## Oral Communications, Awards and Poster Presentations

**Oral Communications, Friday 21st November 2014**

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### UKCPA Awards (Poster) Section

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### UKCPA Clinical Research Grant (Poster) Section

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<td>An audit to review the prescribing of proton pump inhibitors at Broomfield Hospital - Chan J</td>
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<td>Medication safety culture: development of a tool for use in UK hospitals - Kantial K</td>
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<td>18</td>
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<td>19</td>
<td>A retrospective audit of cinacalcet prescribing in the management of hyperparathyroidism secondary to end-stage renal failure in patients on haemodialysis - Chai MO</td>
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<td>Teenage and Young Adult patients’ needs and satisfaction with medicines information: the development and administration of a survey - Nadesalingam M</td>
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<td>Assessing the perceived effect of electronic prescribing system on healthcare - Abbas Z</td>
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<td>An audit into monitoring adherence to Buckinghamshire Healthcare Trust (BHT) Medicines policy on prescribing guidelines for inpatient prescriptions - Witwit Z</td>
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<td>32</td>
<td>A survey of prescription dosage instructions contained on electronic prescription service 2 (eps2) dispensing tokens - Ilal M</td>
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**BPSA Conference 2014 Winning Poster**

| A              | North West  |
|                | An Evaluation of Valganciclovir Prescribing for CMV Prophylaxis in a Single Centre Transplant Population - Shah S |
| B              | London      |
|                | Audit of missed doses to patients due to medication supply according to hospital procedures, October 2013 - Hollins N |
| C              | East of England: Beds, Essex & Herts |
|                | Audit: Time to first dose of antibiotics on the Adult Critical Care Unit - Ahmed A |
| D              | Wales       |
|                | Audit on the Transfer of Information on Medication Changes on Discharge from Hospital to Primary care - Griffiths C |
| E              | East of England: excluding Beds, Essex and Herts |
|                | An audit to determine the quality of prescribing of intravenous fluids and infusions in paediatric patients - Grice K |
| F              | East Midlands |
|                | An audit to assess compliance with Nottingham University Hospitals NHS Trust guidelines for the return and disposal of non-controlled medicines from clinical areas - Hodges K |
| G              | Thames Valley |
|                | A re-audit on IV to Oral antibiotic switching at Milton Keynes Hospital Foundation Trust - Chal R |
| H              | York and Humber |
|                | A clinical audit of compliance with the Hull and East Yorkshire Hospitals NHS Trust’s medicines reconciliation policy - Day S |
| I              | West Midlands |
|                | An audit to show the effectiveness of stage 1: medicines reconciliation at The Royal Wolverhampton NHS Trust - Isthiqia S |
| J              | South West including Dorset |
|                | Post-operative VTE Prophylaxis Prescribing for THR and TKR Patients - Liang Y |
| K              | Kent, Surrey, Sussex and Wessex, excluding Dorset |
|                | Can we stop the meropenem? A review of carbapenem prescribing at a large teaching hospital, with reference to the English Department of Health “Start Smart, Then Focus” guidance - Price A |

Please note, this is a poster presentation only. The abstract does not appear in this handbook but can be found in the GHP/UKCPA 10th Joint National Conference Handbook, Manchester, April 2014 (available on the UKCPA website)

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Background: Diabetes and the inpatient management of diabetes have been identified as a key learning need for pharmacists through the results of local and national studies. In this Trust, the rate of recorded pharmacist contributions is significantly lower for insulin than warfarin and other high risk medicines. However, there is a significant amount of evidence to show that many errors relating to insulin occur within the Trust. Anecdotal evidence from junior pharmacists suggests that a lack of confidence and skills in this clinical area contribute to insufficient pharmaceutical care of patients with diabetes.

An assessment exercise was undertaken at King’s College hospital to evaluate the confidence, knowledge and skills of pharmacists to provide pharmaceutical care to patients with Diabetes.

Objective: To identify areas where educational interventions could improve the pharmaceutical care of patients with Diabetes across the trust. An evaluation of confidence, knowledge and skills will identify educational needs and provide a basis on which to develop a training programme.

Method: Basic competencies describing a minimum standard for diabetes management were developed by a Diabetes working group comprising senior and specialist pharmacists in Education and Diabetes. The competencies cover key knowledge and skills areas and outline the level at which a junior pharmacist should be practising.

A questionnaire comprising demographic, confidence and knowledge and skills questions was devised by the Diabetes working group and then reviewed by a Consultant Diabetologist and Specialist Diabetes Nurse. The questionnaire was piloted on 2 occasions by different pharmacists with amendments made after each pilot. A four-point confidence rating scale was used: not confident, fairly confident, confident and fully confident. 15 multiple choice questions were used to test knowledge and skills, with only one correct answer per question. Each question was equally weighted with a correct answer given a mark of one.

The questionnaire was hosted on an online website, SurveyMonkey®. A link was emailed to all pharmacists and participants answered the questions on the website. The questionnaire was live for approximately two months (September to October 2013). Responses were downloaded onto MS Excel and analysed descriptively. Ethics approval was not required for this project as patient care was not altered in any way.

