found that out of 60 patients, unintentional variations were identified in the medication histories of 38 (63.3%). Variations (n=129) included drug omission (n=93, 72%), different dose (n=32, 17%), different frequency (n=39, 7%), drug commission (n=4, 3%) and dose omission (n=1, 0.7%). Thirteen patients had more than four unintentional variations. Table 1 provides a breakdown of the number of unintentional variations found in the 38 patients.

The mean number of medicines being taken was seven. The mean ± SD number of unintentional variations was 3.4 ± 2.9. There was a significant positive correlation between the number of medicines being taken and the number of unintentional variations found (Pearson’s correlation coefficient r = 0.573, n = 60, p = 0.0001). Thirteen percent of variations were judged by the assessors as having “potential to cause patient harm”.

**DISCUSSION AND CONCLUSION**

This study demonstrated that the process of medicines reconciliation can be improved by involving a pharmacist in medicines reconciliation. ED is the ideal setting to undertake this as involving a pharmacist at an early stage of the patient journey could have maximum impact. Efforts are ongoing to secure funding for this position using the results of this study.

Limitations of this study included: a small sample size of 60 patients, the exclusion of cognitively impaired patients; the possibility of recall bias as patients may have remembered more details regarding their medicines when interviewed by a pharmacist and when in the comfortable ward environment rather than the busy ED; the subjective nature of grading the variations by the consultant and clinical pharmacist; and the lack of a consensus approach to grading the variations.

**REFERENCES**


Collaboratively spreading an SHA-wide green medicines bag from the safety agenda to QIPP

Hough JE, England E, Eccleston F
No Needless Medication Errors Green Medicine Bag Team, South Central SHA

South Central SHA (SC) pharmacists have a history of working collaboratively and since 2008 energies have been directed towards the No Needless Medication Errors (NNME) work-stream of the SC Patient Safety Federation (PSF). Improving medicines reconciliation (MR) rates was a key objective, and having access to patients’ own drugs (PODs) was believed to facilitate the MR process. With drive and persistence from the ambulance service (SCAS) pharmacist a consensus on the design of a biodegradable hole-punched green medicines bag for SC-wide use was eventually agreed. A business case was successfully submitted to the PSF to pump-prime secondary care trusts with bags. Trusts committed to purchase specific quantities and the procurement pharmacist tendered the business.

Trusts were supported to introduce or reinvigorate their green medicine bag processes by an NNME Team (SCAS pharmacist, specialist pharmacy services pharmacist and NNME project manager) providing adaptable resources (often based on the green bag tool kit) and facilitating regular workshops and conference calls. Trusts were generally good at supplying bags at discharge but it was unclear how many of the green medicines bags were used to facilitate PODs being brought into hospital and if this could be translated into a quality improvement productivity prevention (QIPP) saving.

**OBJECTIVES**

- To spread the SC green medicines bag from the safety agenda to QIPP
- To quantify the number of patients from three care groups bringing PODs in hospital

Table 1: Breakdown of number of unintentional variations

<table>
<thead>
<tr>
<th>Number of patients (n=38)</th>
<th>Number of unintentional variations found (n=129)</th>
<th>Percentage of number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>1</td>
<td>31%</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>21%</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>13%</td>
</tr>
<tr>
<td>13</td>
<td>&gt;4</td>
<td>34%</td>
</tr>
</tbody>
</table>
To quantify the number of green medicine bags brought in.

To quantify the number and value of the PODs brought in.

To estimate the proportion of PODs used on the wards.

To determine a QIPP saving.

METHOD

All South Central acute trusts agreed to participate in the audit. A data collection form was piloted and an audit date agreed. A point prevalence type audit was designed, whereby on 17 May 2011 all the medical, surgical and care-of-the-elderly patients were reviewed to count the number of PODs brought into hospital (and whether a green medicine bag had been used) and to estimate whether all, some or none of the PODs were being used during the stay. Data collection forms were returned centrally for analysis.

One of the electronic prescribing sites provided detailed information on the PODs their patients brought into hospital on the audit day, and the hospital costs of the medicines. This information was used to calculate the “saving” to secondary care of not supplying the medicine for use on the ward.

Previous work in South Central based on NICE/NPSA methodology had estimated the cost avoidance of pharmacy-led medicines reconciliation to be in the order of £5 per MR. Monthly data collection of the percentage of MRs routinely collected as part of the NNME work-stream and was used to calculate the safety saving. Typically 70% of adults receive a medicines reconciliation within 24 hours of admission.

RESULTS

2,922 patients from 12 acute trusts in South Central were reviewed: 42 to 47% (depending on specialty) brought their medicines into hospital, 5.7 to 11% were not on any medication prior to their admission and 3.5 to 8.5% were monitored dose patients whose medicines would not be reused. Two-thirds to three-quarters of PODs were used on the wards. The audit did not identify the proportion that were not suitable for use or had been discontinued. See Table 1.

The value of PODs brought in by patients estimated from the electronic prescribing site data was manipulated into a daily and an SC average length of stay “saving” to secondary care for not resupplying the medication, Details are in Table 2.

There are approximately 900,000 admissions a year in South Central. The PSF pump-primed 90,000 bags at a cost of £12,000. There is a significant return on investment. If 40% of patients are bringing their medicines into hospital, and there is a conservative “saving” of £10 per patient, then a “saving” of £3.65 is currently made from medicines and a further £1.26m from MR safety cost-avoidance for 70% of these patients across South Central SHA each year.

DISCUSSION

There is an overwhelming safety agenda (accurate medicines reconciliation, avoidance of missed and delayed doses, etc) to encourage the use of green medicine bags. There is also clearly a contribution to QIPP targets, which could be increased by encouraging more patients to bring their medicines into hospital preferably, in a green medicine bag.

Albeit it would appear relatively small numbers of green bags were brought into hospital, the green medicine bag is a facilitative tool to encourage patients and ambulance staff to bring medicines into hospital. If a different method is used that is not a problem.

Further work is under way. One of the three themes of the SC waste medicines campaign launched on 20 February 2012 was “Bring your medicines into hospital using a green medicine bag”. The audit was to be repeated in May 2012 to measure the impact of the campaign. Local pieces of work with team support are under way to ensure medicines follow the patient as they move round organisations; and frequent flyers and key patient groups are being targeted to empower patients to bring their medicines into hospital and to challenge staff to move their medicines with them.

REFERENCES


A survey of NHS consultant pharmacists in England

Howard P*, Barnett N†

*University of Leeds; †Northwick Park Hospital

Consultant pharmacists were introduced in 2005 to provide best care for patients and retain experienced pharmacists in practice. The Department of Health has published a framework for the development of consultant pharmacist posts. It was initially envisaged that there would be around 50 posts. The framework stated that posts should be approved at regional level, but local organisations should determine where they are required and posts could be shared. Post holders should provide up to 50% expert practice (but not necessarily have direct patient contact), and the remainder should be research and service development, education and professional leadership. Posts can be part-time or job share. There were transitional arrangements in place for two years until 2007. It is a restricted title.

OBJECTIVE

The aim of the survey was to quantify for the first time the range of activities being undertaken by the NHS consultant pharmacists in England and to explore their aspirations.

METHODS

This survey built on the NHS North West survey of non-medical consultants undertaken by Working Together Consultancy in 2010. The survey was tailored to the pharmacist role with additional questions added after a review by the Consultant Pharmacists’ Group (CPG). The questions were entered onto web-based survey software SurveyMonkey. The survey was piloted and refined, then e-mailed in March 2011 to all of the current consultant pharmacists known to the CPG. Post holders were followed up until most had entered their data. The software collected and anonymised the responses. No ethics approval was needed as the survey was not about patients.

RESULTS

There were 41 consultant pharmacists in England. The response rate was 95% (23 female). The one non-responder was on maternity leave. Average age at appointment was 40. Seventeen were appointed under transition arrangements and 24 were new posts (10 in 2008; six in 2009 and four in 2010). There are currently no posts in Scotland, Northern Ireland or Wales, with the exception of public health consultant pharmacist posts, which are excluded from the survey. 68% work in acute teaching hospitals, 12% acute non-teaching, 5% in mental health, 7% in primary care and 5% in specialist trusts. The most common specialties are: eight posts in critical care, seven in antimicrobials/infectious disease/HIV, five in haemato-

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Table 1: Details of patients and medicines brought into hospital

<table>
<thead>
<tr>
<th>Admissions</th>
<th>Not on medicines</th>
<th>MDS</th>
<th>Medicines brought in</th>
<th>Number of medicines</th>
<th>Percentage used</th>
<th>Green bags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elderly care</td>
<td>585</td>
<td>22 (3.7%)</td>
<td>50 (8.5%)</td>
<td>262 (45%)</td>
<td>1,112</td>
<td>75%</td>
</tr>
<tr>
<td>Medical</td>
<td>1,346</td>
<td>54 (4%)</td>
<td>88 (6.5%)</td>
<td>571 (42%)</td>
<td>3,046</td>
<td>66.7%</td>
</tr>
<tr>
<td>Surgery</td>
<td>991</td>
<td>111 (11%)</td>
<td>33 (3.3%)</td>
<td>470 (47%)</td>
<td>2,7408</td>
<td>74%</td>
</tr>
</tbody>
</table>

Table 2: Estimates of savings to secondary care from medicines brought into hospital

<table>
<thead>
<tr>
<th>Item saving (£ per day)</th>
<th>Daily savings (£)</th>
<th>Average length of stay saving (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elderly care</td>
<td>0.21</td>
<td>1.55</td>
</tr>
<tr>
<td>Medical</td>
<td>0.26</td>
<td>2.01</td>
</tr>
<tr>
<td>Surgery</td>
<td>0.32</td>
<td>2.51</td>
</tr>
</tbody>
</table>
Consultant pharmacists were introduced in 2005 to provide best care for patients and retain experienced pharmacists in practice. The Department of Health has published a framework for the development of consultant pharmacist posts. It was initially envisaged that there would be around 50 posts. At the time of the survey, there were 41 consultant pharmacists in post. The framework stated that posts should be approved at regional level, but local organisations should determine where they are required and posts could be shared. Posts should provide expert practice, research and service development, education and professional leadership. There were transitional arrangements in place for two years until 2007. It was a restricted title.

OBJECTIVES
Two surveys were planned: one for the chief pharmacists and another for national and regional chief pharmacists. They aimed to identify the strategic approaches to planning new posts at all levels, the barriers to appointment, assessment of current performance and improvements to current roles.

METHODS
Two similar surveys were designed using the web-based software SurveyMonkey. This was piloted and revised. The link to the survey was e-mailed to all the national and regional chief pharmacists in the UK in March 2011. The regional chief pharmacists network was used to disseminate the information to the trust chief pharmacists. Regions that had not responded within one week were followed up by phone. The chief pharmacists of Northern Ireland, Scotland and Wales were also contacted by phone. Responses could be anonymous, and no details would be shared about specific centres. No ethics approval was needed as the survey was not about patients.

RESULTS
Responses were received from seven (70%) regional pharmacists, two national leads and 73 chief pharmacists from across all of the 10 strategic health authorities (SHAs). 52% were from foundation trusts, 44% acute teaching trusts, 30% acute non-teaching trusts, 7% mental health trusts and 6% PCT chief pharmacists.

The non-English countries were planning consultant pharmacists but currently had none in place. Wales and Scotland had public health consultant pharmacists appointed through a different mechanism. These are excluded. 44% of regions had a strategy for the appointment of new posts. Only 23% of trust chief pharmacists had an agreed strategy for future appointments at regional level, 2% at local health economy level (e.g. PCT) and only 7% at trust level. Both regional and trust chief pharmacists identified a need for a strategy at local level (85% and 58%, respectively), regional level 65% and 50%, and national level 85% and 51%.

The main barriers that prevented future appointments were financial (81%), funding time at university (36%), no need (21%) and lack of transitional arrangements (13%), and not aware of benefit over advanced
A survey of dose tailoring methods following therapeutic drug monitoring of aminoglycoside and glycopeptides in the UK

Howard P
Leeds Teaching Hospitals NHS Trust, Leeds

Numerous publications from the Department of Health and the Health Protection Agency (HPA) over the past five years have directed hospitals to adjust the narrow therapeutic spectrum aminoglycosides and glycopeptides where levels are routinely done.

Table 1: Numbers of consultant pharmacist posts

<table>
<thead>
<tr>
<th>Number of consultant pharmacist posts</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posts under transitional arrangements</td>
<td>53</td>
<td>11</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>67</td>
</tr>
<tr>
<td>New posts</td>
<td>50</td>
<td>9</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>61</td>
</tr>
<tr>
<td>Posts in planning stage</td>
<td>47</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>59</td>
</tr>
</tbody>
</table>

Table 1. What do you use to tailor the dosing?

<table>
<thead>
<tr>
<th>Answer option</th>
<th>No tailoring</th>
<th>Written guidance (or nomogram)</th>
<th>By hand</th>
<th>Software</th>
<th>Response count*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gentamicin</td>
<td>1 (2.1%)</td>
<td>30 (62.5%)</td>
<td>17 (35.4%)</td>
<td>6 (12.5%)</td>
<td>48</td>
</tr>
<tr>
<td>Tobramycin</td>
<td>4 (11.1%)</td>
<td>14 (38.9%)</td>
<td>15 (41.7%)</td>
<td>5 (13.9%)</td>
<td>36</td>
</tr>
<tr>
<td>Amikacin</td>
<td>4 (10.8%)</td>
<td>10 (27.0%)</td>
<td>22 (59.5%)</td>
<td>3 (8.1%)</td>
<td>37</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>0 (0%)</td>
<td>30 (83.8%)</td>
<td>20 (52.6%)</td>
<td>3 (8.4%)</td>
<td>47</td>
</tr>
<tr>
<td>Teicoplanin</td>
<td>10 (26.8%)</td>
<td>9 (25.7%)</td>
<td>15 (42.9%)</td>
<td>1 (2.7%)</td>
<td>34</td>
</tr>
</tbody>
</table>

*more than one response allowed

A survey of dose tailoring methods following therapeutic drug monitoring of aminoglycoside and glycopeptides in the UK

Pharmacists (14%). 53% would still use the transitional arrangements if available. Interestingly, 58% would part-fund a post, but only two had done so. 20% of the respondents identified posts in the planning stage. The main ones were haemato-oncology, antimicrobials, critical care, renal, medicines safety and nutrition. There are six posts matched to the Agenda for Change (AFC) job profile without the title. There were nine instances where vacant posts could not be filled, with 33% of reasons being no applicants. One comment stated that there needed to be a registrar type post.

However, 7% want less national leadership, and 8% get everything they want. 18% are unaware what the posts can do, 43% have never been shown what they have achieved, and 58% would like more information on the advantages of the post.

Review of performance was good. 100% thought expert practice met or exceeded expectation. Only 18% thought leadership was below expectation, 11% for education but 31% for research. 44% of trusts would want greater leadership locally, 22% more visibility like them to bring more research funding in, 35% want more research to demonstrate what they have achieved, and 58% would like more information on the advantages of the post.

**CONCLUSIONS**

This is the first survey of chief pharmacists since the framework was published. Consultant pharmacists are generally delivering what their employers want. There needs to be a strategy for the planning of new posts at trust, regional and national level, as well as an improved development process to ensure appointments are made. There needs to be a summary of the benefits of the posts to encourage more appointments. More work needs to be done to bring in research money that would pay for posts, and more research needs to be published. The Consultant Pharmacists’ Group is writing up a report based on the surveys. The results from these two surveys have been submitted as part of the Modernising Pharmacy Careers review.

**REFERENCES**


**RESULTS**

There were responses from 48 different hospitals: England 41 (25% of acute English trusts), Scotland four, Ireland two and Wales one. For gentamicin, tailoring was done in 95.8% (46 hospitals) of adult patients, 70.8% (34) in children and 68.8% (33) in neonates. Only one centre did not do any tailoring. For tobramycin, it was 59.0% (23) adults, 56.4% (22) children, 33.3% (13) neonates, 23.1% (9) that did not, and nine centres not using the drug. For amikacin, 73% (27) adults, 40.5% (15) children, 35.1% (13) neonates, 21.6% (8) that did not, plus 11 centres not using the drug. For vancomycin, 100% (48) adults, 62.5% (30) children and 58.3% (28) in neonates. For teicoplanin, 66.7% (24) adults, 30.6% (11) children, 13.9% (5) neonates, 33.3% (12) did not and 12 centres did not use the drug.

Written guidance (or nomogram) is most commonly used for gentamicin and vancomycin, whereas dose adjustment calculation by hand was most commonly used for tobramycin, amikacin and teicoplanin. A software program was rarely used: gentamicin = 6 hospitals, tobramycin = 3, amikacin = 1, vancomycin = 3 and teicoplanin = 1. Four centres used a program developed in-house by Aintree, Airedale or Glasgow, and two used different commercial programmes: OPT or RxKinetics for Android. A survey in Australia and New Zealand showed similar results to these, with little use of commercial software.1 This is in contrast to the US, where pharmacokinetic consults are done routinely.1 This is probably due to the statement in 1998 by the American Society of Health-System Pharmacists increasing in the UK, while the use of cephalosporins and fluoroquinolones has decreased considerably.

Gentamicin is the most commonly prescribed aminoglycoside in both adults and children. For adult patients, the Hartford method is routinely used for treatment in patients without endocarditis, amputation or renal patients. Once-daily gentamicin is routinely used in children and neonates. Both are recommended in the British National Formulary (BNF). Dose optimisation has been shown to decrease toxicity and improve outcome.1

Vancomycin is the most commonly prescribed glycopeptide in the UK. In response to increasing resistance levels, new guidance on loading and maintenance dosing has been issued by the Infectious Diseases Society of America (IDSA) and the American Society of Health-system Pharmacists (ASHP).2 The historic dosing of 1g every 12 hours in an 80kg patient with normal renal function is unlikely to reach the minimum target trough concentration of 10mg/L, and made lead to resistance. The Scottish Antimicrobial Pharmacy Group has developed a loading and maintenance dose calculator, but this does not provide subsequent dose adjustment advice.3

**METHOD**

A survey was designed using SurveyMonkey software. Three questions were asked about aminoglycoside and glycopeptide dose tailoring following serum levels monitoring in adults, children and neonates where levels were high or low. This was circulated to the members of the UKCPA Infection Management Group during April 2011. A link to the web-based survey was provided. The software analysed the submitted data automatically. No ethics approval was required as this was a survey that did not impact on patient care.