Results: A total of 78 pharmacists completed the questionnaire across both sites out of approximately 100 eligible pharmacists (78% response rate). Out of a total of 858 responses for the 11 confidence questions, only 22% (192 answers) were either confident or fully confident. Just 5% of respondents (4/78) rated themselves confident or fully confident in all topic areas.

Individual scores for knowledge and skills questions ranged from 0% (no questions answered) to 80% (12/15 correct answers). If respondents who skipped all questions are excluded, the range of scores was 27% (4/15) to 80%, mean score of 33%. If respondents who skipped all questions are excluded, the range of scores was 27% (4/15) to 80%, mean score of 47%.

Table 1.1 results of confidence, knowledge and skills evaluation by topic area

<table>
<thead>
<tr>
<th>Topic area</th>
<th>Respondents reporting confidence* in this topic area</th>
<th>Knowledge and skills; No. of questions relating to this topic area</th>
<th>Knowledge and skills; Respondents with correct answers</th>
<th>Confident respondents with correct answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding blood glucose (BG) results and factors affecting these</td>
<td>22% (17/78)</td>
<td>1</td>
<td>18% (14/78)</td>
<td>6% (1/17)</td>
</tr>
<tr>
<td>Understanding and interpreting relationships between BG control and patient parameters</td>
<td>22% (17/78)</td>
<td>3</td>
<td>12% (9/78)</td>
<td>6% (1/17)</td>
</tr>
<tr>
<td>Pharmacology of oral hypoglycaemic agents</td>
<td>10% (8/78)</td>
<td>1</td>
<td>40% (31/78)</td>
<td>63% (5/8)</td>
</tr>
<tr>
<td>Pharmacology of insulin</td>
<td>Not asked</td>
<td>1</td>
<td>40% (31/78)</td>
<td>n/a</td>
</tr>
<tr>
<td>Ability to adjust an insulin regimen according to relevant patient parameters</td>
<td>10% (8/78)</td>
<td>2</td>
<td>21% (16/78)</td>
<td>50% (4/8)</td>
</tr>
<tr>
<td>Ability to advise on appropriate BG monitoring in the context of other disease states</td>
<td>Not asked</td>
<td>1</td>
<td>60% (47/78)</td>
<td>n/a</td>
</tr>
<tr>
<td>Management of diabetic ketoacidosis</td>
<td>Not asked</td>
<td>2</td>
<td>10% (8/78)</td>
<td>n/a</td>
</tr>
<tr>
<td>Selecting an appropriate insulin regimen for a patient</td>
<td>Not asked</td>
<td>1</td>
<td>8% (6/78)</td>
<td>n/a</td>
</tr>
<tr>
<td>Managing and advising on variable-dose IV insulin regimens</td>
<td>9% (7/78)</td>
<td>3</td>
<td>3% (2/78)</td>
<td>0% (0/7)</td>
</tr>
<tr>
<td>Managing hypoglycaemia</td>
<td>29% (23/78)</td>
<td>Not asked</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Understanding micro- and macrovascular complications</td>
<td>28% (22/78)</td>
<td>Not asked</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Conclusion: The assessment clearly demonstrates a lack of pharmacists’ knowledge and skills in this area. The Diabetes working group plan to develop a training programme tailored to the educational needs highlighted in this assessment. The baseline assessment tool could be used across the NHS to quickly provide a baseline evaluation for any specific disease and identify priorities for training and development.

References

Background
The concept of a Healthy Living Pharmacy (HLP) was piloted in Portsmouth in 2009. This saw the development of pharmacy staff into Healthy Living Pharmacy Champions (HLPCs) to promote health and well being from community pharmacies. For participants in this study to become a HLPC, pharmacy staff undertook the Royal Society for Public Health (RSPH) Level 2 Award in Understanding Health Improvement. This was also the training used in the HLP pilot. Pharmacy support staff also already undertake qualifications and training to perform their various pharmacy roles. It was not known to what extent any previous training along with the RSPH training, met the needs of support staff to implement the HLP initiative and deliver public health interventions. As part of a wider study of the views of pharmacy support staff on delivering the HLP initiative in Northumberland, insights were gained into the perceived training needs of support staff to deliver the HLP initiative from community pharmacy.

Aims and Objectives
To explore the views and attitudes of pharmacy support staff on the HLP initiative, including identification of barriers and facilitators to delivery of public health interventions such as training.

Methods
Face to face semi-structured interviews were conducted with 21 participants from 12 HLPs in Northumberland in August-October 2013. Participants had only undergone the RSPH training as part of becoming a HLP at the point of interview. HLP Champions (n=16) and non-champion (n=5) staff were included in the sample. Participants also covered a range of pharmacy roles including medicines counter assistants (n=9), dispensing assistants (n=6) and pharmacy technicians (n=6); National multiple (n=8), small chain (n=2) and independently owned (n=2) pharmacies were represented. Participants were recruited by contacting pharmacists in HLPs who nominated support staff for potential participation. Informed consent was obtained prior to conducting interviews. A topic guide was developed and underwent face validity testing and piloting with one participant. Data from the pilot was subsequently incorporated into the results. Interviews were audio recorded, transcribed verbatim and analysed using Framework approach. The study was approved by RGU ethics committee. NHS ethics approval was not required.

Results and Discussion
Two of the seven parent themes identified from the data analysis indicated the perceived training needs of support staff to deliver the HLP initiative. These were ‘Factors which could be barriers or facilitators to public health activity’ and ‘Concerns about becoming a HLP prior to accreditation’.

Training from various sources was generally seen by participants as a facilitator to public health activity, with the most useful training that which concentrated on delivery of clinical knowledge for health promotion. However, a need for more of this type of knowledge on specific topics, such as cancer awareness was also expressed by some participants. A couple of participants also described using health promotion materials such as leaflets to gain further knowledge in preparation for public health campaigns.

Participants did not agree about whether there was an additional training need around developing skills for initiating lifestyle conversations. Some felt the RSPH training had been adequate for this, whilst others still did not feel confident in initiating lifestyle conversations despite receiving the training. Participants also perceived some lifestyle topics as ‘difficult’ to have with clients, which also influenced their ability to initiate lifestyle conversations. Not all participants agreed on which topics were ‘difficult’, but smoking cessation was generally described as being easier, and interventions around alcohol consumption were generally cited as more difficult. Some staff may therefore benefit from supplementary training to develop skills and confidence around starting conversations, specifically in areas which are perceived as ‘difficult’.

Participants’ perceived demand for some public health interventions from pharmacy clients was another sub-theme which indicated an additional training need. Demand was interpreted by participants through quantity of requests for advice, over-the-counter products or access to pharmacy services in relation to public health. Without any perceived demand for a type of intervention, some participants seemed to struggle to place them in the context of their community pharmacy setting. This suggested a wider training need around the role of community pharmacy in public health.

Client point in change cycle, although not recognised in the context of formal theories, was widely acknowledged by participants as another factor which could be barrier to provision of health promotion interventions. Incorporating training in stage of change for smoking cessation for pharmacy staff has previously been indicated as a successful strategy for supporting pharmacy staff to deliver smoking cessation interventions.

A couple of participants felt that they lacked knowledge about the HLP concept itself, which was included in ‘Concerns prior to becoming accredited a HLP’ and this seemed to lead to lack of confidence in delivery of the initiative. Training on the HLP initiative concept needs to be delivered before accreditation to ensure delivery of outcomes from the pharmacies soon after accreditation.

Conclusion
Existing training for current pharmacy support staff roles provides a good foundation from which to deliver public health interventions. Despite completion of the RSPH Award in Understanding Health Improvement, additional training needs were identified in this study. These included development of skills around initiating lifestyle conversations, especially for topics perceived as ‘difficult’, preparation for the delivery of public health campaigns, and to provide context to the delivery of public health from community pharmacy.

References
Context
Warfarin is a recognised high risk drug with a narrow therapeutic window requiring close monitoring to minimise the risk of haemorrhagic and thrombotic events. The National Patient Safety Agency (NPSA) issued a patient safety alert in 2007 concerning the risk to patients from anticoagulant related incidents and hospital admissions. In addition to making a number of recommendations to minimise harm caused by anticoagulation the NPSA also introduced a number of safety indicators. Monitoring of these indicators helps to identify risks and promote the appropriate actions to minimise them. Indicators for monitoring the safety of anticoagulation include measuring the proportion of international normalised ratio (INR) tests over 5.0 and over 8.0 as a marker of the risk of haemorrhage. We benchmarked the rate of INRs over 5.0 and 8.0 in the inpatient setting in our Trust against rates observed in other Trusts and found that our rates were comparable. Despite having similar rates to other Trusts, to minimise harm to patients and improve the patient experience we wanted to lower the proportion of high INRs within our Trust.

Objectives
- To agree and implement an intervention to support timely identification of patients with high INRs for pharmacist input
- To determine whether following implementation of the intervention there was a change in the rate of high INRs in the inpatient setting across the Trust

Method
A working group was developed including an anticoagulation pharmacist, a haematologist, an anticoagulation nurse and a representative from the Trust’s Pathology Information Technology department. A dataset that could be run as an automated Trust-wide daily INR report including patient’s demographics, clinician details and ward locations was developed and agreed by the group. The report was piloted and refined to enable easier identification of patients’ ward location. The involvement intervened a pharmacy technician accessing the report on a daily basis to identify all inpatients with an INR over 5 and sending a ‘High INR’ email to ward pharmacists, requesting that they review the patient, providing information as to probable contributory factors and take appropriate action. Following feedback from Trust pharmacists, the alert email was revised; sending it with more background information and formatting into a questionnaire to clarify why it had been sent, what actions pharmacists were expected to take and to aid pharmacists’ in providing relevant and useful information about potential contributory factors. Data from the INR reports and from pharmacists’ responses were reviewed to see what, if any changes had occurred during the time the emails had been introduced. Ethics approval was not required as this was a quality improvement project.