**OBJECTIVE**

The objective of this survey was to quantify the methods employed across the UK to adjust the narrow therapeutic spectrum aminoglycosides and glycopeptides where levels are routinely done.
Pharmacists’ observations of nurse drug administration rounds

Barlow J, Green CF
Countess of Chester Hospital NHS Foundation Trust

The Healthcare Commission report “The best medicine” showed that 97% of patients reviewed were taking medicines, with 82% taking four or more different preparations. Medicines administration errors are also widely documented, with an estimated error rate of 3–8% for non-intravenous doses, and significantly higher for parenteral medicines. The NPSA has issued an alert around administering doses of critical medicines in a timely fashion. Medicines administration, although carried out by nursing staff, is a critical part of the patient’s treatment and an important area for pharmacists to engage with and understand.

OBJECTIVES

Key objectives were to:

- Ensure ward pharmacists attended a drug administration round (DAR) to gain insight into practical and safety issues encountered by nursing staff
- Collect data regarding the omission/delays of medicines administration
- Identify areas of good practice
- Identify rapid improvement opportunities to make DARs safer and more efficient

METHOD

Pharmacists accompanied nursing staff to observe scheduled DARs at a variety of times during the day, for a minimum number of 10 patients per round. The semi-structured observation tool used was adapted from the trust’s “Go See” leadership walkaround tool, and ethics approval was not required. Pharmacists discussed their findings with the respective ward managers, producing an action plan where necessary. During the observation, records were made of the duration of the round, missed doses, drug unavailability, interruptions to the round, and more detailed information on the omission of critical doses.

RESULTS

Twenty pharmacists observed DARs on 15 wards covering the full spectrum of wards at COCH, except critical care. Observation times ranged from 35 to 140 minutes and totalled 27 hours. The time taken for a nurse to administer medication ranged from 4 to 15 minutes per patient (mean: 7.3 minutes). Nine rounds (45%) took place in the “morning”, seven (35%) at “lunchtime”, three (15%) in the evening and one (5%) at “night time”. Nursing staff were interrupted a total of 139 times during observations; a mean of once every 6.3 doses administered. Some pharmacists recorded reasons for interruptions, including: retrieving drugs from stock cupboards, missing charts, telephone calls, patient arrivals on ward, patients without wristbands, no water at the bedside, clinical queries around administration, cannula issues and responding to immediate patient needs.

The administration of 875 medications to 220 inpatients was observed, of which 17 (1.94%) were intravenous drugs and four (0.1%) were Controlled Drugs. Eleven doses (1.25%) were omitted due to the drug being unavailable. 183 (21%) doses were deemed to be “critical drugs”, according to trust policy and, of these, nine (4.9%) were not given within two hours of the prescribed time constituting a delay in treatment. Miscellaneous observations included a potential issue around a shortage of suitable infusion pumps which led to a delay in the administration of infusions; for one patient by 3.5 hours. It was a concern that nursing staff did not generally observe patients’ use of inhalers, assuming appropriate technique and actual self-administration.

A number of opportunities for process or safety improvement were identified:

- Ensure that nursing staff understand and take note of prescription chart endorsements
- Develop a “drug trolley checklist”, for example, ensure trolleys are tidy, have a stock list and are regularly restocked
- Develop a pre-DAR checklist to minimise disruptions due to missing items (medication cups, oral syringes, sharps bin and ensure water is available for patients
- Continually monitor stock lists and levels to ensure product availability
- Ensure medication is re-ordered before the last dose is used
- Avoid taring boxes wide open for easy access, as this increases the likelihood of loose strips of medication being placed in the wrong box
- Highlight patients to pharmacists who are unable to take or refusing medication
- Take steps to minimise interruptions to the DAR, eg, using coloured tabs
- Use a “job book” for medical staff rather than Post-It notes on charts in trays
- Encourage the use of patients’ own drugs and ensure medicines are transferred to their bedside locker, rather than leaving them in the treatment room or patient property bag
- Give IV antibiotics and insulin at the start of rounds to avoid delays in administration

DISCUSSION AND CONCLUSION

This study allowed pharmacists to gain a greater insight and understanding into DARs outside the confines of a formal study. The “Go See” method allows the collection of real time, practical information and encourages rapid changes to processes or procedures where action is required. It also encouraged ward pharmacists to engage with nursing staff and gain a greater appreciation of their issues while administering medication for example, the administration of medicines to very sick or difficult patients, as well as other practical issues.

Agreeing an action plan for both pharmacy and the ward with ward managers was an invaluable opportunity for giving and receiving feedback around the management of medicines at ward level and the pharmacy service as a whole.

A number of opportunities have been identified to improve patient safety as part of a continuous improvement programme, for example, issues around the availability of IV pumps and the lack of supervision and checking of patients inhaler technique, and these will form part of our audit and research strategy moving forwards. Similarly, a number of items of good practice were identified which we will promulgate across the trust, via staff
Inpatient satisfaction with clinical pharmacy services on acute hospital wards

Ladds S
Western Sussex Hospitals NHS Trust, Worthing and Chichester

The 2010 white paper, “Equity and excellence: Liberating the NHS”, seeks to put patients at the centre of services and decision-making in the NHS, and encourages the routine use of patient experience surveys to help achieve this. Outpatient satisfaction surveys are routinely carried out by both community and hospital pharmacies, and while the Care Quality Commission’s national inpatient survey includes some questions relevant to clinical pharmacy services, it is not sufficiently specific to guide service development.

A questionnaire was developed to assess inpatient awareness of, and satisfaction with, clinical pharmacy services on general medical and surgical wards at two acute hospital sites.

OBJECTIVES

- To determine inpatients’ awareness and understanding of the clinical pharmacy service
- To assess inpatients’ satisfaction with clinical pharmacy services

METHOD

Ethics approval was not required for a satisfaction survey, but approval from the trust’s head of information governance was obtained for a group of undergraduate health and social care students from local universities to conduct the survey as an inter-professional learning unit. With facilitation by the trust’s clinical pharmacy manager, the students designed a questionnaire and piloted it on 10 inpatients. Some questions were removed and some modified, then the questionnaire was used by several students to interview inpatients on general medical and surgical wards at two acute hospital sites, during a one-week period in February 2011. The questionnaire consisted mostly of two-way, or five-point Likert scale, closed questions about experience and satisfaction, and open questions about understanding of clinical pharmacy. No patient identifiable data was recorded and patients were not asked about their medical condition or treatments. Patients were excluded if they were unable to participate due to communication difficulties, and verbal consent was obtained. Results for each hospital site were analysed separately to identify any differences.

RESULTS

A total of 112 patients were surveyed, 66 at hospital site A and 46 at hospital site B. The numbers of exclusions and refusals to participate were not recorded. Respondents were mostly emergency admissions (81%) and mostly over 60 years of age (79%). At hospital A, 31 respondents (47%) stated that they had seen a pharmacist at least once, compared to 33 (72%) at hospital B.

Understanding of the role of clinical pharmacists was poor. In response to an open question, 62 (55%) of the total respondents across both hospital sites stated that they did not know what the role was and most others had just a basic awareness that pharmacists were looking at, and supplying, the medicines.

Responses to selected two-way closed survey questions are displayed in Table 1.

<table>
<thead>
<tr>
<th>Question</th>
<th>Hospital A</th>
<th>Hospital B</th>
</tr>
</thead>
<tbody>
<tr>
<td>On admission, did pharmacy staff ask what medicines you usually take?</td>
<td>14 (21%)</td>
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</tr>
<tr>
<td>Are you able to identify pharmacy staff on the ward?</td>
<td>12 (18%)</td>
<td>26 (57%)</td>
</tr>
<tr>
<td>If you want to talk to a pharmacist, do you know how to do this?</td>
<td>11 (17%)</td>
<td>31 (67%)</td>
</tr>
<tr>
<td>Have you been given sufficient information about your medicines?</td>
<td>37 (56%)</td>
<td>22 (48%)</td>
</tr>
</tbody>
</table>

DISCUSSION

Satisfaction with clinical pharmacy staff and services is high, but there is limited understanding of the service, so it is likely that expectations are low. Satisfaction levels at the two hospitals are similar, but there are clear differences in responses to the three questions about accessibility (chi² values <1, p values >0.05) and so have been combined. The proportion of respondents finding aspects of service excellent or good were 98% (47/48) for both appearance and politeness, 88% (42/48) for bedside manner, 73% (35/48) for knowledge about medicines, and 85% (41/48) for overall satisfaction with services. Four patients found pharmacists’ knowledge to be poor or very poor. Six patients were either dissatisfied or very dissatisfied with the overall service.

A leaflet has been produced to briefly explain medicines reconciliation and other aspects of the inpatient clinical pharmacy service. It suggests ways that inpatients can make contact with pharmacy staff whilst in hospital, and other ways to access information about medicines. Leaflets are given to patients as part of the medicines reconciliation process.

Hospital A has started to move towards the ward-based style of service provided at hospital B and additional technicians have been trained in medicines reconciliation.

A medicines helpline has been established and methods of signposting and referring to community post-discharge Medicines Use Review (MUR) services are being explored.

REFERENCES


Table 1: Positive responses to individual questions for each hospital site

Understanding of the role of clinical pharmacists was poor. In response to an open question, 62 (55%) of the total respondents across both hospital sites stated that they did not know what the role was and most others had just a basic awareness that pharmacists were looking at, and supplying, the medicines.

Responses to selected two-way closed survey questions are displayed in Table 1.

Satisfaction ratings were obtained from 20 patients at Hospital A and 28 at Hospital B. They were not statistically different between hospitals (chi² values <1, p values >0.05) and so have been combined. The proportion of respondents finding aspects of service excellent or good were 98% (47/48) for both appearance and politeness, 88% (42/48) for bedside manner, 73% (35/48) for knowledge about medicines, and 85% (41/48) for overall satisfaction with services. Four patients found pharmacists’ knowledge to be poor or very poor. Six patients were either dissatisfied or very dissatisfied with the overall service.

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DISCUSSION

Satisfaction with clinical pharmacy staff and services is high, but there is limited understanding of the service, so it is likely that expectations are low. Satisfaction levels at the two hospitals are similar, but there are clear differences in responses to the three questions about accessibility (chi² values <1, p values >0.05). These can be explained by differences in service delivery style. The ward service at hospital B has undergone radical change over the last two years to become much more ward-based, making it a very visible service. There has also been investment in medicines reconciliation technicians and most pharmacy staff wear a uniform. Hospital A operates with traditional daily pharmacist ward visits and minimal contribution from technicians. Pharmacists at hospital A do not wear a uniform.

There is poor satisfaction with the information received about medicines at both sites (no statistical difference) and a further question showed that most information comes from doctors and nurses, with less than 10% being provided by pharmacy staff. It was not possible to determine all the reasons for overall dissatisfaction with the service. However, three of the six dissatisfied patients had not seen a pharmacist at all during their inpatient admission.

As a result of the survey outcome the following actions are under way:

- A leaflet has been produced to briefly explain medicines reconciliation and other aspects of the inpatient clinical pharmacy service. It suggests ways that inpatients can make contact with pharmacy staff whilst in hospital, and other ways to access information about medicines. Leaflets are given to patients as part of the medicines reconciliation process.
- A medicines helpline has been established and methods of signposting and referring to community post-discharge Medicines Use Review (MUR) services are being explored.

REFERENCES

The effect of an electronic system for monitoring medicines reconciliation on clinical pharmacy performance

Hill A, Nicholls I
Royal Cornwall Hospitals NHS Trust, Truro

With unintentional prescribing errors on admission quoted as 30–70%, medicines reconciliation is a key area for pharmacy involvement. Results for our trust indicated a level of 40% errors on admission. Historically we used a pharmacy drug history template incorporated as part of the medical notes. This resulted in good documentation and communication among the healthcare team, but we were unable to routinely monitor pharmacy performance and had duplication of the medication history documentation by different staff members. Medicines reconciliation activity monitoring was done periodically either through benchmarking exercises of ward pharmacist activity or retrospective audit of the medical notes and drug charts. To overcome the associated problem of sustainability and validity of these methods, and to optimise our delivery of the NICE guidance, we developed an IT systems approach. Drivers for change were migration to the JAC medicines management functionality our pharmacy team record the medications at patient admission. A crystal report is generated and printed out for reconciliation. Pharmacists and accredited technicians then reconcile the medications documenting whether they have been continued, changed or stopped once all unintentional errors have been resolved. This sheet is part of the medical notes once completed. A drug called “medicines reconciled” is added to the patient’s record, allowing us to monitor pharmacy performance. A daily report is run for all patients who have had the “medicines reconciled” drug added to their record and this compares the time this occurred to the time of admission. This report is circulated daily within the department. Ethics approval was not required for this project as it service evaluation.

OBJECTIVES
2. Use results in conjunction with manual audit as a key performance indicator to be reported at ward / division level.

METHOD
Using the JAC medicines management functionality our pharmacy team record the medications at patient admission. A crystal report is generated and printed out for reconciliation. Pharmacists and accredited technicians then reconcile the medications documenting whether they have been continued, changed or stopped once all unintentional errors have been resolved. This sheet is part of the medical notes once completed. A drug called “medicines reconciled” is added to the patient’s record, allowing us to monitor pharmacy performance. A daily report is run for all patients who have had the “medicines reconciled” drug added to their record and this compares the time this occurred to the time of admission. This report is circulated daily within the department. Ethics approval was not required for this project as it service evaluation.

RESULTS
Following implementation of the new process in August 2011, results showed an increase in reconciling admitted patients from less than 50% to approaching 80%. Reconciliation within 24 hours is difficult to achieve particularly with limitations of reduced staff at weekends.

DISCUSSION
The initial improvement in performance is attributed to the transparency of monitoring, staff wanting to perform in their area, as well as staff knowing that results for named wards are shared within the pharmacy team. There was a second increase in performance in October 2011 due to outsourcing our outpatient dispensing, allowing us to free up medicines management technician time to support pharmacists on the wards, particularly focusing on medicines reconciliation. The more recent dip in performance in 2012 is attributed to staff shortages. More detailed data show the expected variation in performance during the week with reconciliation happening to a greater extent towards the end of the week.

We identified some unexpected benefits from this project, a number of which were associated with the discharge stage. Doctors doing e-discharge are reminded when prescribing on discharge of any medications that have been stopped during the hospital stay and will recommence medications if necessary. It is quicker for a doctor to complete an e-discharge when the drug fields are already populated. Clinical checking of prescriptions away from the medical notes for example in the dispensary is now more effective as the electronic record can be used in addition to the drug chart.

The medicines reconciliation report is used by the pharmacy team to help prioritise work.

Due to high turnover of patients in the inpatient areas we achieved medicines reconciliation of greater than 70% and currently set our target as 50%, however, the percentage of medicines reconciled within 24 hours is significantly higher in admissions locations than on the wards.

There are limitations of our medicines reconciliation report: it provides a minute-by-minute snapshot of performance only and relies on our patient administration system being up to date. However, for our trust it provides a more accurate and sustainable picture than previous manual data collection methods that were laborious and had none of the additional benefits that we have seen in our project.

In conclusion, monitoring our data has produced a significant improvement in performance on medicines reconciliation and allows us to use our resources as efficiently as possible. The data have helped us develop services, for example, increased input to the orthopaedic areas and introducing a Saturday clinical service. We intend to further evaluate the clinical impact of this increased level of medicines reconciliation on patient outcomes.

REFERENCES

An investigation into compliance with NICE and NCEPOD recommendations for adult parenteral nutrition

Callagy T, Pooler J, Green CF
Pharmacy Department, Countess of Chester Hospital NHS Foundation Trust

Parenteral nutrition (PN) is indicated where enteral/oral nutrition is contraindicated, inappropriate or not expected to provide adequate nutrition for a minimum of five days. It may result in potentially fatal complications — for example, infection, hyperglycaemia, thrombophlebitis, fluid overload or dehydration. The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) on the care of hospital patients receiving parenteral nutrition was published in 2010 and reported that good practice was identified in 171 (19%) of 877 cases reviewed. Good practice was based on the opinion of an advisor and
defined by the standard of care they would accept from themselves, their trainees and their institutions, although clear definitions were not provided.1

For safe administration of PN, NCEPOD requires an accurate nutritional and biochemical assessment, a re-feeding risk assessment, suitable intravenous access and careful monitoring of the patient’s electrolytes and anthropometric response.1 NICE clinical guideline, “Nutrition support for adults”, recommends that sodium, urea, potassium, creatinine and random glucose measurements should be carried out every day until the patient is stable. NICE also states that patients at risk of re-feeding should have daily phosphate and magnesium levels monitored. Finally, PN should not be an emergency service; it should be a planned, elective intervention.1

OBJECTIVES
The aim was to retrospectively audit practice at COCH in comparison to the NCEPOD report and NICE guidance. The objectives were to assess compliance with each of the measures set out in the NCEPOD and NICE guidance and these are described in the results and Table 1.

METHOD
The NCEPOD report, generated by an expert panel, could not be replicated. Therefore an audit tool was developed using measurable recommendations of NCEPOD/NICE guidance. A data collection form was designed and pilot tested resulting in no significant changes. Data were collected via the electronic patient record. Patients over the age of 18 years were included in the audit; those already receiving PN on admission to the hospital were excluded. Ethics approval was not required.