Results
Daily INR reports and high INR email alerts sent to ward pharmacists were introduced across the Trust in September 2012. Data on the rate of high INRs for two time periods: September 2012 to January 2013 and January 2014 to March 2014 is presented (Table 1). In terms of potential contributory factors, pharmacists provided information on 39 cases between September 2012 to January 2013 and for 62 cases between January 2014 and March 2014. The responses in both time periods were comparable in that interacting drug was the most commonly cited contributory factor (67% between September 2012 to January 2013 and 45% between January 2014 and March 2014), with antibiotics being the most frequent drug class and clarithromycin the most frequently cited in both time periods. Other contributory factors highlighted in both time periods included comorbidities, poor oral intake and patient sensitivity to warfarin. The proportion of cases where the pharmacist was unable to identify a potential contributory factor for a high INR went down from 31% to 17% between the two time periods.

Table 1. Comparison of high INRs (Inpatient): Sept 2012-Jan 2013 and Jan 2014-Mar 2014

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Number of INR tests</td>
<td>8798 (1759/month)</td>
<td>5133 (1711/month)</td>
</tr>
<tr>
<td>Number of INR tests &gt;5.0 (rate)</td>
<td>320 (3.64%) 64/month</td>
<td>146 (2.84%) 49/month</td>
</tr>
<tr>
<td>Number of INR tests &gt;8.0 (rate)</td>
<td>56 (0.64%) 11/month</td>
<td>28 (0.55%) 9/month</td>
</tr>
</tbody>
</table>

Discussion
Over the period that high INR reports have been sent to ward pharmacists there has been a downward trend in the number of high INRs in inpatients across the Trust. Whilst it may not be possible to say that this is solely due to the email alerts, it is likely that the alerts had some bearing on the rate reduction. The increased pharmacist response rate over the period suggests improved pharmacist engagement. Whilst the high INR email is a reactive approach, the process of receiving an email alert requesting a response might have reinforced key safe prescribing points for pharmacists and by proxy prescribers, making future prescribing safer.

There are a number of limitations to this work including the time frames compared were not the same and data was not corrected for potential seasonal variation. In addition, data on contributory factors for high INRs depended on pharmacists’ response and was therefore subjective.

The risk of a bleed increases exponentially above an INR of 5.2 In addition, high INRs and warfarin-associated bleeding may not only increase patients’ length of stay but also adversely affect patients’ perception and experience of warfarin negatively impacting adherence. This quality improvement project suggests that sending ward pharmacists an email alerting them to patients with high INRs and asking them to take relevant actions has contributed to a reduction in the rate of high INRs in a large teaching Trust.

Further work currently being considered includes expansion of the email alert for use in INRs between 4 and 5 (i.e. raised INRs) to explore whether a more proactive approach might further reduce high INR rates.

References
Introduction

Parenteral Nutrition (PN) is a proven method of administering nutrition to patients who have a non-functioning or inaccessible gut, but it is associated with numerous risks. The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) audit ‘PN: A Mixed Bag’, examined the care of patients receiving PN in hospital and showed that only 19% of adult patients received PN care that was considered to be good practice. They recommended that hospitals should have a multidisciplinary nutrition team (NT) involved in the provision of PN and this is also recommended by the National Institute for Health and Care Excellence (NICE).

SWBH comprises two main hospital sites – Sandwell Hospital (SGH) and City Hospital (CH). Each site has a NT that is responsible for the initiation and prescribing of PN. The CH team consists of a nutrition nurse, dietician and gastroenterologist. The SGH team consists of the same core with the addition of a biochemistry specialist doctor. The PN pharmacist and pharmacy technician work as part of both teams. All PN at SWBH is ordered from an external manufacturing company. All requests for PN are referred to the NT by the patient’s parent team. Reorganisation of services within the Trust has resulted in certain specialties being concentrated on a single site, for example gastrointestinal (GI) surgery at SGH, and gynaecology at CH.

There was a perception amongst staff that there were differences in the prescribing of PN on each site.

Aim

To undertake a retrospective audit to identify any differences in the prescribing of PN between the two hospital sites and what those differences were.

Objectives

- Identify how many adult patients received PN in the year 2012 on each site.
- Identify the specialties where PN was initiated.
- Identify how many of the PN bags prescribed in this period were standard bags and how many were bespoke bags. 80% or more should be standard bags and 20% or fewer should be bespoke bags. 0% of bags should contain no micronutrients.
- Identify how many patients developed electrolyte disturbances.
- Identify the professionals involved in the prescribing of PN.

Method

A data collection sheet was devised in order to capture all data needed to assess whether the standards would be met and the objectives achieved. Data was obtained from the pharmacy PN notes and iSOFT Clinical Manager (iCM) pertaining to patient demographics and history, PN prescribed and blood results. Patients that received PN ordered in 2012 and who had full pharmacy PN notes available were included. Patients who were transferred between sites whilst on PN were excluded. The audit was registered with the clinical effectiveness department who confirmed that ethical approval was not required.

Results

Both sites were compliant with the audit standards set (Table 1). Differences were noted in the two sites with regard to the addition of electrolytes to standard bags. At SGH 94% of the PN patients were GI surgery patients, 4% haematology and 2% gastroenterology. At CH 41% were gynaecology patients, 23.5% GI Surgery, 6% cardiology, 6% urology and 6% vascular surgery.