RESULTS
Fifty patients were audited of whom, 23 (46%) had PN administered via a peripherally inserted central catheter (PICC) line and 27 (54%) via a central line. Comparison with the NCEPOD report is described in Table 1. The median duration of PN was eight days (range 1–150 days, IQR 5–25 days). Four patients (8%) received PN for three days or less, which the NCEPOD report suggested might be a reflection of bad decision-making regarding the necessity for PN. Random glucose monitoring was omitted in every one of the affected patients. Only one patient did not have twice weekly liver function tests done and this patient was refusing to give blood at that time. Thirteen-seven patients (74%) were identified as being at risk of re-feeding and of these, 29 (78%) followed the NCEPOD recommendation that they must have daily blood tests; in particular phosphate and magnesium.1 Two patients did not have any blood measurements done over the weekend despite a documented request in one instance.

Of the four patients with a delay in establishing access, two occurred over a weekend due to the absence of a PICC line insertion service.

DISCUSSION AND CONCLUSION
The audit results were largely positive in comparison to those of the NCEPOD report, but a number of opportunities to improve patient safety around the provision of PN have been identified. With regard to the two patients unsuitable for PN, in both cases, the consultant involved in the care of these patients considered low albumin levels a reason to warrant PN; however, NCEPOD described this as a poor marker of nutritional status that should not be used in the decision to commence PN.2 It is debatable as to whether the supply of PN should have been made; however, the nutrition support team currently has an advisory, rather than enforcement role which is being reviewed as a result of this audit. As a result of the administration of the Kabiven bag without the vitamin and trace element infusion, examination of the process identified that the one infusion was stored at room temperature and one in the refrigerator which necessitated physical separation of the infusions. This has now been rectified via the sourcing of infusions that can be stored at room temperature together. The poor results found in the monitoring phase may be largely attributable to random glucose measurements not being recorded in Meditech in line with the mantra:“If it’s not documented, it didn’t happen.” Compliance with weighing patients could be improved. However, the retrospective nature of the audit meant it was difficult to identify whether this may have been due to their clinical condition. Nevertheless, this has been followed up with the wards concerned.

The findings of the audit have been shared with the nutrition team and a readapt scheduled for six months’ time.

REFERENCES

An audit of biologic drug waste in rheumatology patients
Whiteman J, McVerry M, Brown G
Musgrave Park Hospital, Belfast Health and Social Care Trust, Belfast

Musgrave Park Hospital is a regional specialist centre for rheumatology in Northern Ireland. More than 1,080 patients are on biologic treatment for inflammatory disease such as rheumatoid arthritis, ankylosing spondylitis and psoriatic arthritis. Musgrave Park Hospital pharmacy department dispenses all biologic drugs for day ward attendees, inpatients and outpatients. These drugs are either sent to the ward or delivered by a homecare agency to patients’ homes. A large number of dispensed biologic drugs are returned to pharmacy. If the cold chain has been maintained then these drugs can be recycled. However, if these drugs have been stored in a patient’s home the drugs have to be destroyed. On average biologic drugs cost around £9,500 per patient per year compared with around £450 per year for conventional therapy.1 The use of biologic drugs has a large financial impact on the NHS. It is therefore important to prevent unnecessary waste and to regularly review the practices of prescribing, dispensing and administering these drugs.

OBJECTIVES
● To audit returned biologic drugs for recycling
● To audit returned biologic drugs for disposal
● To identify reasons for returns and waste
● To identify methods for reducing returned prescriptions and waste

Audit against the following standard: Robust procedures should be in place to reduce biological drug waste.

METHOD
The initial audit was a six-month audit between August 2008 and January 2009. The details of all biologic drugs returned to pharmacy and whether the drugs were recycled or discarded was recorded. It was normal practice to record patients’ medical assessments, treatment and dispensing history using a computerised care pathway. These records were used to identify

| Table 1: Comparison of the findings at COCH to those published in the NCEPOD report. (n=50) |
|---------------------------------|----------------|----------------|
| **Standard of care** | **COCH compliance** | **NCEPOD findings** |
| Inappropriate indication | 2 (4%) | 232/808 (29%) |
| Deficiency in biochemical, nutrition and re-feeding risk assessment | 0 (0%) | 399/738 (54%) |
| Inadequate monitoring | 26 (52%) | 296/683 (43%) |
| Inadequate biochemistry review | 1 (2%) | 165/683 (24%) |
| Inadequate glucose review | 21 (42%) | 120/683 (18%) |
| Weekly weights not carried out | 16 (32%) | 155/683 (23%) |
| PN started out of hours | 1 (2%) | 138/846 (16.5%) |
| Delay in identifying the need for PN | 4 (8%) | 128/798 (16%) |
| Delay in establishing access for PN | 5 (10%) | 71/782 (9%) |
reasons for drug return. Results were presented to the rheumatology team at the multidisciplinary audit team meeting. The initial audit identified reasons why drugs had to be returned to pharmacy for recycling and also reasons for drug waste. A biologic drug return form was developed so that drugs switched to biologic for rescheduled patients and adverse events were returned to pharmacy for recycling as patients do not receive drug for a number of reasons. Pharmacy is able to recycle a large amount of returned drugs to be held for the patient if they had been rescheduled, thereby reducing pharmacy workload. It was hoped to reduce pharmacy workload by introducing a biologic drug return form. This form allowed drug to be held for the patient if they had been rescheduled, thereby reducing the work involved in processing returns and re-dispensing drugs.

During the first six-month audit, 122 biologic scripts, amounting to a value of £14,800, were recycled by pharmacy. The reasons for drugs being returned were: drug withheld from patient (39%), patient not on ward (31%), drug ordered in error (18%), drug changed (2%), patient off drug (8%), unknown (2%). During the same period 38 biologic prescriptions were returned for disposal from 31 patients, amounting to £56,185 of drug waste. Between April 2009 and March 2010, pharmacy recycled £284,872 worth of biologic drugs. During this time period 174 self-injectable pens or syringes were returned for disposal. This amounted to £61,685 of drug waste. Figure 1 shows the number of patients returning self-injectable biologic drugs for disposal and the reasons for waste.

**DISCUSSION**

The first audit showed that the practice of pre-ordering biologic infusions for the biologic clinic on the day ward led to a large amount of drug being returned to pharmacy for recycling as patients do not receive drug for a number of reasons. Pharmacy is able to recycle a large amount of returned drug as good practices mean that the cold chain is maintained. However, this increases pharmacy workload. It was hoped to reduce pharmacy workload by introducing a biologic drug return form. This form allowed drug to be held for the patient if they had been rescheduled, thereby reducing the work involved in processing returns and re-dispensing drugs. However, introduction of a biologic return form did not appear to reduce the amount of recycling substantially. Other strategies to reduce the amount of recycled drugs need to be considered such as reducing the number of prescriptions pre-ordered by the ward and investigating why patients did not attend the ward for drugs.

The audit also showed that there was high cost drug waste. Waste is difficult to prevent as it is impossible to predict if patients will experience an adverse event. Switching between biologic drugs due inefficacy or adverse event contributes to waste. Patient education is important as patients need to understand their responsibilities and the need to refuse delivery of drug if they are unwell or think they may be discontinued off drug by their consultant. As a result of this audit pharmacy has developed a patient information leaflet that will be delivered to the patient with their medication. This highlights the high cost of these drugs and gives advice on when to refuse delivery and when to contact pharmacy or the homecare delivery service. It is necessary to continue to audit the prescribing, dispensing and delivery systems in place for these high cost drugs.

**REFERENCES**


An audit of dronedarone prescribing and monitoring

Giddings S, Plater S
Royal Brompton & Harefield NHS Trust, London

Dronedarone, a class III-antiarrhythmic, is used in atrial fibrillation (AF) to prolong the action potential and to reduce arrhythmia burden.

Post marketing data on dronedarone revealed 155 reports of patients developing severe liver damage, two requiring transplant. Additionally PALLAS, a phase 3B clinical trial investigating dronedarone in patients with permanent AF, was terminated due to an increased mortality in the study drug arm. Consequently, the European Medicines Agency (EMA) in September 2011 revised its recommendations, limiting dronedarone to “maintain heart rate in patients with non-permanent AF as a second line treatment following cardioversion.” The EMA also recommended the close monitoring of liver function tests (LFTs) for all patients taking dronedarone. As dronedarone is monitored in the primary care setting under a shared care arrangement, the trust informed the relevant GP surgeries of the increased monitoring requirements for patients on dronedarone.

**AIM**

The audit aimed to establish whether patients were compliant to National Institute for Health and Clinical Excellence (NICE) or trust guidelines for the initiation of dronedarone and whether they were monitored correctly in the primary care setting.

**OBJECTIVES**

The audit standards combine both NICE and trust guidelines due to the fact that the former have not been recently updated. 2,3

- 100% of patients comply with risk factors identified by NICE or otherwise trust guidelines indicating the use of dronedarone (risk factors include hypertension requiring drugs of two or more classes; diabetes mellitus; previous transient ischaemic attack, stroke or systemic embolism, left atrial diameter of 50 mm or greater; LV ejection fraction less than 40% or aged 70 years or older)
- 100% of patients have non-permanent AF
100% of patients have a baseline ECG done before and one week after commencing treatment
● 100% of patients have regular blood tests to check LFTs (monthly for six months, then at 9 and 12 months respectively).
● 100% of blood results do not show an increase of alanine transaminase (ALT) above three times the upper range of normal
● 0% of patients have heart failure or left ventricular (LV) dysfunction

**METHOD**
Ethics approval was not needed for the audit project. The collection tool was piloted using five patients; no adjustments to the tool were made. Over a one-week period the medical/electronic files of all patients on dronedarone at the Royal Brompton (RBH) site were analysed. This was done to determine whether patients met the audit standards. The patient’s GP surgery was then contacted to request a faxed copy of all blood tests performed since the initiation of dronedarone. The trust issued correspondence to GP surgeries requesting commencement of regular monitoring of patient blood tests if they had not already done so in March 2011. Therefore blood results were analysed from April 2011 onwards, to allow a one-month period to implement recommendations.

**RESULTS**
Of the 70 dronedarone patients (identified by JAC), 16 were excluded due to death, treatment for less than 10 days or unobtainable records. Five patients were excluded from blood monitoring as records were unobtainable from primary care. Thirty-two of the 49 patients had at least two ALT results to compare. The results are summarised in Table 1.

**DISCUSSION**
The results were supportive of consultant-led initiation with 87.04% of patients meeting NICE criteria, and remaining patients satisfying criteria set by trust guidelines. Yet the minority of patients with heart failure/LV dysfunction (16.66%) need reviewing and ideally discontinued from dronedarone. This is supported by findings from the PALLAS study. QT prolongation is a common side effect of dronedarone and the electrical conductivity of the heart needs monitoring on initiation. 11.11% of patients had an ECG done before and within seven days of starting treatment; this highlights an area for improvement. The monitoring of dronedarone is of large concern, 87.76% of patients are not regularly monitored and likely unaware of the recent cautions to dronedarone use. An intervention is required to ensure patient safety is paramount. A review of the shared care system would be ideal. It may be preferential to send out blood boxes direct to the patient, which they take to the GP to ensure necessary monitoring occurs. It is encouraging that no patients had raised ALT results; yet the lack of available results may indicate that some LFT abnormalities may not have been identified.

**CONCLUSION**
There appears to be areas of concern regarding the initiation and monitoring of dronedarone. Those patients with heart failure or LV dysfunction need to be reviewed and the shared care system itself revised. A re-audit should take place after recommendations are implemented.

**REFERENCES**

**An audit of the safer prescribing, administration and storage of insulin**
Al-Abduallah S, Ruszala V
North Bristol NHS Trust (NBT), Bristol

The Institute for Safe Medication Practices (ISMP) has listed insulin as a high-risk medicine; a medicine that is likely to cause significant harm to the patient even when prescribed as intended. The National Reporting and Learning Service (NRLS) revealed that inappropriate management of insulin within the NHS accounted for 15,227 incidents between November 2003 and August 2009. Moreover, in January 2012, the Department of Health (DoH) listed the maladministration of insulin as a “never event”. Between 2004 and 2009, the National Patient Safety Agency (NPSA) received a total of 3,881 wrong dose incidents that involved insulin including the use of an IV syringe to measure and administer insulin, which resulted in three deaths.

As a result in June 2010 the NPSA issued a rapid response report (RRR) regarding the safer administration of insulin. This outlined key standards for safe practice in prescribing, preparation and administration of insulin that the trust must adopt, alongside its current policy regarding the storage of insulin.

**OBJECTIVES**
1. Collect and record all data on a self-designed collection tool across both sites
2. Audit against the standards set out by the NPSA in relation to the prescribing, administration, preparation and storage of insulin

**METHOD**
The representative sample size was calculated as 40 based upon the number of expected diabetic inpatients within the trust and the number expected to be treated with insulin. Ethical approval was not required but the trust's clinical governance and audit department was informed of the audit. The inclusion criteria were patients treated with insulin, on a medical or surgical ward and were present on the ward, with accessible notes and drug chart. The standards for the audit were:

1. The term “units” is always written in full and insulin is always prescribed by brand name
2. Device for insulin administration and timing of doses are always specified
3. Decision of self-administration is documented in the notes for all patients
4. All infusions have a specified rate, all syringes are made up correctly and capillary blood glucose is monitored hourly
5. All wards have adequate supplies of insulin syringes and subcutaneous needles
6. No insulin pens are stored with needles still attached
7. All unopened insulin is stored in the ward refrigerator
8. All insulin in use is stored in the patient’s drug locker and labelled with name and date of opening

**RESULTS**
Data was collected for a total of 40 inpatients. No patients were identified on an insulin pump and only two patients were identified that were on an

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Table 1: Percentage of patients complying with audit standards set for the initiation and monitoring of dronedarone

<table>
<thead>
<tr>
<th>Audit standards for the initiation of dronedarone</th>
<th>Percentage of patients who meet set standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients comply with risk factors identified by NICE guidelines for the use of dronedarone (n=54)</td>
<td>87.04%</td>
</tr>
<tr>
<td>Patients comply with risk factors identified by NICE or otherwise trust guidelines for the use of dronedarone (n=54)</td>
<td>100.00%</td>
</tr>
<tr>
<td>Patients have non-permanent atrial fibrillation (AF) (n=54)</td>
<td>100.00%</td>
</tr>
<tr>
<td>Patients have a baseline ECG done before and one week after commencing treatment (n=54)</td>
<td>11.11%</td>
</tr>
<tr>
<td>Patients have regular blood tests (monthly for six months, then at nine and 12 months, respectively) (n=49)</td>
<td>12.24%</td>
</tr>
<tr>
<td>Blood results do not show an increase of ALT above three times the upper range of normal (n=32)</td>
<td>100.00%</td>
</tr>
<tr>
<td>Patients do not have heart failure or LV dysfunction (n=54)</td>
<td>83.33%</td>
</tr>
</tbody>
</table>
Develop common definitions of ward based clinical activities

Develop comparator indices

Measure clinical activities of our staff

Develop comparator indices

Table 1: Number of errors identified

<table>
<thead>
<tr>
<th>Standard</th>
<th>Number of patients</th>
<th>Errors identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Units” written in full</td>
<td>40</td>
<td>6 (15%)</td>
</tr>
<tr>
<td>Brand name written in full</td>
<td>40</td>
<td>11 (27.5%)</td>
</tr>
<tr>
<td>Drug device specified</td>
<td>40</td>
<td>29 (72.5%)</td>
</tr>
<tr>
<td>Timing of doses specified</td>
<td>40</td>
<td>24 (60%)</td>
</tr>
<tr>
<td>Documentation if patient is self-administering</td>
<td>14</td>
<td>4 (28.6%)</td>
</tr>
<tr>
<td>Infusion made up correctly and rate specified</td>
<td>1</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Infusion discontinued 30min after patient's usual insulin dose</td>
<td>2</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Unopened insulin stored in fridge</td>
<td>40</td>
<td>1 (2.5%)</td>
</tr>
<tr>
<td>Insulin pens stored without needles attached</td>
<td>18</td>
<td>6 (33%)</td>
</tr>
<tr>
<td>Opened insulin stored in locker</td>
<td>11</td>
<td>7 (63.6%)</td>
</tr>
<tr>
<td>Devices labelled with patient name</td>
<td>40</td>
<td>23 (57.5%)</td>
</tr>
<tr>
<td>Date insulin opened documented</td>
<td>40</td>
<td>26 (65%)</td>
</tr>
</tbody>
</table>

insulin infusion. All wards had adequate supply of needles and IV syringes were not being used to measure insulin. A summary of findings is displayed in Table 1.

Discussion

There were a number of prescribing errors identified including failure to specify the exact time that insulin should be administered and the device to be used. This risk decreases as there is a risk that high-risk errors could be occurring, which may lead to patient harm.

Although some errors were being stored with needles still attached, this error was identified on patients who were self-administering their insulin, indicating that patient education may be lacking and could be a focus for the future. Many nurses were unaware of the requirement for insulin to be stored at room temperature once opened, resulting in inappropriate storage. This was consistent with failure to state the date the insulin was opened and the failure to label the insulin with the patient’s name, which may lead to contamination risk and impair the quality of the medication being used.

In order to re-enforce the safe prescribing of insulin, a new chart is almost to be launched across the trust, including in specialty directorates. This chart already has the term “units” pre-printed to avoid prescribing and administration errors. Furthermore, timings are already specified on the chart, including the instruction “pre-meal”, allowing greater clarification of the exact time that patients required their insulin dose. It would be of great benefit to re-launch the storage policy within the trust and to increase education for both nurses and patients. It is clear that more needs to be done regarding self-administration and education of how to store insulin and this should be the focus for efforts in the coming months.

References


Benchmarked clinical pharmacy services


One of the many challenges facing clinical pharmacy managers is ensuring we are providing a cost effective service. As a group we have worked together over a number of years to try and establish common standards and practices. We have undertaken audits to try to improve practice. The next step was to benchmark our practice in order to provide data that will allow us compare our performance.

Objectives

- Develop common definitions of ward based clinical activities
- Measure clinical activities of our staff
- Develop comparator indices

Method

One of us has previously published work on which defined direct patient care activities have impact on patient care. We used this second piece of work as a pilot to help refine and develop a tool to collect direct patient activity on wards. At two meetings of clinical pharmacy managers from across Yorkshire we further refined and agreed definitions of 13 separate direct patient care activities. For seven days in December 2011 we asked every clinical pharmacist across all the acute hospital trusts to document their time spent on wards undertaking clinical work. They recorded all the direct patient care activities carried out during their time on the ward and the contributions to patient care that resulted from those activities. We also obtained information about numbers of admissions to each trust during the seven-day period.

Data were entered onto a standardised database by each acute trust. The data were then collated centrally before sharing among all the participating trusts.

Results

During the seven days, data were collected from over 3,000 hours of ward-based direct patient care work across 11 trusts. This resulted in 5,491 minor interventions and 575 significant (or “major”) interventions. We were interested in determining which specific activities led to the significant interventions and analysis showed that the activity that led to the most significant interventions was Level 2 medicines review at 202 (35%) followed by medicines reconciliation at 115 (20%) then medication history taking 70 (12%). Data were collected from 563 patients who had a comprehensive consultation with a pharmacist (to provide information and advice about their medicines) and 1,336 patients who were provided with brief advice or information. All data was anonymous. As a benchmarking exercise, ethics approval was felt necessary.

The number of patients per hour who had each type of direct patient care activity by a pharmacist were calculated (Table 1). Also in the table are the number of “interventions/contributions” per hour. A similar set of indices were calculated that related number of patients who had a direct patient care activity divided by the number of admissions. Not all trusts were able to obtain accurate numbers of “admissions to hospital” for the study period. There was a wide range of values between trusts when number of admissions was used as the denominator. The median number of medicines history confirmed was 0.48 (range 0.18–1.08). The median number of medicines reconciliations per admission was 0.45 (range 0.23–1.1). The median Level 2 medication review per admission was 0.84 (range 0.62–1.56).

Discussion

This was our first attempt at comparison of clinical pharmacy activity across a number of trusts. All participating trusts said that they valued the data and have used the data internally in discussions within their departments; in a number of trusts the data have been used in multidisciplinary meetings.

Some of the data is similar across trusts, suggesting our practices appear comparable. For one trust their medication history and medicines reconciliations per admission exceeded 1.0: we think this is due to the way admissions are recorded by that trust. Looking at the activity rate per hour for “medicines information” requests from other healthcare professionals the rate per hour varies between 0.52 and 1.08 per hour. This is in contrast to medication history, which has a wide variation in activity rate. We think this is likely to reflect those trusts that more widely use pharmacy technicians to confirm drug histories (we didn’t collect data from technicians’ activities). There is a weak negative correlation between medication history and attendance at MDT (Spearman rank correlation
Enhanced clinical pharmacy service targeting tools: risk predictive algorithms

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*Clinical and Practice Research Group, School of Pharmacy, Queen’s University Belfast; 1Pharmacy and Medicines Management Centre, Antrim Area Hospital [Northern Health and Social Care Trust (NHSCT)]

Targeting of resources to patients who are most in need of healthcare services is considered the ultimate goal of healthcare providers. Comprehensive targeting of care is expected to lead to an improvement in the overall quality of healthcare and better control over healthcare costs. Hospital readmission rate is considered an outcome measure that indicates the effectiveness of hospital services. To allow improved targeting of care, the Department of Health (DOH) and the NHS have recommended the use of a case finding algorithm called PARR (patients at risk of re-hospitalisation), the aim of which is to help identify patients with higher priority for clinical interventions, based on the risk of readmission to hospital.

OBJECTIVE

To determine the value of using a mix of clinical pharmacy data and routine hospital admission spell data in the development of predictive algorithms for post-discharge outcomes. The exploration of risk factors in hospitalised patients, together with the targeting strategies devised, will help promote the provision of more efficient clinical pharmacy services to those patients who will derive the most benefit.

METHOD

Data required to calculate the assessment measures were obtained from computerised hospital episode statistics (HES), including demographic data and diagnoses. PARR++ is a predictive algorithmic modelling tool that gives risk scores for re-hospitalisation of individual patients in the 12 months post discharge. Running the monthly PARR++ algorithm produced PARR re-hospitalisation risk scores (0 to 100), for inclusion in the modelling. The total number of months covered was 60. Risk scores were also correlated with clinical pharmacy staffing levels (surrogate for clinical pharmacy activity at the study site hospital).

Predictive algorithms were developed using a 75% randomly selected sample of inpatients (n=605) who received integrated medicines management (IMM) services while hospitalised, and validated using the remaining 25% (n=201). The algorithms were applied to the validation sample and predicted risk probability was generated for each patient from the coefficients. Risk-thresholds for the algorithms were determined by identifying the cut-off points of risk scores at which the algorithm would have the highest discriminative performance.

The study, part of an ongoing research project on healthcare outcomes, was approved by the Office of Research Ethical Committees in Northern Ireland (ORECNI, reference number 05/N101/98).

RESULTS

Numbers of previous admissions in the previous three years and number of admission medicines formed the optimal post-discharge readmission risk algorithm. The optimal post-discharge mortality algorithm contained these latter two parameters together with age-adjusted comorbidity and receiving a diuretic. Age-adjusted comorbidity proved to the best single index to predict mortality. The algorithms created were valid in predicting risk of post-discharge mortality and risk of hospital readmission at three, six and 12 months post discharge. Patient at risk of readmission (PARR) scores showed no relationship with the size (in FTEs—full time equivalents) of the clinical pharmacy team. However, increase in the clinical pharmacy team size over the study period was correlated with a decrease in monthly mean scores for RAMI (Risk Adjusted Mortality Index; Figure 1) and LOS (length of stay), and an increase in RALI (Risk Adjusted Length of Stay Index).

DISCUSSION AND CONCLUSION

Although no statistically reliable algorithm could be developed to predict risk of a longer hospital stay than expected, the present research demonstrated the

| Table 1: Number of patients per hour who had a direct patient care activity |
|--------------------------|--------|--------|--------|--------|-------|--------|--------|--------|-------|--------|--------|-------|
| Activity                | A t/hr | B t/hr | C t/hr | D t/hr | E t/hr | F t/hr | G t/hr | H t/hr | I t/hr | J t/hr | K t/hr |
| Medication history      | 1.69   | 1.50   | 1.59   | 0.95   | 0.89   | 0.59   | 1.69   | 0.93   | 2.24   | 1.38   | 0.68   |
| Medicines reconciliation| 1.96   | 2.38   | 1.34   | 1.03   | 1.22   | 0.60   | 1.72   | 0.95   | 1.95   | 0.9   | 1.83   |
| Prescription review     | 4.71   | 5.77   | 4.78   | 1.42   | 5.42   | 2.66   | 6.37   | 2.85   | 5.11   | 2.17   | 5.23   |
| Level 2 medicines review| 2.41   | 3.38   | 2.56   | 2.88   | 3.20   | 2.82   | 1.82   | 2.20   | 2.08   | 2.01   | 2.74   |
| Brief advice            | 0.61   | 0.53   | 0.34   | 0.44   | 0.72   | 0.32   | 0.55   | 0.77   | 0.63   | 0.39   | 0.60   |
| Comprehensive information| 0.10  | 0.05   | 0.12   | 0.35   | 0.07   | 0.00   | 0.03   | 0.17   | 0.13   | 0.07   | 0.91   |
| Patient investigation   | 0.10   | 0.03   | 0.06   | 0.08   | 0.12   | 0.00   | 0.01   | 0.16   | 0.04   | 0.14   | 0.02   |
| Medicines information   | 0.98   | 0.63   | 0.77   | 0.64   | 0.82   | 1.00   | 0.81   | 0.75   | 1.08   | 0.52   | 0.79   |
| Prescribing             | 0.00   | 0.01   | 0.28   | 0.13   | 0.37   | 0.00   | 0.02   | 0.10   | 0.12   | 0.19   | 0.01   |
| MDT attendance          | 0.00   | 0.13   | 0.15   | 0.65   | 0.74   | 0.57   | 0.34   | 0.58   | 0.83   | 0.6   | 0.54   |
| TTO validation          | 0.53   | 0.15   | 0.38   | 0.54   | 1.24   | 1.10   | 0.52   | 0.51   | 0.92   | 0.74   | 1.38   |
| Contact primary care    | 0.28   | 0.06   | 0.14   | 0.12   | 0.15   | 0.00   | 0.13   | 0.16   | 0.27   | 0.09   | 0.13   |
| POD review              | 0.79   | 0.34   | 0.28   | 0.13   | 0.75   | 0.10   | 0.55   | 0.32   | 0.89   | 0.27   | 0.38   |
| Minor interventions      | 2.73   | 2.89   | 1.96   | 2.10   | 2.21   | 1.38   | 1.97   | 2.42   | 0.52   | 1.63   | 4.38   |
| Major interventions      | 0.37   | 0.31   | 0.26   | 0.15   | 0.20   | 0.16   | 0.34   | 0.20   | 0.12   | 0.09   | 0.35   |

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value of using a mix of clinical pharmacy data and routine hospital admission data in the development of predictive algorithms for post-discharge mortality and readmission at three, six, and 12 months. It is recommended that this latter approach is used to target clinical pharmacy services during patient hospitalisation to help reduce undesirable post-discharge outcomes.

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Quality of prescribing of anticholinergic drugs in the over-65s

Chaudhry, N and DeMello, J
Ealing Hospital, NHS Trust

Anticholinergic drugs (ACD) carry different anticholinergic burdens (ACB) due to the severity of each side effect. Researchers have identified three ACB scores: 1 is for drugs with lower anticholinergic activity, with fewer side effects, while 3 is associated with more side effects.1 Studies have linked the use of anticholinergic medication in 65-year-olds to cognitive impairment. Patients over 65 years have lower anticholinergic activity and anticholinergic usage can further decrease levels leading to side effects,2 which may increase risk of falls (ROFs) and increase mortality. A study established that an increase in the number of ACDs in patients directly increases their ACB (calculated by adding the ACB of each medication) and its cumulative effects in the body. An addition of one ACD had shown to increase the rate of mortality by 26%. Patients with an ACB of 3 have a high risk of mortality.1 In the local hospital, falls is one of the most reported incident. It is important to identify if ACD use had been implicated in this.

OBJECTIVES
To identify the percentage of patients (over the age of 65) taking anticholinergic drugs, the percentage of patients with high ROFs and with an ACB of 3.

METHOD
Ethics approval was not required as this was an audit, and the audit tool was produced. A drug list was formulated by placing the ACD into three scores (as stated above). The pilot was conducted by three pharmacists, over a one-week period. A template of relevant changes was made to the tool. The audit tool and drug list were distributed to all pharmacists, who recorded the patient and their medication details on their wards, over a three-week period. The collection criteria only included patients over the age of 65. For patients taking anticholinergics, the dose, duration, symptoms and documented ROFs (in nurse’s notes) was recorded. Any incomplete data was highlighted and was collected before the patient was discharged. All the data was placed on a Microsoft Excel sheet, and any duplicate data from the same patient was removed.

RESULTS
The results are set out in Figure 1. Of the 87 patients documented, 63% were on ACD and 16% had an ACB of 1. Out of the 16%, 22% had high risk of falls. 84% had an ACB of 1–2, out of which 68% had high risk of falls. Out of the 63% of patients on ACD the overall high ROFs rate was 69% while 21% had low ROFs and 10% had no documented ROFs. 35% of the patients on ACD were males while 65% were females, suggesting that women are at more risk than males. 45% of patients had been admitted to hospital while on anticholinergics.

The most common symptoms experienced were: confusion (22%), dizziness (19%), constipation (18%), increased heart rate (12%) and dry mouth (11%). The most common drugs used were: furosemide (18%), codeine (14%), warfarin (11%), isosorbide mononitrate (8%) and ranitidine (7%). The top three drugs commonly prescribed are used frequently in the community and hospitals.

DISCUSSION
There is a positive correlation between the use of ACD and ROFs. This may be due to the large number of ACDs, which have a cumulative effect on the ACD. The symptoms experienced by patients (as stated above in Results) may impair mobility or may result in them tilting out of bed and increasing the ROFs. In addition, due to the co-morbidities, patients over 65 are likely to be taking a high number of medications, including ACDs.

Patients with an ACD of 1–2 had the highest ROFs (68%). There may be a link to the length of time patients have been on ACD, as 85% of patients were on ACD prior to admission. 22% of patients who had a high risk of falls had an ACD 3, suggesting that these drugs should be reviewed as a matter of priority.

As the results have demonstrated a link to ROFs with ACD regardless of their ACB, a pocket sized ACB guideline had been produced to help doctors and pharmacists review ACD in patients with high ROFs.

LIMITATIONS
Not all wards had been covered during this audit, so a few patients would have been missed. Some anticholinergics chosen in this audit were uncommon, and pharmacists had to familiarise with them in order to highlight the patients. The ACB for some ACDs could not be determined and were allocated the lowest ACB score of 1. The precise time for starting the medication could not be determined in patients; however, whether the medication had been taken prior to admission was identified as part of the drug history.

CONCLUSION AND RECOMMENDATIONS
ACD usage increases the ROFs (69% of patients had high ROFs who had been taking ACDs), therefore all patients on ACD or who have high ROFs should be reviewed and their treatment optimised to decrease that risk. Pocket sized guidelines have been produced and will be used to review all patients on ACD with high ROFs, for a six-month period in the admissions ward. The hospital will then be re-audited and the results will be compared to verify whether the guidelines have had a positive effect.

REFERENCES
Medicines management in care home residents: impact of a pharmacist clinical medication review

Hughes KS,1, Hodson KL,1, Harries J,2 Hawkins B1
1Cwm Taf Health Board, Royal Glamorgan Hospital, Wales; 2Cardiff University, School of Pharmacy and Pharmaceutical Sciences, Wales

The Department of Health’s (DoH) Care Home Alert was issued in January 2010 following the publication of the Care Homes Use of Medicines (CHUMS) report in November 2009.1 The CHUMS study revealed a high incidence of medication errors in terms of prescribing, dispensing, administration and monitoring of medicines that were received by older residents of care homes; on any one-day 70% of patients experienced at least one medication error. The DoH alert highlighted that pharmacists have the necessary knowledge and skills to undertake medication reviews in primary and secondary care.1 The cost-effectiveness and logistics of a pharmacist-led clinical medication review (CMR) service to care home patients within Cwm Taf needed to be researched to identify whether investing in such a service would be financially rewarding and minimise the number of unnecessary and potentially harmful medicines prescribed.

OBJECTIVES
- To identify the type of medication changes made following a pharmacist-CMR
- To identify the frequency with which pharmacist recommendations following a CMR were accepted by general practitioners (GPs)
- To explore reasons why pharmacist recommendations were not accepted and/or implemented by GPs
- To identify cost implications

METHOD
Cwm Taf Health Board and Cardiff University both independently approved the research protocol. An application for ethical approval was not required as the research was deemed to be service evaluation according to the National Research Ethics Service. One home was selected from a shortlist based on convenience sampling. Prospective CMRs of all 40 patients (residential and nursing) within the care home took place between April and July 2011. Residents were registered with five different GP practices. The number and nature of interventions made following the CMR and rate of acceptance and implementation by the GP was recorded. Cost implications compared the cost differences of monthly repeat medication, pre- and post-CMRS and the pharmacist resource requirements. Data was analysed using the Statistical Package for Social Sciences version 18.0.

RESULTS
The 40 residents were prescribed a total of 326 medicines (mean: 8.15/patient). A total of 147 interventions were identified (mean: 3.68/patient). Overall prescribed medicines, 45% (147/326) required an intervention. Nearly all (39) patients required at least one intervention.

Table 1 shows the types of interventions recommended and the corresponding GP acceptance and implementation rates. Each intervention category was subcategorised to provide rationale for the intervention, for example, a combined 71.4% (25/35) of “stop” interventions were for “inappropriate duration” or “indication no longer being valid”. Two-thirds (67%) of interventions were accepted by GPs and implemented. A reason for GPs declining “stop” interventions in particular was because they were unwilling to take the risk of a potential adverse event occurring after discontinuing a medicine. Another common reason for GPs declining recommendations in general was personal knowledge of the patient’s medical condition not documented on the medical records. The GPs awareness of the relatives’ resistance to changes in patient’s medication also contributed to recommendations being declined.

The main therapeutic areas for the interventions were cardiovascular (18%), endocrine (18%), nutrition and blood (15%), central nervous system (14%) and gastrointestinal (13%).

The cost reduction of the repeat medication following one CMR per patient for the care home study was £14,576 (mean: £365/patient or £100/intervention) per annum. The gross pharmacist cost per CMR was £243. A net saving to Cwm Taf Health-Board of £13,602.80 per annum was achieved, demonstrating a 14-fold return on investment in medicines expenditure.