91% of PN bags at SGH were prescribed by a NT member, with the remainder being prescribed by someone experienced in PN, but not in the NT. At CH 20% of bags were prescribed by a NT member, 4% by someone not in the NT but experienced in PN and 76% by someone with little or no experience. See Table 1 for other summarised results.

<table>
<thead>
<tr>
<th>Patients receiving PN</th>
<th>CH</th>
<th>SGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients included</td>
<td>22</td>
<td>60</td>
</tr>
<tr>
<td>Standard PN bags with no micronutrients</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Standard PN bags with micronutrients</td>
<td>Standard electrolytes 78%</td>
<td>Standard electrolytes 53%</td>
</tr>
<tr>
<td>Additional electrolytes*</td>
<td>4%</td>
<td>Additional electrolytes* 34%</td>
</tr>
<tr>
<td>Total</td>
<td>82%</td>
<td>87%</td>
</tr>
<tr>
<td>Bespoke PN bags</td>
<td>18%</td>
<td>13%</td>
</tr>
<tr>
<td>Patients with electrolyte disturbances</td>
<td>47%</td>
<td>82%</td>
</tr>
</tbody>
</table>

*Classified as those bags with electrolytes added to manufacturer’s accepted maximum concentrations.

Discussion

SGH had more patients receiving PN than CH, resulting in a different workload across the sites. However, this reflects the different specialties concentrated on each site and therefore appears to be appropriate. GI Surgery is concentrated at SGH and is the specialty expected to have highest proportion of patients.

Both sites had a similar ratio of standard and bespoke bags. However at SGH electrolytes were added more frequently to standard bags, than at CH. This finding is supported by the higher number of patients at SGH with electrolyte disturbances and reflects the higher concentration of GI surgery patients at SGH who are more likely to suffer GI losses.

At SGH 91% of PN bags were prescribed by a member of the NT compared to only 20% at CH. This is not in accordance with either the NICE guidance or the recommendations from the NCEPOD audit. These results will be presented to the NT, with the recommendation that the NT assumes greater responsibility for prescribing at CH as well as the current input from non-prescribing members of the NT.

For convenience a retrospective design was chosen. However, service reconfiguration during the audit period may limit the applicability to current practice. Limitations of the project include retrospective nature, and inability to match electrolyte results with PN prescription. Further work to investigate this is planned.

References

Introduction
Between 2002 and 2012 the National Patient Safety Agency (NPSA) issued guidance on safe medicines use in the form of Patient Safety Alerts, Safer Practice Notices and Rapid Response Reports to reduce the risk of harm from medicines. NHS trusts were required to declare compliance with guidance to provide assurance that actions were implemented to prevent recurrence of error in the future. In addition to national guidance and in response to medication incidents reported within our organization additional strategies to reduce the risk of error have been implemented. Ongoing audit of compliance with guidance is resource intensive and therefore difficult to sustain on an ongoing basis.

Error prevention strategies can be categorised in three ways:
1. Reducing or eliminating the possibility of error e.g. by restricting access to drugs or specific presentations of drugs,
2. Making errors visible e.g. with alerts or forcing functions,
3. Minimising the consequence of error e.g. by ensuring ‘rescue’ drugs are available in clinical areas.

We aimed to simplify the audit process by developing a tool for measuring the extent to which strategies to reduce the risk of harm from high risk medicines, based on this categorisation are being adhered to.

Objectives
To define standards for medicines safety from local and national guidance.
To measure compliance of wards against the standards
To identify standards and ward locations where compliance can be improved.

Standards
The standards against which compliance was measured are listed in Table 1.

Method
Standards based on the above 3 principles were derived from local guidance and published NPSA guidance. A data collection form was developed and piloted over three wards. This was amended and used to audit all wards in our Trust. Wards were visited, unannounced, on one occasion over the 5 day period 9th-13th October 2013. Clinical rooms and drug storage areas were inspected by the investigators and findings were recorded. Not all standards applied to all wards, and certain wards were exempt from standards according to local policy. Data were analysed using Microsoft Excel 2010. Ethics approval was not required for this audit.

Results
Forty six wards were visited. Results from the standards under the category Reducing or eliminating the possibility of error are presented in Table 1.

Three standards were met by 100% of wards to which the standards applied. Six standards were met by more than 90% of wards. There was poor compliance with standards 2 (12/46, 26.1%) and 8 (22/46, 47.8%).

Table 1: Compliance with standards relating to restricting access to high risk medicines

<table>
<thead>
<tr>
<th>Standard</th>
<th>No. wards applied to</th>
<th>Compliance (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No wards stock potassium chloride ampoules (unless authorised by policy)</td>
<td>32</td>
</tr>
<tr>
<td>2</td>
<td>No wards stock ‘high strength’ opioids unless administered to a patient within the last seven days</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>Wards stock only Midazolam 1mg/ml amps (unless prescribed and dispensed for a current inpatient)</td>
<td>39</td>
</tr>
<tr>
<td>4</td>
<td>No wards stock vials of non-lipid amphotericin (Fungizone)</td>
<td>46</td>
</tr>
<tr>
<td>5</td>
<td>No wards stock heparin 5000units/5ml amps</td>
<td>41</td>
</tr>
<tr>
<td>6</td>
<td>Patient controlled angesia (PCA) infusions in children over 50kg are prepared using morphine 50mg/50ml ready to use vials only</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>No paediatric wards stock sodium chloride 0.18% with glucose 4% infusions</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>No wards stock magnesium sulphate 50% (unless authorised or dispensed for a current inpatient)</td>
<td>22</td>
</tr>
</tbody>
</table>