DISCUSSION AND CONCLUSION
This project demonstrates the opportunity for achieving considerable cost savings in medicines expenditure in Cwm Taf by using a clinical pharmacist to improve cost effectiveness and safety of prescribing in care homes through performing CMRs. The number and range in the nature of interventions recommended and subsequently accepted and implemented highlights the need for regular reviews in this patient population. The optimum interval for medication review has not yet been identified and although not evidence-based, the National Service Framework for Older People outlines that people taking four or more medicines should be reviewed six-monthly.3 It would be interesting to discover if the same type of interventions are identified and cost savings reproduced on subsequent CMRS in the same cohort. A closer working relationship with GPs to change their approach to prescribing in care home patients in the longer term is essential if benefits in medicines management are to be maintained. Only the research pharmacist recommended and subsequently accepted and implemented highlights the need for regular review in this patient population. The optimum interval for medication review has not yet been identified and although not evidence-based, the National Service Framework for Older People outlines that people taking four or more medicines should be reviewed six-monthly.3

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REFERENCE

Quantitative analysis of OSCE assessments in Level 4 MPharm students

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School of Pharmacy, Queen’s University Belfast

Pharmacy has undergone an evolution over the past 20 years, with pharmacists increasingly extending their roles including independent
prescribing in multiprofessional or pharmacist-led clinics in order to meet the changing healthcare needs of society. The ability to apply an increasingly clinical skill-set within the diverse pharmacy workforce has fuelled a radical transformation in pharmacy undergraduate education in order to ensure that future pharmacist professionals are fit for purpose. Appropriate and reliable assessment of pharmacy student competence with regard to the provision of clinical pharmacy skills is fundamental in order to ensure patient safety.\(^1,2\)

A wide range of assessments have been used to estimate student performance across the healthcare disciplines. The objective structured clinical examination (OSCE) is one of the most popular and was first described by Harden et al\(^3\) with medical students in 1975. The OSCE has been proven to be the most reliable and valid tool for assessing clinical competence\(^1\) and has the ability to examine a range of skills for a large number of students.\(^8\) The OSCE is a flexible examination format, consisting of a series of task stations through which students rotate on a timed basis. Time spent at each station is usually short — 5–10 minutes — but the time and number of stations varies with the OSCE design. OSCEs offer advantages over traditional forms of testing, e.g., multiple choice questions (MCQs), as they provide the opportunity to assess communication and interpersonal skills, professional judgement and moral/ethical reasoning as well as the application of clinical knowledge.

In 2011, the General Pharmaceutical Council (GPhC) introduced guidelines on the initial education and training of pharmacists,\(^4\) which emphasised the need for schools of pharmacy to demonstrate student competence in defined tasks. At Queens University Belfast, a formative OSCE was introduced in the academic year 2009–10 to determine the clinical skills of third-year undergraduate students during their hospital placement; subsequent to this, when these students reached fourth year, they completed a summative OSCE which contributed 15% of one module.

**OBJECTIVES**

- To assess fourth year MPharm students’ overall perception and acceptance of an objective structured clinical examination
- To investigate the validity of the OSCE by comparing students’ performance in the OSCE with four other modules completed in the MPharm degree and compare OSCE results for the top 10% and bottom 10% of students in the year group

**METHOD**

In December 2010, all fourth-year students (\(n=123\)) completed a four-station OSCE, two oral and two written. In February 2011, all fourth-year students were asked to complete a questionnaire regarding OSCE use in the MPharm. The questions intended to evaluate the extent of understanding, preferences on frequency of use and overall attitude to the OSCE. The results of the OSCE were also compared with results of Pharmacy Practice, Responding to Symptoms, Pharmacotherapy and Pharmacist Prescribing modules (top 10% and bottom 10% of student year group based on aggregated marks from third and fourth year). Cronbach’s alpha parallel forms reliability test was used to determine how consistent OSCE performance was compared to each of the modules considered by calculating the correlation between the two sets of scores. A value of 0.7 or above was considered to indicate acceptable reliability. Ethical approval for this study was obtained from the School of Pharmacy Ethics Committee in Queen’s University Belfast.

**RESULTS**

A good response rate of 89% (\(n=110\)) was obtained from the questionnaire with the majority of respondents (78.1%, \(n=86\)) understanding what was expected of them in the OSCE and only 26% felt they were not aware of the knowledge required to complete an OSCE. Over 40% (41.5%, \(n=46\)) stated it was more stressful knowing the person acting as the patient. Over half (52.4%, \(n=58\)) of students felt the OSCE measured clinical skills in almost “real-life” situations and 80% (\(n=88\)) felt OSCEs should be introduced earlier in the MPharm degree. Male students were more in favour of OSCEs. There was no significant relationship identified between age, hospital or community experience and student views regarding OSCE. The OSCE showed no significant correlation with the modules examined, although there was a trend towards significance (0.67) with students’ performance in the Responding to Symptoms module.

**DISCUSSION AND CONCLUSION**

Students reported feeling that the OSCE was a significantly more stressful assessment than a written exam, which is supported by findings in the literature.\(^1\) They proposed that the time allocated (10 minutes) per station contributed to the stress they experienced. However, assessors deliberately chose a short period of time in order to expose students to performing a clinical task in a pressured situation as reflective of real life practice.

Although most students felt that they could achieve better marks in a written exam than an OSCE and admitted to spending more time revising for a written exam this could reflect a lack of familiarity with the OSCE format and hence how to prepare for this assessment despite the provision of a mock exam, a handbook, a tutorial and a DVD to help prepare them pre-OSCE.

The lack of correlation with performance in other modules can be perceived as a positive result as it establishes that OSCEs are able to assess different areas of practice that other assessments cannot.

**REFERENCES**


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**Adherence to appropriate medication supply and identification of cost saving at an NHS hospital trust via dispensing outpatient prescriptions**

Beard S, Dabasia S, Cassam J

Ealing Hospital NHS Trust, London

In recognition of the challenging financial situation faced by the NHS it is important for each hospital pharmacy to ensure adherence to appropriate medicines supply as part of the quality, innovation, productivity and prevention (QIPP) initiative. Schedule 22 of the local NHS medicines management contract\(^1\) (MMC) clearly states that prescriptions should only be dispensed if the following applies:

1. Patient needs immediate treatment with a medication
2. Patient is dependent on hospital transport
3. Patient needs a medicine on the red list of medicines that the hospital should not ask General Practitioners (GPs) to prescribe
4. There has been an arrangement with commissioning organisations and GPs that the medicine in question will be supplied by the hospital until therapy stabilised
5. The medicine is not available outside the hospital

Some medicines prescribed via outpatient prescriptions do not meet the above criteria and should instead be obtained via GP referral letter.

**AIM**

To identify adherence to the dispensing criteria and quantity of medication supplied, to calculate cost of potential savings via outpatient prescriptions and make recommendations to implement changes.
OBJECTIVES
1 To identify names and number of items that do not conform to the requirements set out in Schedule 22 of the local NHS MMC, and calculate the cost of inappropriate supply.
2 To determine the number of items that do not adhere to the 14 days or nearest original pack supply requirement and calculate the cost of oversupply.
3 To identify the number of over-the-counter (OTC) items for patients who are not exempt from the NHS charges and calculate the potential income generation.

STANDARDS
Standards 1 and 2 have been adapted from the medicines management policy and Standard 3 has been agreed by senior pharmacists.

1 100% of items on the outpatient prescriptions should comply with Schedule 22 of the MMC.
2 The quantity of items supplied should be for 14 days or the nearest original pack size in 100% of items prescribed on outpatient prescriptions.
3 100% of OTC items on the outpatient prescriptions for patients who are not exempt from the NHS charges should be identified.

METHOD
Ethics approval was not required for this audit. Quantitative data was obtained retrospectively for one month (September 2011) from the outpatient prescriptions and local Ascribe dispensing system using a piloted data collection sheet. The data was collected for the items that did not meet the contract supply requirements of Schedule 22, items where the quantity supplied was greater than 14 days or nearest original pack size and for items endorsed ND (not dispensed). Three senior pharmacists assessed whether the given patients diagnosis required an immediate treatment with a medication in order to identify compliance with criterion 1.1 of Schedule 22. The collected data consisted of the drug name, strength, dose, frequency, quantity supplied, pack size and cost. The data was split according to the three objectives and analysed.

RESULTS
The results are set out in Table 1.

DISCUSSION AND CONCLUSION
The results (Table 1) show that compared to the standard only a small proportion of items supplied, 1.40%, did not comply with Schedule 22 of the MMC. Examples include levothyroxine, ferrous sulphate, Haelan tape and Dalvit drops. It can be argued that by meeting the standard savings could be made. The suggested list of medications that do not conform to Schedule 22 could be discussed at the Drug and Therapeutics Committee (DTC) with the aim of being excluded from supply on the hospital outpatient prescription and obtained from the GP in all instances. In individual cases the delay of 48 hours to arrange an appointment with GP may not be appropriate and should be discussed with the prescriber. Implementation of this change could project annual cost savings of £2,700. Therefore I recommend putting forward a list to DTC, applying change and then re-auditing.

Secondly, an even smaller proportion of items did not comply with the 14 day or nearest original pack size supply (0.74%). However, there is room for improvement in order to achieve 100% compliance and in doing so, a projected yearly saving of a further £1,000 could be made. Therefore, I recommend buying smaller pack sizes of medications, carrying out a training session on adherence to 14 days’ medication supply with dispensary staff and then re-auditing 14 days’ medication supply.

Thirdly, 100% of OTC items were correctly identified. The potential projected cost estimated to £1,260 per year. However, there is not enough data to conclude if there is a business case for OTC sales. Also the cost of setting up OTC sales needs to be taken into consideration. Therefore I recommend carrying out a bigger scale audit with at least six months’ data.

Table 1: Medicines supply and cost per month and projected per annum

<table>
<thead>
<tr>
<th>Objective</th>
<th>Result title</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number of items supplied outside Schedule 22</td>
<td>30 (1.40%) (n=2153)</td>
</tr>
<tr>
<td></td>
<td>Total cost of items supplied outside Schedule 22</td>
<td>£225.47/month, or £2,700/annum</td>
</tr>
<tr>
<td>2</td>
<td>Number of items oversupplied</td>
<td>16 (0.74%) (n=2153)</td>
</tr>
<tr>
<td></td>
<td>Total cost of oversupply</td>
<td>£89.69/month, or £1,000/annum</td>
</tr>
<tr>
<td>3</td>
<td>Number of OTC items identified</td>
<td>17 (100%) (n=17)</td>
</tr>
<tr>
<td></td>
<td>Potential cost of OTC items if supplied (calculated as per private prescription)</td>
<td>£105.62/month, or £1,260/annum</td>
</tr>
</tbody>
</table>

In conclusion, this audit confirmed good adherence to dispensing criteria (98.6%) and medication supply (99.26%) according to the MMC, identified potential cost saving in implementing list, buying smaller pack sizes of medications and setting up OTC sales. Implementation of these changes could potentially generate yearly cost saving of approximately £5,000. However, large-scale audit is required to confirm findings taking into account setting up cost, implementing changes and re-auditing.

REFERENCES

How are we doing: methods and results of a key user internal survey at University Hospitals of Leicester

Hall G, Ellwood C, Reddin M, Harris D, Couchman P, Meakin C
Pharmacy Department, University Hospitals of Leicester NHS Trust

The University Hospitals of Leicester (UHL), like many NHS trusts, is changing radically to manage in a financially challenging environment. This is affecting all services across the three main sites that constitute UHL and has led to plans to consolidate to two acute sites.

To rise to the challenge of these changes the Pharmacy Department set up the “New ways of working steering group” to lead on the implementation of changes to working practices such as lean working and the reconfiguration of services. It is chaired by the deputy chief pharmacist and has on it senior pharmacists and managers. Information from key users on current service and priorities was essential to direct the work of this steering group.

OBJECTIVE
To carry out a survey of key internal service users and decision makers within the trust, to inform us of their priorities, and to rate our current services. To use these results to determine what we do well and what we need to improve.

METHODS
We used a SurveyMonkey questionnaire technique as this allows easy access to individuals via their e-mail account and result analysis is carried out automatically.

Three key internal groups of service user were surveyed to inform us of their priorities with regards to pharmacy services and to rate current services. These three groups were senior doctors (consultants, heads of service and divisional directors), senior nurses (matrons, heads of nursing and divisional nurses) and senior managers (service managers and divisional managers). Some questions were core and others tailored to a specific user group.

Questions were devised by members of the new ways of working steering group members and piloted by staff in each key user group. The link to the survey was e-mailed to key users in July 2011 and was open to
An audit of omitted and delayed doses of antimicrobials in adult critical care following the NPSA rapid response report RRR009

Zakir Z, Fischer AH
Royal Brompton & Harefield NHS Foundation Trust

The National Patient Safety Agency (NPSA) received over 21,000 incident reports regarding omitted and delayed medicines in hospitals over a 34 month period. These included 27 deaths and 68 cases in which the patients suffered severe harm as a result of timing of administration or omissions.

Antimicrobials were highlighted as a group of critical medicines that when omitted or delayed could cause serious patient harm. Antimicrobials were responsible for 31 of the 95 most serious incidents and accounted for the highest number of reported deaths. Delayed administration of antimicrobials has a greater potential to affect patients’ outcome, if patients are critically ill. Timely administration of antibiotics has shown to improve morbidity and reduce length of hospital stay. It is therefore recommended that antimicrobial therapy should be initiated and the first dose given within an hour of the time prescribed. For subsequent doses a maximum of two hours between time due and time administered can be accepted. The audit reviewed the antimicrobial administration practice on two adult intensive care units (AICU) and compared current practice against the NPSA recommendations.

OBJECTIVES
This audit aims to identify if critical care patients are receiving their antimicrobial medication within the recommended times. In particular all patients (100%) should have:

- first dose of antimicrobials administered within one hour of being prescribed
- subsequent doses administered within two hours of schedule
- no doses of antimicrobial medication unintentionally omitted

The audit identified baseline data to assess the compliance with the NPSA alert and areas for improvement. Furthermore, it sought to establish if automated reports from electronic medicine administration record ICIP (Intellivue Clinical Information Portfolio, Philips) can be used to establish regular reporting.

METHODOLOGY
A retrospective medication administration record review was undertaken, including all adult patients admitted to the AICUs receiving antimicrobial therapy over a seven-day period. The reporting database of the electronic patient record system ICIP was accessed using standard SQL syntax (SQL Server 6, Microsoft), which was developed using a Microsoft Access interface (Access, Microsoft Office 2007). The retrieved data were validated and analysed using Microsoft Excel (Excel, Microsoft Office 2007). The audit tools consisted of two work sheets. The first recorded patient demographics and details of each antimicrobial course. The second recorded the details of each antimicrobial dose, medication details, scheduled and administration times, and time delays. The electronic signature of the nurse administering the medication was used as the administration time. Ethical approval was not required as the audit was set out to evaluate local practice and review compliance with the NPSA report.

RESULTS
Over the seven-day period a total of 52 patients were included and 144 antimicrobial courses analysed. A total of 496 scheduled doses were identified from the ICIP. No doses were omitted unintentionally. Eight
Are patients getting enough information about their antibiotics?

Ibidapo A, Cheema K
Ealing Hospital NHS Trust, Southall

Information supplied to patients about newly prescribed medication increases their understanding of the medication and increases adherence. In a Cochrane review by Haynes (2008), counselling and provision of written medication information showed increased adherence in patients prescribed short-courses of treatment and consequently, increase in health outcomes. The Care Quality Commission (CQC) also emphasises the need for clear information to be supplied with medication, to increase adherence and patient outcomes. According to their national report on managing patients' medicines after discharge from hospital, “It is particularly important that patients are given clear information about the purpose of their medicine and possible side effects.”

This audit aimed to investigate patients’ knowledge about their antibiotics in Ealing Hospital NHS Trust (EHT).

OBJECTIVES

1. Set standards for the minimum level of patient knowledge expected
2. Design a data collection tool and use this to find out what patients know about their prescribed antibiotics and what they will like to know
3. Collect data through interviews with patients on designated wards over three weeks in October 2011
4. Analyse data, compare to standards and present to antibiotic team in the trust and Patient/Public Involvement (PPI) representative
5. Suggest recommendations for an antibiotic patient information leaflet (PIL)

STANDARDS

Incorporating CQC guidance, the antibiotics pharmacist and doctors at EHT agreed the following standards for patients suitting the inclusion and exclusion criteria:

- 100% should be aware that they have been prescribed antibiotics.
- 100% should be aware of why they have been prescribed antibiotics.
- 100% should have all their information needs met.

METHOD

Being an audit, ethical approval was not required from the National Research Ethics Service, although audit approval was gained from the trust's
To measure the level of adherence to the standards over a one-week period.

**AIM**

To audit the quality of statins prescribing against trust guidelines and compare with previous baseline. The standard set for this audit was a 72.22% low cost statin target.

**OBJECTIVES**

- To measure the level of adherence to the standards over a one-week period
- To evaluate the low cost to high cost statin prescribing ratio and compare against baseline

**METHOD**

Ethics approval was not required for this audit. A data collection form was designed to gather the relevant information needed for the audit. A pilot of the data collection was carried on the cardiology ward and modifications to the collection form were made. Training was given to ward pharmacists to ensure consistency and reliability of data. Data was collected between 5 and 10 December 2011 on all wards, using handover sheets, patients' drug charts, medical notes and discharge summaries, and by verbal communication with the patients. Blood cholesterol levels were obtained from the pathology department.

**RESULTS**

Table 1 compares some of our results with the baseline data.

<table>
<thead>
<tr>
<th>Table 1: Comparing results of post-guidelines audit with baseline audit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Post-guidelines audit</strong></td>
</tr>
<tr>
<td>Total number of patients</td>
</tr>
<tr>
<td>Percentage of statins changes made in hospital</td>
</tr>
<tr>
<td>Percentage of low cost statins vs high cost statins</td>
</tr>
</tbody>
</table>

**An audit of the quality of prescribing of statins at Ealing Hospital**

Guirguis R, Patel Z

Ealing Hospital (EHT), London

Coronary heart disease is the number one killer in the UK, with one in five men and one in seven women dying from the disease. Statins are lipid-lowering drugs that have consistently demonstrated a reduction in mortality and cardiovascular events in patients at risk of cardiovascular diseases. However, with the NHS’s limited budget and its £20bn target of efficiency savings by 2015, there is a need to identify those patients who would most benefit from statin therapy. Current expenditure on statins is estimated at £500m a year in the UK. The NHS “Better Care, Better Value” indicators, which identify potential areas for improvement in efficiency, show that 72.22% of statins prescribed in our local area could be prescribed as low cost statins. Our trust revised its lipid modification guidelines in December 2010 in order to optimise statins therapy cost-effectively. This audit is a re-evaluation of the prescribing following implementation of these guidelines. Findings from a previous audit on the quality of statins prescribing were used as a baseline for comparison with our results.

**DISCUSSION AND CONCLUSION**

Patient knowledge of the main side effects to look out for and the duration of the antibiotic course was weak. There were no set standards for these but it informs us that this is an area to work on, because according to CQC, patients should be made aware of the main side effects to look out for in their medication. It should be noted that some respondents were satisfied at not receiving any information at all and did not need to know anything about the addition of new medication due to complete trust in the medical team.

The audit results have highlighted the areas of patient knowledge that need improvement as provision of side effect information and duration of antibiotic course. These will be incorporated into a trust-wide antibiotic PIL. Doctors or pharmacists will complete relevant sections on the PIL and supply it to the patient newly prescribed an antibiotic. It will also act as a prompt to information provision. A draft PIL has been developed and will be finalised by the antibiotics team and the PPI in terms of readability. It will then be piloted and rolled out.

As this is only the starting point for this topic, the small sample size was a limitation. Larger sampling is a recommendation for further work. Further work should also include non-English speaking patients because the trust is based in an area with a multicultural population. Repeat data collection to analyse the effect of the PIL is recommended; it is proposed that the poor areas of information provision will improve.
40% (42/106) of the patients who had their drug history continued were on a high cost statin.

64.7% (11/17) of the newly initiated/changed statins involved stepping up treatment or initiation of a higher intensity statin. 70.6% (12/17) of the interventions made to statin therapy were compliant with guidelines. Of the patients who had their treatment continued as per their drug history, 59% (63/106) were being treated according to guidelines.

56% (70/124) of the statins patients seen during the audit were on a low cost statin while 44% (54/124) were on a high cost one.

**DISCUSSION**

The population studied and the trends observed were similar to the baseline data, suggesting that there has been no significant change in practice post-guidelines. The number of interventions made at the hospital has remained almost the same post-guidelines, most of which involved the stepping up of statin treatment in patients not achieving target lipid levels or in the treatment of acute coronary syndromes. This is due to the acute nature of admissions at the hospital which rarely leads to a stepping-down of statin. 8(6%) patients were initiated on a statin at the hospital. The interventions made at the hospital had a 70.6% adherence to guidelines. The interventions that were not compliant to guidelines involved the inappropriate initiation of atorvastatin 40mg instead of simvastatin 40mg for secondary prevention. In some cases, lower potency statins than what is recommended by guidelines, were prescribed.

The majority of statins are initiated in community. 116 (94%) patients were already on a statin upon admission. 41(4%) of the patients who had their statin continued, as per their drug history, were not being treated according to hospital guidelines. This is most likely to be an underestimation as all the patients who were on atorvastatin 40mg, for secondary prevention, were passed as compliant to guidelines. To precisely determine whether these patients were appropriately initiated or stepped up to atorvastatin 40mg, we would need to assess the patients' lipid profiles and this was beyond the scope of this project. These results suggest that better consideration to guidelines is needed in the community, when initiating or changing statin therapy, in order to reduce prescribing of high cost statins.

Overall, 56% (69/124) of all the statins patients assessed were on a low cost statin, with patients having a statin as part of their drug history contributing to the majority of these figures. This falls short of the standard set at the beginning of the audit. However, as mentioned above, the patients admitted to hospital are usually very ill and are often the ones who require more aggressive statin therapy. A similar audit, if performed in the community, would give us a better indication as to whether the 72.22% low cost statin target in our locality is being met.

Emphasis should be placed upon the use of simvastatin 40mg (unless contraindicated) as the first-line agent for secondary prevention and that only patients who do not achieve the target cholesterol levels of 4mmol/L and low density lipoprotein levels of 2mmol/L are offered atorvastatin 40mg.

**REFERENCES**


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**An audit on missed and delayed doses at NWLHT**

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During a patient’s stay in hospital, medicine doses can often be delayed, missed or omitted. When prescribed medicines are not given, a valid reason must always be documented in medical notes. Patient safety is a major priority for all healthcare organisations. The National Patient Safety Agency (NPSA) has defined a patient safety incident as “any unintended or unexpected incidents which could have or did lead to harm for one or more patients”. In 2010, the NPSA issued an alert on missed doses. This alert was issued to illustrate the need for further work in the NHS to address this important patient safety issue. As this was an audit project, ethics approval was not required.

**AIM**

To undertake an audit that will assess whether the trust complies with the NPSA alert and the Medicines Policy with regards to omitted and delayed doses.

**OBJECTIVES**

- To determine the total number of missed and delayed doses on a sample of patients on all wards across the trust and areas whereby we provide a pharmacy service
- To determine whether drugs are being administered according to trust guidelines
- To make recommendations to improve adherence to trust guidelines

**STANDARDS**

100% of drug doses must be administered on time unless a valid reason has been documented in the medical notes

**METHOD**

An audit was conducted in November 2011 with the help of pharmacists within the trust. A form was designed to collect data for the first five patients on each ward, looking at the number of doses that should have been administered in the previous 24 hours. All pharmacists involved in the data collection were briefed on how to use the form.

A pre-determined code is noted down on the drug chart when a dose is missed or delayed to indicate the reason for this omitted dose. This can be: (1) patient away from ward; (2) nil by mouth (NBM); (3) nausea and vomiting (N&V); (4) patient refused; (5) other.

This audit will focus on the number of “5”s used, reasons behind their use, and the number of unsigned boxes administered on the drug chart. The type of data collected included: total number of doses; number of “5”s with documentation; number of “5”s with no documentation; number of unsigned boxes on the drug chart; any comments regarding the medications missed or delayed.

**RESULTS**

During the audit period, a total of 1,920 medicines had been prescribed, of which only 8% of doses were not administered. A total of 92% of doses were administered during the audit period, however, 8% of doses were not. From this 8%, the audit data showed that 66% had unsigned boxes and 10% had “5”s with no documentation. The remaining missed doses (24%) had “5”s with documentation. The trust policy had been followed by documentation of the reason.

When comparing the results for Northwick Park Hospital (NPH) with Central Middlesex Hospital (CMH), CMH had a higher percentage of unsigned boxes (77% compared to 56% respectively). Results from NPH indicate that there was a higher percentage of “5”s being documented compared to CMH (30% compared to 18% respectively). See Table 1.

Across the trust, it is clear that not all doses were administered. Surgical wards at CMH and NPH had the lowest percentage of doses administered. This result did not include codes 1-4.

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Percentage of doses administered CMH</th>
<th>Percentage of doses administered NPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialist</td>
<td>99%</td>
<td>99%</td>
</tr>
<tr>
<td>Surgery</td>
<td>81%</td>
<td>89%</td>
</tr>
<tr>
<td>Elderly care</td>
<td>96%</td>
<td>94%</td>
</tr>
<tr>
<td>General medicine</td>
<td>84%</td>
<td>96%</td>
</tr>
</tbody>
</table>

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See Table 1.
DISCUSSION

The standard set at the beginning of this audit was not met. Results from both sites indicate that some drug doses were not signed for and hence it is not known whether or not they were administered.

One of the reasons why doses were not administered was due to nurses not being able to find the drug on the ward. This is clearly not an acceptable reason as all efforts must be made to obtain medication. If this is not possible then advice should be sought from the prescriber or pharmacist as stated in the medicines policy and the outcome documented in patient notes. Missing doses can lead to complications such as underdosing, which can be fatal in some cases.

The percentage of “5’s” with documentation was the highest for both hospitals in the elderly care speciality. This not only indicates compliance but also nursing staff in this speciality have received adequate training.

If the drug is not available, other actions should be undertaken, such as calling pharmacy to see if the drug has been dispensed, double-checking the drug cupboard or contacting the on-call pharmacist out of hours. In future audits, the same amount of wards for each speciality should be audited.

Some pharmacists did not complete the full data collection form, therefore an easier data collection form should be made, and pharmacists should be briefed further about the audit.

CONCLUSION

The standard set was not met. Out of the 8% of doses not administered correctly, the largest percentage (66%) was due to unsigned boxes. The tabard scheme was introduced on some wards across the trust. This scheme involves nurses on drug rounds wearing red aprons stating that they are on a drug round and should not be disturbed. This scheme has lowered the percentage of “5’s” with no documentation and the percentage of unsigned boxes; and should be placed on all wards across the trust. Nurses currently undertake a training programme that focuses on missed doses every three years. Undertaking this programme annually would be beneficial.

REFERENCES
2 NWLHT Medicines policy.

Compliance with oral methotrexate guidelines

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Oral methotrexate (MTX) is used by thousands of people in the UK and provides safe and effective treatment for a range of medical conditions. However, if taken at an incorrect frequency or dose, or with insufficient monitoring, it can cause serious harm and even death. Due to these risks, the former National Patient Safety Agency (NPSA) issued a patient safety alert providing guidance on how to improve the safe supply of oral MTX to patients.1 In line with this, the trust cytotoxic policy was updated to provide guidance for safe oral MTX dispensing. The essential recommendations outlined in both these guidelines have been used to derive standards for this audit and are listed below.

AIM
To determine the level of compliance with national and trust cytotoxic guidelines for safe supply of oral methotrexate.

OBJECTIVES
• To measure the level of compliance of the screening, checking and counselling processes of oral MTX supply against standards, using outpatient prescriptions between 14 November and 9 December 2011 on two sites within a trust
• To identify areas of non-compliance to guidelines
• To make recommendations to improve compliance

STANDARDS

1. Prescribed dose corresponds with the dose entered in the book 72%
2. Patients’ U&Es, FBCs, platelets and LFTs are current and checked 98%
3. Labels state the total number of tablets and the day of the week that it must be taken 98%
4. Two pharmacists carried out a final check on the prescription 100%
5. New patients were counselled on how to take MTX, the dose and frequency 76%
6. Regular patients were counselled on identification of side effects and signs of toxicity 67%
7. Patients prescribed folic acid know the differentiation between MTX and folic acid tablets 84%

METHOD

The compliance criteria used in the data collection form were derived from the NPSA patient safety alert and the trust cytotoxic policy.1 All standards set above were covered in the data collection form. A pilot study was conducted over one week to assess the quality of the form and changes were made where necessary. Before the audit was undertaken, the outpatient dispensary team was briefed on the aims of the audit and on how to correctly complete the data collection form before any pharmacist interventions were made with the prescription. The audit was carried out over a period of four weeks in two hospitals within the trust. This audit did not require any ethical approval.

RESULTS

Table 1 shows that only one standard met the 100% compliance target. This standard defined that 100% of prescriptions must be checked by two pharmacists and was guidance set in the trust cytotoxic policy. The lowest levels of compliance were found on recommendations set nationally by the NPSA. These included ensuring correspondence between the dose prescribed and the dose entered in the monitoring book (72%), and appropriate counselling for new and regular patients to ensure the safe use of MTX (76% and 67%, respectively).

DISCUSSION

Comments cited on the data collection forms for poor compliance with Standard 1 revealed that doctors did not always complete patients’ monitoring books. In addition, prescriptions were written omitting certain details, for instance the day of the week to take MTX, and for these reasons failed to meet all criteria. Secondly, barriers to effective counselling were possibly due to pharmacy staff handing out MTX who sometimes did not have the necessary expertise to provide adequate counselling. Furthermore, medication was sometimes collected by patients’ representatives; therefore
An audit on the prescribing of angiotensin converting enzyme blockers and angiotensin 2 receptor antagonists

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The Quality, Innovation, Productivity and Prevention (QIPP) programme is a national Department of Health strategy designed to ensure that value for money is further enhanced while quality is maintained or improved.1 The North West London Hospitals Trust (NW LH T) is supporting the primary care QIPP agenda to ensure cost-effective prescribing of angiotensin converting enzyme inhibitors (ACEI) and angiotensin 2 receptor antagonists (A2RA).

ACEIs and A2RAs are used for various indications, including heart failure, hypertension, diabetic nephropathy, acute coronary syndrome and post myocardial infarction prophylaxis.2 The National Institute for Health and Clinical Excellence (NICE) recommends an ACEI should be used as first line as this is the most cost-effective treatment option. ACEIs have more established evidence compared to A2RAs for all indications in terms of efficacy and safety. An A2RA may be considered as an alternative when an ACEI is clinically indicated but is not tolerated by the patient or is not suitable for the specific patient due to ethnicity. The most cost effective A2RA was previously candesartan. Recently the first-line choice has changed to losartan, following the expiry of the patent for branded losartan (Cozaar).

OBJECTIVES

- To support primary care QIPP targets, in ensuring that the prescribing of angiotensin system drugs is appropriate, with ACEIs being prescribed in preference to A2RAs when indicated
- To assess the level of adherence of the prescribing of ACEIs and A2RAs according to the trust guidelines during the data collection period
- To make recommendations for improvement before the next re-audit if the need arises

STANDARDS

- 100% of patients admitted and initiated on an ACEI in hospital must comply with the trust guidelines and be initiated on one of the low cost ACEIs (captopril, enalapril, lisinopril, perindopril or ramipril)
- 100% of patients admitted and initiated on an A2RA in hospital must comply with the first line choice of A2RA — losartan — as per trust guidelines
- The ratio of ACEIs issued as a percentage of the total number of ACEIs and A2RAs issued is 78% or greater
- At least 50% of patients admitted to hospital or newly initiated on an A2RA must be prescribed generic losartan as first line in preference to other A2RAs

METHOD

A data collection form was designed to capture the necessary data. This was piloted in the previous audit carried out in July 2011, and no major changes were required to the data collection form that was used during this audit.

Data collection for this audit was conducted in two parts, which began concurrently: The first part of the audit involved gathering data for patients admitted to NW LH T on ACEI/A2RA therapy, which ran over a week. The second part of the audit involved collecting data for patients initiated on ACEI/A2RA at NW LH T, which ran over a month. Data was collected for different durations as there would be a large quantity of patients being admitted with an ACEI/A2RA leading to a large amount of data. Data was collected across the NW LH T, involving Central Middlesex Hospital and Northwick Park Hospital inpatients wards, including all general medical and surgical wards. Paediatrics and critical care wards were excluded from the audit.

RESULTS

- 100% of patients admitted to the trust on an ACEI complied with the trust formulary choice of low-cost ACEI
- 100% of patients within the trust initiated with an ACEI comply with the trust formulary of prescribing a low cost ACEI
- 19% of patients admitted on an A2RA to the trust comply with the first line choice of A2RA — losartan — as per trust guidelines
- 67% of patients within the trust initiated on an A2RA had an appropriate indication
- The percentage of patients admitted and initiated on an ACEI as a total of ACEI and A2RAs prescribed was 72%
- The percentage of patients admitted and initiated on losartan as a percentage of total A2RAs was 23%

DISCUSSION

Overall, two standards were met entirely: 100% of patients admitted or initiated on an ACEI complied with the trust guidelines of being prescribed a low cost ACEI. Only 19% of the 27 patients admitted with an A2RA were prescribed the first-line choice, losartan. The results show that most prescribing by GPs is not within the recommended guidelines of prescribing losartan first-line. Only three patients across NW LH T were initiated on an A2RA, 67% being losartan. The third patient was initiated on candesartan — previously first-line.

As part of the QIPP agenda, Brent and Harrow primary care trust (PCT) has set targets for the inappropriate prescribing of ACEIs and A2RAs. Results from the audit showed 72% of patients were admitted and initiated on an ACEI as a percentage of total ACEI and A2RA items. This is below the target of 78% set by the PCTs. This is, however, a big improvement from the 62% achieved between October and December 2010 in the initial audit carried out.

Losartan is the current first-line choice if an A2RA is indicated. The audit shows only 21% of patients admitted and initiated to hospital were prescribed losartan as a percentage of the total number of A2RAs prescribed. Brent and Harrow PCT set a target of 50% to be achieved by January and March 2012; hence the trust is still significantly behind with reaching this target. However, there has been an improvement since the initial audit showing that Brent achieved 19% and Harrow 14%.

The main limitation observed was the low quantity of data collected for patients being initiated on ACEI and A2RA. This makes it difficult to draw appropriate conclusions as the data collected for this area may not be representative of the total number of patients that may have been initiated on these drugs over four weeks.

REFERENCES


STANDARDS
Recommendations for improvement include increasing awareness of prescribing losartan as the first line A2RA. Senior pharmacists can conduct lunchtime education sessions for doctors, including consultants and registrars, on the appropriate prescribing of renin-angiotensin drugs. The number of interventions made by pharmacists was very low, even though the majority of patients on A2RA did not have a valid indication. Therefore, increasing pharmacists’ knowledge of guidelines and current NICE recommendations would improve pharmacist-led interventions and change prescribing patterns.

REFERENCES
1 QIPP: A comprehensive online resource to help you identify opportunities and support. www.improvement.nhs.uk (accessed 10 December 2011).
2 Angiotensin-II receptor antagonists: what is the evidence for their place in therapy? MeReC Bulletin Volume 20, Number 2

Does a prescription proforma improve intravenous insulin infusion quality?

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Insulin is a medication that has revolutionised the care and treatment of patients with diabetes. However, it is also a high-risk medicine where inappropriate management can result in significant harm to the patient.1,2 Both locally and nationally a number of errors have been made, some of them serious.1,2

Nationally numerous insulin risk reduction measures have been proposed.1–3 These include the use of pre-printed prescriptions, a standard intravenous infusion concentration, a ready—administer infusion, training and never abbreviating “unit”. Pre-filled syringes of 50 units in 50mL human soluble insulin had been successfully introduced across the organisation.