Discussion
Five standards with greater than 90% compliance were derived from NPSA guidance. Standard 5 is a local standard. The standard least well complied with was the presence of high strength opioids in ward controlled drug cupboards. We aim to restrict controlled drug storage to first line opioid products to reduce the risk of selection errors where multiple strengths and multiple formulations of the same product might be available. Whilst compliance with the standard to restrict the availability of magnesium sulphate ampoules is low this standard was measured prior to full implementation of a policy to replace concentrated magnesium solutions with ready-to-administer infusions. Future audits are expected to demonstrate significant improvements against this standard.

Three wards complied with all the standards relevant to them, and 19 wards complied with all standards other than the non-availability of high strength opioids.

Conclusion
This audit has identified that several medication safety constraints are not consistently adhered to suggesting that some medication errors may not be prevented. However the results presented are from a single ward visit and may not accurately represent the position in rapidly changing clinical environments. Promotion and support for wards to achieve the standards consistently through liaison with senior nurses is needed. Refinement of the tool and regular re-audit with feedback are planned.

References
Background
Protecting patients from avoidable harm is a fundamental aim of the National Health Service; preventing avoidable emergency readmission to hospital is a quality indicator of both inpatient safety and good transitions of care. Local commissioners do not pay for a proportion of readmissions within 30 days of discharge from hospital meaning that it is also a high profile financial pressure on acute NHS trusts.

Readmission prediction tools (e.g. PARR-30) are based primarily on epidemiological data; there are no published studies that look at the predictive effect of appending medication risk factors to the existing tools. While correlations exist between certain medications and admission or readmission to hospital, it is not known if they are causal factors; the attitudes and adherence of individuals to their medications may well have a stronger influence on risk of readmission. Our hypothesis was that patient-centred care (meeting each individual patient’s need for information, risk-management or support with their medicines) might reduce readmissions. The New Medicines Service (NMS) and targeted Medicines Use Reviews (tMUR) are designed to address many of these but at the time we started this work there was no formal pathway linking secondary care with those services.

Objectives
- Identify medicine-related needs and medication-related risk factors for readmission for each individual patient.
- Design and implement pharmaceutical care bundles (small, straightforward sets of best practices intended to improve patient outcomes) to address the needs identified.
- Facilitate uptake of NMS/tMUR after discharge.
- Provide domiciliary visits where patients could not access their local pharmacy.
- Assess the impact of our interventions on emergency readmission rate over a 12 month period.
- Measure patient and GP satisfaction with the enhanced service.

Method
We have previously described the methods used to develop, implement and evaluate REACH, our person centred model of care. Medicine-related needs were identified using an existing assessment tool based on Med-MAIDE®. Medications correlated with readmission were identified from a literature review and care bundles were produced by the Pharmacy team. This paper presents the data for the full 12 months of our intervention. We recorded the detail of our interventions for individual patients on the intervention ward. Emergency readmission rate was monitored by our trust’s informatics department for 12 months. Patient and GP satisfaction were surveyed during month 9 of the intervention. Our project was designed to join up existing services and we were permitted to conduct the study as a service evaluation rather than research. Caldicott approval was gained to hold and evaluate patient data for this purpose.

Results
30-day readmission rates on the intervention and control wards were not significantly different in the 12 month period before our intervention (19 vs 16%, two sample z test for difference in proportions of unrelated samples) but readmission rate was significantly lower on the intervention ward during the 12 month intervention period (17% vs 22%, p<0.05, z=2.05, two sample z test for comparison of proportions in unrelated samples). 50% of the patients in our sample who were eligible for an advanced service at their community Pharmacy could not access it, usually because they were housebound but also because some community Pharmacies did not offer those services. 80% of those eligible patients accepted the service when we offered it to them from the hospital and we provided 90% of those services over the telephone. All patients who responded to our satisfaction survey (n=13) felt able to take or use their medicines in the way they had discussed with the hospital Pharmacy Technician. 9 of 13 (68%) respondents knew the common side effects of their medicines and what to do if they experienced one. 17 of 30 (57%) GP respondents agreed that the discharge information from the intervention ward was better quality than information they usually received at hospital discharge.

We were unable to use all parts of the REACH model for a number of patients on the intervention ward. Comparing readmission rates for patients discharged from the intervention ward for whom REACH was delivered or not delivered showed that three parts of the REACH model made the largest difference to readmission rates:
1. assessing an individual’s need for support with their medicines.
2. referring eligible individuals to their community Pharmacist for advanced services.
3. providing advanced services from the hospital Pharmacy (domiciliary or by telephone) where an individual was eligible but unable to access them at their community Pharmacy.