The intravenous route of administration poses heightened risk, and concerns with its use have highlighted this as a priority for action.1 Appropriate measurement is the only way to know whether a change to practice represents an improvement. An audit was performed before and after the introduction of a pre-printed prescription and monitoring proforma, to establish compliance with safe prescribing aspects, based on national criteria.4

AIM AND OBJECTIVES
To improve the quality of insulin prescribing for adults on variable rate intravenous insulin infusions (VRIII) on the vascular surgery ward, monitored by the clarity and completeness of prescriptions against a nine-point prescribing bundle: patient identification, date, medicine name, route, concentration, “units” in full, prescriber signature, bleep number and prescription is clear and unambiguous.

METHODS
A VRIII prescription, administration and monitoring proforma was approved for local testing and revision on a discrete clinical area using the Plan-Do-Study-Act (PDSA) improvement methodology in December 2010. Support from vascular surgery was sought and obtained; ethics approval was not required as this was classed as service development. Patients on the vascular ward, under the care of the vascular service, prescribed a VRIII were eligible for inclusion. These were identified by the ward pharmacist or nurses and referred to the auditor. Quantitative data were collected opportunistically using a pre-piloted data collection form, prescription and blood glucose monitoring chart from 16 December 2010 until 30 April 2011. Data were entered into Microsoft Excel for analysis, and all entries independently checked to provide quality assurance.

RESULTS
Compliance with the prescription bundle is shown in Figure 1. Initially there was wide variation with a prescription quality score between five and nine out of nine, despite local guidance giving clear instructions on the required prescription elements. After proforma introduction, 21 sequential prescriptions scored nine out of nine. These contained all elements of the prescribing bundle, so all were fully compliant.

DISCUSSION AND CONCLUSION
Without the proforma there was wide variability with the prescribing of VRIII, such that prescriptions did not consistently contain all the required bundle elements. This meant that prescription quality remained unpredictable.

After introduction of the proforma all prescriptions fully complied with the prescribing bundle. Figure 1 demonstrates a stable reliable process, where the use of the VRIII proforma delivers safe and reliable prescriptions. Several quality enhancements were achieved including standardisation of VRIII process, establishment of a glycaemic target, freedom from reliance on memory, legible and clear prescriptions. It is important that any recommended VRIII guidance should be as safe as well as effective especially as the potential dangers of hypoglycaemia with excess insulin therapy and
strict glycaemic control have recently been highlighted.\textsuperscript{1,5} Future work is required to ensure that patients achieve target glycaemic range without increased hypoglycaemia. Lessons learned from this audit are that guidelines alone cannot be relied upon to improve the quality of prescribing, but a proforma can ensure safe, complete VRH\textsuperscript{III} prescriptions. Correct insulin prescribing is an important aspect of improving patient safety by reducing preventable errors. The design provided an effective method to reduce harm and a means to effectively transmit change through to clinical practice.

REFERENCES

**Using electronic prescribing records to audit parenteral heparin infusions and coagulation control**

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Anticoagulants are one of the medicines most frequently identified as causing preventable harm.\textsuperscript{1} Intravenous-unfractioned-heparin (IVUFH) is a recognised high-risk medication. Close monitoring of activated-partial-thromboplastin-time (aPTT) is required to maximise therapeutic efficacy and minimise the incidence of serious complications such as catastrophic haemorrhages. The use of IVUFH for anticoagulation has declined over the past decade since the introduction of low molecular weight heparins (LMWH). Experience with IVUFH monitoring and subsequent dose adjustment to maintain therapeutic aPTT levels has also declined. Surveillance of IVUFH use for individual patients has been difficult with paper-based charts.

University Hospital Birmingham NHS Foundation Trust has a locally developed electronic prescribing system that enables clear auditing of prescription, administration and laboratory data. Within this system, we deploy an IVUFH dosing-algorithm to aid dose decisions to maintain target aPTT. Improvements to the decision support elements of the system based on U3 experience\textsuperscript{1} are being made. This audit reviews the outcome of the latest set of changes.

**AIMS AND OBJECTIVES**

The aim was to audit current practice to determine whether the computer system support was achieving the desired patient outcomes. The detailed objectives being compliance with the trust protocol on IVUFH use and monitoring including: (1) 100% patients to have baseline parameters before therapy (FBC, INR, aPTT, U&E); (2) 100% receive bolus dose based on body weight (kg); (3) dose adjustments — (3a) 100% infusion rates based on weight (kg); (3b) 100% patients have their first aPTT within six hours of initiating infusion; (3c) 100% doses adjustments following aPTT results based on trust protocol.

**METHODS**

From the electronic prescribing database, a total of 30 patients were consecutively identified to have received IVUFH spanning over a six-week period. Data was obtained to determine: prescription data and the presence of baseline laboratory data prior to the initiation of therapy. Data on each infusion rate change made adjacent to matched aPTT measurements. Note: there were no exclusion criteria.

Descriptive statistics were used to identify percentage adherence to trust protocol and data further analysed to determine whether aPTT control was maintained when following trust guidance. Individual patient data was also plotted for their aPTT against time, using an indicator variable to illustrate whether the last dose adjustment was appropriate according to trust protocol (not included in abstract).

**RESULTS**

Thirty patients were identified for audit inclusion. Indication for therapy was as follows: treatment of DVT (3.3%), PE (15%), acute-peripheral-arterial-occlusion (3.3%), haemodialysis (3.3%), myocardial infarction (3.3%) and other (73%).

1. **Date for baseline parameters** Overall, 79% of patients had their baseline parameters recorded.
2. **Bolus dose** Fourteen patients (47%) had a bolus dose prescribed and 13 received the dose; only two (14%) patients’ doses were based on their body weight.
3. **Dose adjustments** (3a) Only three patients received an initial infusion rate based on their weight. (3b) However, 90% patients had an aPTT value within six hours of first dose. (3c) Of a total of 168 dose adjustments made to IVUFH for 30 patients, 43% (72) were deemed appropriate and 57% (96) inappropriate as per trust policy. Further analysis indicates that following, or not following, trust guidance to adjust infusion rates was as likely to result in an aPTT value within target range (chi square=0.416, p=0.57). However, extreme aPTT values (>7.5) were related to previous inappropriate dose adjustments.

**DISCUSSION AND CONCLUSION**

Results demonstrate that adherence to simple protocols, eg, baseline blood testing, remains poor even with computerised prompts (79%). Fewer than half of the patients (47%) were prescribed bolus dose, of which only two (14%) were based on patient weight. Guidance is based on trends of extrapolation that guide dosing. Omitting initial steps (baseline parameters/bolus doses) dosing is based on either exceptional experience or guessing\textsuperscript{1} Considering there are no restrictions on prescribing according to grade, we highlight safety parameters that need to exist for junior staff.

A total of 168 dose adjustments made to IVUFH for 30 patients, 43% (72) of which were deemed appropriate and 57% (96) inappropriate as per trust policy. Further analysis indicated that following, or not following, trust guidance to adjust infusion rates was as likely to result in an aPTT value within target range (chi square=0.416, p=0.57). However, extreme aPTT (>7.5) values were related to previous inappropriate dose adjustments.

Electronic prescribing (EP) has the potential to reduce the risk associated with IVUFH particularly as the collection and analysis of data is facilitated. This audit demonstrates that this is not necessarily the case and...
that system design needs to be enhanced to ensure safer practices result. Implementation of systems should be seen as the starting point for improving practice.

This is part of an ongoing series of audits that is looking to improve the prescribing and monitoring of heparin within the trust. Improvements to the system will be made as a result. The prescribing of IVUFH remains a problem: current trust protocol is not being followed in all cases. Results demonstrate that if it were, the level of risk to patients would be reduced. Further work is required to facilitate compliance using the tools available with the EIP system.

**Recommendations:**
1. User interface improved to make guidance more clearly visible to prescribers.
2. Visual mapping at the point of prescribing with associated results on one screen; this will aid compliance with infusion rate adjustments.
3. Additional decision support/fields to aid compliance with trust protocol – ie, mandatory weight input for all IVUFH prescription, reminders about ordering baseline and maintenance blood tests (ie, first aPTT at six hours).
4. Further audit to be undertaken following each change to ensure benefits results.

**REFERENCES**

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**A review of patient counselling at Croydon University Hospital**

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Counselling within medicines management is defined as “the act of providing advice and guidance to a patient or the patient's family.” It is the duty of the pharmacy team to support the safe and effective use of medicines by patients. Counselling helps with compliance directly influencing the success of therapy. It is therefore a key service that should be provided to patients.

Each year the Care Quality Commission (CQC) sends out a national patient survey (NPS) to collect feedback on the experience of patients using health care services. Poor CQC results could lead to the trust getting a quality improvement notice. From the results of the 2010 survey, patient counselling was highlighted as a potential improvement that could be made by Croydon University Hospital (CUH). In response, extra resources were hired to backfill core services while extended pharmacy-led medication counselling took place.

**OBJECTIVES**

The review was conducted to assess:

1. The proportion of patients counselled at discharge during pharmacy opening hours, before and after the pharmacy led counselling initiative
2. The level of counselling received by in-patients during their admission at CUH
3. The proportion of patients that were able to re-call being counselled on their medicines two weeks post discharge
4. The proportion of patients that could remember the information given to them four weeks post discharge

**METHOD**

A data collection form was piloted on three medical wards to collect the number of patients discharged and those counselled over three days. Data was then collected from 19 wards for one week. (Baseline) ITU, HDU, and SCBU were excluded. The proportion of patients counselled up to the point of discharge was determined. The pharmacy department then increased the resources available, to allow clinical staff to undertake patient counselling for a period of eight weeks. A training package was put in place for pharmacy staff to validate their competence in delivering verbal and written counselling. A medication administration record (MAR) card was also introduced to aid the counselling process. Counselling was provided on wards and in discharge lounge. A re-audit of the proportion of patients counselled on the wards was conducted. A systematic randomisation process was used to select 150 patients for follow-up two weeks after discharge from hospital wards. The patients were asked the NPS questions: (Q1A) Did a member of staff explain the purpose of the medicine you were to take at home in a way you could understand? (Q1B) Did a member of staff tell you about medication side effects to watch for when you went home? (Q1C) Were you told how to take your medication when you went home? (Q1D) Were you given clear written or printed information about your medicines?

Randomly selected 54 patients counselled in the discharge lounge were asked questions to test if they remember the information they were given about their medicines four weeks post discharge from hospital. The questions were: (Q2A) Did a member of staff explain the purpose of medicines you were to take at home in a way you could understand? (Q2B) Were you given written information about your medicines? (Q2C) Do you remember the information you were given about your medication? Can you please tell me what three of your medicines are for? (Q2D) Can you tell me three side effects you can remember of any of your medicines that you were told about in hospital?

All patients gave consent to be contacted by telephone for follow up.

**RESULTS**

The results are set out in Table 1. Seventy-five per cent (112/150) of patients responded to the NPS questions Q1A–1D. The results were 60% (67/112), 41% (46/112), 66% (74/112) and 50% (56/112), respectively. All 54 patients responded to the questions to test if they remember information they were given about their medicines post discharge (Q2A–2D). The results were 87% (47/54), 80% (43/54), 35% (19/54) and 24% (13/54), respectively.

**DISCUSSION AND CONCLUSIONS**

Overall, there was a 61% increase (Table 1) in patient counselling due to the extra resources made available. Therefore, it is recommended that there is a development of a pharmacy discharge team.

| Table 1: The proportion of patients counselled before and after counselling commenced. |
|---|---|---|---|---|
| Ward | Baseline | Re-audit |          |
| Number | Number | Percentage | Number | Percentage |
| A | 3 | 20 | 15 | 17 | 18 | 94 |
| B | 3 | 14 | 21 | 13 | 15 | 87 |
| C | 3 | 3 | 2 | 4 | 50 |
| D | 4 | 23 | 17 | 11 | 15 | 73 |
| E | 0 | 12 | 0 | 18 | 19 | 95 |
| F | 0 | 3 | 0 | 7 | 7 | 100 |
| G | 2 | 10 | 2 | 8 | 11 | 73 |
| H | 3 | 8 | 38 | 6 | 8 | 75 |
| I | 4 | 16 | 25 | 6 | 16 | 38 |
| J | 1 | 10 | 2 | 2 | 10 | 20 |
| K | 3 | 27 | 11 | 22 | 28 | 79 |
| L | 0 | 16 | 0 | 11 | 18 | 61 |
| M | 1 | 12 | 8 | 3 | 7 | 43 |
| N | 6 | 31 | 19 | 22 | 23 | 96 |
| O | 0 | 3 | 0 | 0 | 3 | 0 |
| P | 1 | 14 | 7 | 9 | 10 | 90 |
| Q | 6 | 30 | 27 | 34 | 43 | 79 |
| R | 0 | 14 | 0 | 20 | 21 | 95 |
| S | 0 | 20 | 0 | 12 | 12 | 100 |
| Total | 39 | 286 | 12 | 223 | 288 | 73 |

...
Audit of antimicrobial prescribing and de-escalation practice in four acute hospitals

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The overuse and inappropriate prescribing of antimicrobial therapy is a major threat to public health and patient safety, requiring urgent and effective action. The Scottish Government has taken a strategic approach to this through the Healthcare Associated Infection (HAI) Task Force work programme; an action plan providing direction on the use of antimicrobial agents, surveillance of resistant organisms, infection prevention and control, and education and training. Annual targets relating to health improvement, efficiency, access and treatment (HEAT) are supported through nationally agreed prescribing indicators. De-escalation optimises the use of antimicrobial therapy and local recommendations include (1) changing from an empirical broad spectrum to a narrow spectrum antimicrobial when sensitivity results are available; (2) avoiding unnecessary intravenous use, and (3) discontinuing antimicrobial therapy according to local guidelines, culture results or progress of the clinical condition. Although point prevalence surveys are completed by the antimicrobial management team (AMT) as part of the European Surveillance of Antimicrobial Consumption programme (ESAC), de-escalation practice was identified by the AMT as an area requiring evaluation.

OBJECTIVES
To quantify the current level of adherence to local antimicrobial guidelines, identify reasons for non-adherence, and suggest opportunities to improve patient care.

METHOD
The audit criteria (n=10) were developed from the local antimicrobial guidelines and national prescribing indicators and agreed through multidisciplinary peer review. Criteria related to documentation of indication (n=1), spectrum of antibiotic treatment (n=5), intravenous to oral switch (n=2) and cessation of therapy (n=2); full details of the criteria are available on request. The tool was piloted in eight patients and after inter-rater reliability testing, was applied over a 10-week period (October to December 2010) to patients in adult and paediatric wards prescribed an antimicrobial agent for an acute condition for at least 48 hours. Neonates and patients prescribed prophylactic or long-term antimicrobial therapy were excluded. Research ethics approval was not required. A Microsoft Access database was designed for data analysis. Individual and overall audit criteria were expressed as percentage adherence (95% confidence interval (CI)), which included justified non-adherence (eg, microbiology advice or indication for prolonged intravenous course). Compliance was monitored by comparing the audit criteria with the local guidelines at data collection, using the chi square test for group comparisons.

RESULTS
The audit criteria were applied to 174 antimicrobial prescribing episodes in 104 patients, of which 1,113/1,740 (64.0%) criteria were applicable. Where a guideline was available for the infection being treated, this was adhered to in 105/135 (77.2%) cases. Overall adherence to applicable criteria was 774/1,113 (69.5%). The indication for antibiotic treatment was documented in 149/174 (85.6%) prescribing episodes. Where the indication for treatment was not documented in the patient’s records, the investigator was able to identify the indication in 19/25 (76.0%) cases. Adherence to criteria relating to the spectrum of antibiotic, intravenous to oral switch, and cessation of therapy was 458/597 (76.7%), 105/133 (78.9%) and 62/209 (29.7%) prescribing episodes, respectively. Where sensitivity results were documented, antimicrobial therapy was appropriately altered in 34/38 (89.5%) cases, compared to 16/28 (57.1%) cases where the results were not documented (p=0.0036). Switching from intravenous to oral treatment was not applicable in 149/174 (85.6%) prescribing episodes; 59/149 (39.6%) involved oral therapy and although 90/149 (60.4%) involved parenteral prescriptions, intravenous to oral switch criteria were not met (Table 1). The stop date for antimicrobial therapy was documented in 22/60 (36.7%) prescribing episodes for oral therapy compared to 16/114 (14.0%) for parenteral therapy (p=0.0087). Of the total prescribing episodes, 6/174 (3.4%) involved a restricted antimicrobial and 56/174 (32.2%) involved an antimicrobial associated with high risk of C. difficile infection (CDI) as analysed by subgroups. The chi square test was used for group comparisons.

DISCUSSION AND CONCLUSION
Antimicrobial prescribing practice was audited across a range of specialties. Adherence to the criteria was deemed “satisfactory” although improved documentation is required for indication, sensitivity results, antimicrobial review and duration of therapy. The main drivers for intravenous to oral switch not being appropriate were lack of improvement clinically or from monitoring C-reactive protein (CRP) and white blood count (WBC). The findings suggest further training within the multidisciplinary team is required to highlight the importance of documentation and

| Table 1: Prescribing episodes where intravenous to oral switch criteria were not met |
|-------------------------------------|-------------------------------------|-------------------------------------|
| **Prescribing episodes where criteria recorded** | **Prescribing episodes where criterion not met** |
| **intravenous to oral switch criteria** | **(n)** | **(n, %)** |
| CRP and WBC improving | 33 | 28 (84.8%) |
| Clinically improving | 50 | 36 (72.0%) |
| Temperature less than 38°C for 48 hours | 51 | 26 (51.0%) |
| Suitable oral alternative | 52 | 20 (38.5%) |
| Oral fluids/food are tolerated | 52 | 15 (28.8%) |

* Reviewed 48 hours after initiation of intravenous antimicrobial and at least every 24 hours thereafter. 
† Does not include 24 prescribing episodes where C-reactive protein (CRP) and white blood count (WBC) were not requested
Pilot practice-based experiential education for first-year MPharm students

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*Strathclyde Institute of Pharmacy and Biomedical Sciences (SIPBS), Glasgow; †University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences (UCSSPPS)

Multiple government and healthcare agencies have encouraged a model of healthcare involving multidisciplinary teams in which pharmacists share responsibility with other team members for patient health outcomes. The call for healthcare reform has been mirrored by changes in accreditation standards for pharmacy degree programs in the UK and the US. The philosophy underlying the changed standards is that the best way to train pharmacists to accept responsibility for patient health outcomes is to give supervised patient care responsibilities to first-year pharmacy students followed by increasing patient care responsibilities throughout the remainder of the pharmacy curriculum. Pharmacy schools have the responsibility of working collaboratively with the pharmacy practice community to address the academic and logistical aspects of creating practice experiences for large numbers of students who meet the new accreditation standards.