Discussion
Our evaluation of the effect of a person-centred approach to pharmaceutical care on reducing emergency readmissions in the U.K. is novel and contributes to the evidence base on this topic. Many of the components of the REACH model are already known to be good practice; there are no other published studies evaluating the combination of all these elements into a person-centred pharmaceutical care pathway. The novel ‘pharmaceutical care bundle’ components of REACH were accepted and easily adopted by the clinical pharmacy team.

Moving forward from REACH, we are focusing on the three parts of REACH that made the biggest impact on readmissions. Medicine reconciliation by pharmacy remains a key performance indicator for our department. We have developed and implemented with our Local Pharmaceutical Committee an electronic referral pathway for advanced services between the hospital pharmacy team and community pharmacists. Next steps are to join up with community pharmacy colleagues to develop a strategy for delivering domiciliary advanced services.

References
Introduction

High dose inhaled corticosteroid (ICS) inhalers (>1000 micrograms/day beclometasone dipropionate (BDP) equivalent) are frequently prescribed for the management of asthma and COPD and currently 2 of the top 5 most expensive items to the NHS are high dose combination inhalers. This is despite the lack of evidence that high doses of ICS (up to 2000 micrograms BDP/day) are effective in asthma (grade D evidence in national asthma guidelines), and that in the management of frequent exacerbations of COPD a moderate dose of inhaled steroids (800 micrograms BDP equivalence/day) is as effective as much higher doses. Recently, concerns have been raised about the increased risk of pneumonia, diabetes, osteoporosis, skin thinning and tuberculosis with high dose ICS. Adrenal suppression has long been recognised as a key concerning systemic side effect associated with high dose ICS prescribed for long periods, thus it is important that patients are managed on the lowest dose of ICS that will control their disease.

In April 1998, an NHS Executive circular acknowledged the danger of sudden cessation of systemic steroid therapy. It stated it was the responsibility of the prescriber to issue a steroid card to patients and that the dispensing pharmacist should check that the patient had one (and supply it, if necessary). The card recommended was a revised version of the 1961 card that is still in use today (the “blue steroid card”). Also in 1998 the Committee on Safety of Medicines recommended that a Steroid Treatment Card be issued for patients on ICS at the discretion of the doctor or pharmacist. This advice was strengthened in 2006: the MHRA recommended that “steroid treatment cards should be routinely provided for patients who require prolonged treatment with high doses of inhaled steroids”, resulting in practitioners using the blue cards, often with the words: “prednisolone tablets” or “oral” crossed through. Thus it seemed timely to develop a specific ICS safety card for use with high dose inhalers, and use this to alert prescribers of the potential dangers of high dose ICS and to consider if a lower dose of ICS would be better for the patient.

Objective(s)

- To draft an ICS safety card for patients and accompanying prescribing guidance for health care professionals to highlight the risks of using high doses of ICS, and potential for using lower doses of ICS
- To improve the usability of the materials using feedback from healthcare professionals (HCPs) and patients
- To seek endorsement/support from nationally recognised respiratory bodies
- To issue an approved version of the card and guidance for wider adoption

Method

As part of the Responsible Respiratory Prescribing programme to increase the value gained from respiratory prescribing, the London Respiratory Team (LRT) drafted a patient safety card and prescribing guidance incorporating key factors for safe and effective ICS use. The process of improvement was iterative. Members of the LRT asked their networks of HCPs and patients for comments on early drafts. Subsequent drafts were refined based on collated comments following a questionnaire to HCPs, then re-circulated until no further improvements were offered. The final version was presented to several national professional and patient organisations for endorsement, with dissemination initially co-ordinated by the London/South East Respiratory Pharmacists Network.

Results

Written feedback was received from 33 HCPs on the first draft (7 physicians, 20 pharmacists and 6 community nurses). Interestingly, of them, 7 were not aware that corticosteroid safety cards should be issued to patients using high potency corticosteroid inhalers; all found it useful, all would issue it to a patient if appropriate and all would recommend its use to a colleague. Of the 8 patients asked to comment on the card, none knew a steroid card was recommended [and none had one, though 7 were “eligible” for one], all found it useful and importantly, all said that the card would help them discuss their need for a high dose ICS with their doctor.

To date, this card has been endorsed by NHS England London Respiratory Clinical Leadership Group, BTS/SIGN Asthma Guidelines Committee, Primary Care Respiratory Society-UK, UKCPA and Royal Pharmaceutical Society, with approval being sought from several more including the British Lung Foundation and Asthma UK. Within one month of launch, orders for 40,000 cards were made from trusts and CCGs within London and the South of England. The steroid card can be viewed and ordered at http://www.ashleyforms.co.uk/products-and-services/high-dose-ics-safety-card.

Discussion/Conclusion

A focus on value – outcomes divided by the cost of their production, including respiratory prescribing led to the idea for this innovative and patient-driven improvement. The card is written for patients, so that they understand the value and how to minimise the potential harms of treatment. At the same time there is an underlying objective that the process of a prescriber attempting to issue the card would prompt them to consider whether the high dose of ICS is actually required or whether a lower dose used appropriately would provide similar efficacy, with fewer side effects. Ideally this would result in avoiding the need to issue the steroid card at all.