In response to changes in US accreditation standards, UCSSPPS implemented an entry-to-practice doctor of pharmacy degree program in 1999 which incorporated half-day per week practice-based courses throughout the first three years of the new programme. The strategy agreed by UCSSPPS and the practice community for the practice-based courses was to pair individual students with individual practitioners and to integrate each student in normal pharmacy workflow for multiple years under practitioner supervision. This paper describes a pilot program undertaken by SIPBS in collaboration with pharmacy practitioners in central Scotland to explore the feasibility of implementing practice-based experiences for first-year MPharm students based on the UCSSPPS strategy.

AIM AND OBJECTIVES

- To provide guidance to SIPBS with respect to the design and implementation of practice-based courses in the MPharm first-year curriculum
- To pair 20% of students in the 2011–12 first-year SIPBS MPharm class with pharmacy practitioners (ie, establish demonstration projects to facilitate practitioner recruitment in later years)
- To establish the range of practice-based experiences chosen for each student by her/his practitioner over the course of the 2011–12 academic year

Table 1: Practice-based learning opportunities reported by students

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard operating procedures</td>
<td>Reading and signing site policies &amp; procedures: health, safety, fire, needle-stick. Pharmacist-written Rx. Vision impaired patients</td>
</tr>
<tr>
<td>Counter activities</td>
<td>Generic/brand names.</td>
</tr>
<tr>
<td>Other opportunities</td>
<td>Roles and responsibilities of hospital pharmacists. Hospital computer systems. Review of patients’ medical histories and laboratory results.</td>
</tr>
</tbody>
</table>

RESULTS

Sixty-six students (43% of the class) volunteered. Six (9%) and 28 (42%), respectively, requested community and hospital pharmacy experiences and 32 (49%) expressed no preference. Thirty-nine students (25% of the class) were matched one-on-one with six hospital and 33 community pharmacists. Information abstracted from the students’ diaries regarding the learning opportunities they were given is shown in Table 1.

DISCUSSION AND CONCLUSION

The study demonstrates that pharmacists in central Scotland are prepared to host first-year MPharm students and to assign them normal workflow tasks and responsibilities over multiple half-day visits. The nature of the workplace tasks and responsibilities given to the students has provided guidance to SIPBS for the design of first-year MPharm practice-based courses. SIPBS, based on the number of student/practitioner pairs established, has extended the pilot program with the objectives of maintaining the established student/practitioner matches through 2012–13 and matching 50% of the 2012–13 first-year class with pharmacists for practice-based experiences.

REFERENCES

Review of the medicines related information provided by GPs when electively referring patients to secondary care via an electronic referral system

Foreshew G, Conibere A, Barry K
NHS Devon, Exeter

Medicines reconciliation on admission to hospital has been highlighted as a key issue by the Care Quality Commission (CQC) with the recommendation that a minimum dataset of information is provided on admission to hospital. The CQC report found that 11–24% of GPs do not provide information on co-morbidities, allergies and drug reactions. Prior to this the National Institute for Health and Clinical Excellence (NICE) and the National Patient Safety Agency (NPSA) issued guidance on medicines reconciliation on admission of adults to hospital. It lists one of the contributory factors to unintentional variances in patients' medications as being no access to the patient's medication list from primary care.

Informal discussions with colleagues in our acute trusts had highlighted a lack of good quality information from GPs as a hindrance to medicines reconciliation.

OBJECTIVES

- To assess the completeness of GP information regarding medicines provided to secondary care for elective referrals against the minimum dataset recommended.
- To implement changes to improve the transfer of information across the interface

METHOD

The initial audit, for which ethics approval was not required, took place in October 2010. A random sample of 336 electronic referrals were reviewed. They came from a variety of GP practices and the patients could have been referred to any speciality. If a section was left blank this was counted as no information supplied. If the section had “n/a”, “–” or other similar mark to indicate there was no relevant information that was considered acceptable. The directions “as directed” were considered appropriate for insulin, warfarin and dressings.

Following the initial audit a standard referral template was developed and offered to all practices within the NHS Devon area. This template was compatible with all GP practice systems and automatically captured patient and medicines related information data.

A repeat audit (sample size 429 referrals) was undertaken in October 2011 to determine whether the introduction of a standard referral form had made improvements.

RESULTS

In 2010 21% (n=75) of all referrals contained all the information recommended in the minimum dataset. This improved to 47% (n=201) of referrals in 2011.

Table 1 shows that in 2010 17% of referrals had no medication information, which reduced to 12% in 2011. Improvement was seen in all areas, reaching statistical significance in all except the route of medication. Despite a statistically significant improvement information pertaining to allergies remained low:

In the 2011 audit 81% of referrals (n=355) used the standard template, 17% of referrals (n=74) were done using a referral letter. Referrals using the template contained more information than those using other methods.

DISCUSSION

The original audit showed that all practices used electronic referral but the way they populated the referral letter varied dependent on the practice and the computer system. The introduction of a standard referral template was designed to reduce the differences in information provided, and automatically populate the template with relevant information.

The audit demonstrates that introduction of a standard electronic template improved the quality of medicines related information. However, there were notable differences between the practices. Practices use the template in different ways and the majority of GPs had never seen a completed form, hence without the audit they did not know how well their practice was doing. Additionally 16% of practices are not using the template, and those showed significantly less complete medicines related information.

The lack of medicines related information including allergies may be due to there being no relevant information but this needs to be clearly shown on the referral form. Some GP practices had set up their system to insert a line or similar mark to show that there was no medication or allergies.

Discussion following a presentation to GPs highlighted the issue that many GPs had not seen the completed referrals and hence did not realise some information was missing.

Work now continues to ensure those practices not using the DART template understand the benefits and start to use it. Additionally the team are working with all practices to ensure the way the template is populated is the same; including using a line or similar mark to indicate where there is no relevant information.

Despite the introduction of summary care records only 40% of practice systems in Devon are currently compatible, and hence an alternative means of providing medicines related information is important. An emergency admissions template is being developed in conjunction with secondary care colleagues to improve information for this patient group.

REFERENCES


Table 1: Medication details provided for elective referrals

<table>
<thead>
<tr>
<th>Medication details</th>
<th>Year 2010</th>
<th>Percentage Improvement</th>
<th>Year 2011</th>
<th>Percentage Improvement</th>
<th>P value (chi-squared test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No information provided on medication</td>
<td>26%</td>
<td>12%</td>
<td>14%</td>
<td>-0.0001</td>
<td></td>
</tr>
<tr>
<td>Where medication noted, the following documented:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dose</td>
<td>65%</td>
<td>93%</td>
<td>28%</td>
<td>-0.0001</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>58%</td>
<td>83%</td>
<td>25%</td>
<td>-0.0001</td>
<td></td>
</tr>
<tr>
<td>Formulation</td>
<td>79%</td>
<td>97%</td>
<td>18%</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Route</td>
<td>79%</td>
<td>87%</td>
<td>9%</td>
<td>0.174</td>
<td></td>
</tr>
<tr>
<td>Known allergies</td>
<td>40%</td>
<td>63%</td>
<td>23%</td>
<td>-0.0001</td>
<td></td>
</tr>
<tr>
<td>Co-morbidities included</td>
<td>73%</td>
<td>88%</td>
<td>15%</td>
<td>-0.0001</td>
<td></td>
</tr>
</tbody>
</table>

An audit of missed doses during inpatient admissions on respiratory wards

Vigar A
Leeds Teaching Hospitals Trust, Leeds, Capstick, TGD, Leeds Teaching Hospitals Trust, Leeds

Omitted or delayed doses can have serious consequences for patients but despite this they occur widely and frequently. Between September 2006 and June 2009, the National Patient Safety Agency (NPSA) received reports of 27 deaths, 68 severe harms and 21,383 other patient safety incidents relating to omitted or delayed medicines. As part of this trust’s
response to the NPSA rapid response report, all wards are required to audit missed doses on a monthly basis. The local hospital medicines code describes a list of categories which must be recorded on the drug chart when a dose is not given to explain the reason for omission. Initial audit data from respiratory wards suggested that missed doses were common, and so a more detailed audit was undertaken to further analyse and rectify any problems.

**OBJECTIVES**
The objective of this audit was to:

1. Determine the proportion of drugs where doses were missed
2. Identify if essential medications were missed or omitted
3. Identify the most common reasons for missed doses
4. Review ward stock lists to prevent recurring missed doses

**METHOD**
A data collection form was developed to ascertain which drugs were missed or omitted and why, using omission codes recorded on the drug charts. Data were collected for 90 patients on five respiratory wards at a large teaching hospital on one day in February 2012. The number of missed regular doses was counted for all patients by review of their current drug chart (in use for less than 24 hours to two weeks, therefore not all patients will have had a medicines reconciliation performed. Ethical approval was not required as no patient specific information was included in the audit.

**RESULTS**
In total, 1,015 regular drugs (mean: 11.3 per patient; range 4–21) were prescribed, of which 268 (26%) had a least one missed dose. The reasons for the missed doses are shown in Table 1. A total of 109 of the 1,015 drugs prescribed (10.7%) had at least one unintentional missed dose. Of these, 95 (87%) were prescribed prior to admission and 14 (13%) were commenced during admission. A total of 164 doses were missed, of which the first dose was missed on 74 (45%) occasions. On 17 (10%) occasions the missed drug was known to be available on the ward, as it was either ward stock, had already been supplied by hospital pharmacy or the patient had brought their own supply into hospital. A further 26 (24%) inhaled drugs were documented as unintentional missed doses, although policy within the respiratory department allows for inhaled corticosteroids and long-acting bronchodilators to be omitted for 24 hours if systemic corticosteroids and nebulised bronchodilators are prescribed.

A number of clinically important drugs that were stocked on the ward were missed including amiodarone (one occasion), nitrates (two), diuretics (one), and levothyroxine (one). The number of missed doses that could potentially be detrimental was higher for drugs not currently stocked on the wards, including antiepileptics (four occasions), antipsychotics (one), harbarurates (one), and drugs for Parkinson’s disease (two) and diabetes (five).

**DISCUSSION AND CONCLUSION**
Work completed by the NPSA and the Productive Ward Initiative have tried to minimise interruptions and streamline ward medication rounds in an effort to reduce medication errors. This audit has identified which drugs are being omitted and the reasons for their omission: a large proportion of drugs were found to have a least one missed dose, although more than half were intentional omissions. The proportion of drugs with unintentional missed doses (10.7%) was similar to that seen in other reports (9.7% and 7.6%) but no urgent antibiotic doses or drugs for acute respiratory illness were missed. No assessment was made of the impact of any missed doses on the individual patients.

The audit has identified specific areas where action could be taken to help reduce omitted medications:

1. Strategies to remind ward staff to order non-stock items and check for stock items
2. Ensuring that the ward stock list is more accessible for ward staff
3. Encouraging the use of patients’ own medicines to preventing omissions prior to medicines reconciliation

<table>
<thead>
<tr>
<th>Table 1: Reasons for missed/omitted doses (by BNF chapter)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BNF chapter</strong></td>
</tr>
<tr>
<td>-----------------------------------</td>
</tr>
<tr>
<td>1 Gastro-intestinal system</td>
</tr>
<tr>
<td>2 Cardiovascular system</td>
</tr>
<tr>
<td>3 Respiratory system</td>
</tr>
<tr>
<td>4 Central nervous system</td>
</tr>
<tr>
<td>5 Infections</td>
</tr>
<tr>
<td>6 Endocrine system</td>
</tr>
<tr>
<td>9 Nutrition and blood</td>
</tr>
<tr>
<td>Others</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

4 Regular review of stock medication, taking into account primary and secondary care usage, should used to update ward stock lists appropriately.

The main limitation of this audit is that it was performed on one day due to time constraints, and so audited limited patient numbers. Only current drug charts in use were examined, potentially missed discontinued or transcribed medications on old drug charts.

This audit has allowed a review of the 109 unintentionally missed drugs in order to improve stock holding of drugs on the respiratory wards as part of our medicines management reviews on wards. Analysis of the data has also allowed strategies to be devised to reduce the number of missed drugs, and the impact of these should be re-audited.

**REFERENCES**

**Medicines use reviews: an unmet need in difficult asthma**

**Capstick TG*, Clifton IJ*, Morgan J†, Blenkinsopp A‡**
*Leeds Teaching Hospitals NHS Trust, Leeds; †School of Pharmacy, University of Bradford, Bradford*

Difficult asthma is defined as persistent symptoms and/or frequent exacerbations despite treatment at Step 4 or 5 of the British Thoracic Society asthma guidelines. Such patients often have poor asthma control characterised by frequent daytime and night-time symptoms, poor lung function and exacerbations. Overall there is a heavy burden on healthcare resources and loss of working days through illness. Difficult asthma patients often attend hospital difficult asthma clinics for review, assessment and monitoring of their condition.

Since 2005, UK community pharmacists have been funded to provide medicines use reviews (MURs) for patients with long-term conditions. Asthma has been listed as one of the NHS national target groups for MUR services since October 2011. Studies in asthma patients have demonstrated that MURs are well accepted, can identify and manage adherence problems and potentially may improve asthma control. All asthma patients are eligible for one targeted MUR per year if they have received pharmaceutical services from the same pharmacy for at least three consecutive months.

**AIMS**
This audit seeks to determine how successfully MURs have been targeted to patients with difficult asthma. It was also performed to determine whether adequate numbers of patients could be recruited to a planned research study examining the effects of a co-ordinated management
strategy between primary and secondary care pharmacists on asthma control.

OBJECTIVE
To quantify the proportion of patients attending a difficult asthma clinic who (1) were eligible for an MUR and (2) had been offered or had received an MUR within the past 12 months.

METHOD
In an audit conducted prior to a research study, patients attending a specialist difficult asthma clinic at a large teaching hospital were asked to complete a questionnaire on whether they were new or follow-up patients, how they obtained their dispensed prescriptions in the community and whether they had ever been offered or received an MUR in the past 12 months.

Data were collected during consecutive clinics between November 2011 and February 2012. Ethics approval was not required as it was designed to audit MUR recruitment rather than MUR outcomes and no patient specific information was collected.

RESULTS
Data were collected at 10 difficult asthma clinics, attended by 237 patients. Sixty-four patients completed questionnaires, representing a 27% response rate, of whom 10 (16%) were new referrals and 54 (84%) were follow-up attendees. Overall, prescriptions were collected from community pharmacies in person by 49 (77%) patients, by friends or family for 11 patients (17%), while 12 (19%) received home deliveries. Twenty-six patients (41%) had been offered an MUR and only 19 (30%) had received an MUR within the previous 12 months.

Figure 1 describes the proportion of patients attending the difficult asthma clinic who were eligible for and had received an MUR. Of the 64 responding patients, 50 had used the same community pharmacy for the previous three months and were eligible for an MUR, but only 17 had received an MUR within the previous 12 months. Of the 33 patients (56%) who were eligible but had not received an MUR, 23 collected their prescriptions in person, but only eight had been offered an MUR.

DISCUSSION AND CONCLUSION
This audit found that a high proportion of difficult asthma patients had not received an MUR, reflecting a missed opportunity as most patients collected their prescriptions in person. A limitation of this audit was that it did not collect data on which community pharmacy each patient had used, and therefore it is not known whether all had performed MURs. However, approximately 70% of community pharmacies are accredited with the local PCT to provide MURs, and so potentially half of all eligible patients in the audit did not receive an MUR.

MURs represent an opportunity for extending the role of community pharmacists to make a positive impact on the management of asthma. Patients with difficult asthma are frequently prescribed several oral and inhaled therapies and often remain uncontrolled for prolonged periods of time and have a high need for support. Many patients with asthma might benefit from MURs, but community pharmacists should particularly target those with difficult asthma.

Figure 1: Eligibility for MURs

- 64 patients were included in the audit
- 50 patients had used the same community pharmacy for three months
- 14 patients had used different community pharmacies
- Not eligible for MUR
- 33 patients had not had an MUR in the previous 12 months
- 17 patients had had an MUR in the previous 12 months
- Not eligible for MUR
- 8 patients had previously been offered an MUR
- Eligible for MUR
- 25 patients had not previously been offered an MUR
- Eligible for MUR

Future research could explore why MURs are not performed, although they have been described as a time-consuming, complex and bureaucratic service provided without extra staff resource, and thus sometimes are offered only when convenient to the pharmacy workload. Although it was beyond the audit remit to investigate this further, it is possible that some patients with difficult asthma might be overlooked for MURs because of concerns about knowledge and competence when reviewing the complex treatment regimens used.

The findings of this audit indicate further opportunities for community pharmacy to provide support for asthma patients. There is potential for hospital pharmacists to refer suitable patients identified during outpatient clinics or hospital admission for targeted or post-discharge MURs or the New Medicines Service, such as patients with poor inhaler technique, poor understanding of medicines or newly prescribed medicines. Further work is planned to examine the impact of hospital and community pharmacists on asthma control, and this audit confirms that there are sufficient patient numbers available to recruit to our planned study.

REFERENCES