CCGs in London with an interest in improving the value of their respiratory prescribing have successfully implemented the card. Greater awareness and further endorsement by respiratory interest groups is expected to increase and widen the use of the card. Further work is planned to measure the impact in prescribing as a response to the cards including some qualitative follow-up work with patients on their experience, prescribing data analysis (e.g. a decrease in high dose ICS prescribed) potentially decreasing NHS expenditure on high dose ICS from the current value of £350million per annum in England. Ultimately however, it is hoped that the card will bring about change in prescribers, resulting in improved efficacy and safety of ICS use, and support achievement of value in respiratory prescribing.

References

Introduction
Locally collected pharmacy intervention data had shown a significant proportion of prescribing errors occurred at the point of admission to hospital with doctors incorrectly prescribing patients’ regular medication (unpublished audit data). At the same time supplementary pharmacist prescribing was growing within the Trust, extending from the admissions units to all wards. With the advent of independent prescribing and the publication of the NICE/NPSA guidance1 there was a drive to embed pharmacist prescribing within the patient pathway, with a focus on prescribing patients’ regular medications on admission.
This approach was welcomed by the Trust and since 2006/7 all pharmacists have been expected to gain their prescribing qualification following completion of a clinical diploma. Currently 83% of clinical pharmacists are qualified (n=29) or in training (n=10). Recent data show that Trust pharmacists prescribe for 40% of inpatients, accounting for 13% of all medication orders prescribed, prescribing from all but three sections of the BNF.
Prescribing errors by medical prescribers have been well documented; the EQUIP study states an 8.9% error rate and it is well understood that involving pharmacists in the prescribing pathway reduces risk to patients: the majority of errors picked up in the EQUIP study never reached the patient as they were rectified by the pharmacist. With a well-developed, mature pharmacist prescribing model there was an opportunity to determine if widespread pharmacist prescribing presented similar risks to patients as are known with medical prescribing.

Objectives
To demonstrate that the Trust pharmacy prescribing model reduced risk to patients by measuring the prevalence of prescribing errors by pharmacists

Method
The methodology used in the EQUIP study was chosen as it is a nationally published method for determining prescribers’ error rate. The study was undertaken across three sites at the Trust with all pharmacists’ prescribing for inpatients included.

A data collection form was developed and piloted with the clinical pharmacists, based upon the documentation used in the EQUIP study. Data were collected over ten days (Monday to Friday) over two consecutive weeks in November 2012. The number of medication orders prescribed to the patient, reason for prescribing (existing medicine, new medicine, correction of error, medicine stopped, dose change or whether a medicine was rewritten for clarity) and where (clinical speciality) the prescribing occurred was collected. To reduce the risk of bias during the study period, all clinical checks were carried out by non-prescribing pharmacists who also collected the data, managing any errors identified as per normal practice. Rewriting prescriptions were not blinded to this study.

An error was identified as any intervention the clinical pharmacist had to make to ensure that the prescribing was clinically correct and legal. Errors were classified using the 29 categories used in the EQUIP study. Data were entered into a spreadsheet and analysed descriptively.

Advice on Ethical Approval was sought from the Trust’s Research Development Unit.

Results
Pharmacists prescribed 1,415 medication orders for 155 patients. Four errors (0.3%) were identified: simvastatin 40mg and amlodipine 10mg co-prescribed; morphine sulphate 10mg/ml solution prescribed instead of oxycodone 5mg/ml solution; diltiazem prescribed concurrently with simvastatin 40mg; one medication not signed by the prescriber.

Reasons for pharmacist prescribing are listed in Table 1.

Table 1: Reason for prescribing by pharmacists

<table>
<thead>
<tr>
<th>Reason for prescribing</th>
<th>Medication orders prescribed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular medication not prescribed</td>
<td>799 (57%)</td>
</tr>
<tr>
<td>New drug</td>
<td>184 (13%)</td>
</tr>
<tr>
<td>Wrongly prescribed medication</td>
<td>102 (7%)</td>
</tr>
<tr>
<td>Medication stopped</td>
<td>10 (1%)</td>
</tr>
<tr>
<td>Dose Change</td>
<td>27 (2%)</td>
</tr>
<tr>
<td>Re-written for clarity</td>
<td>49 (3%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>244 (17%)</td>
</tr>
<tr>
<td>Total</td>
<td>1415 (100%)</td>
</tr>
</tbody>
</table>

Discussion
This study shows that pharmacists working at the Trust make few errors (0.3% error rate). This compares favourably to the 8.9% prescribing error rate of doctors, as determined by EQUIP1. This provides assurance that the pharmacist prescribing model reduces risk to patients. The results also provide assurance that a significant proportion of pharmacist prescribing is for patients at the point of admission (57% of items) which was previously identified as an area of risk. This, combined with the low pharmacist prescribing error rate, reduces risk to patients. This is supported by local medicines reconciliation data: currently 85% of patients have their medicines reconciled within 24 hours of admission (unpublished audit data).

It was encouraging to see that pharmacist prescribing was not limited to prescribing patients’ regular medication: 13% of all medication orders prescribed, prescribing from all but three sections of the BNF.

Prescribing errors by medical prescribers have been well documented; the EQUIP study states an 8.9% error rate and it is well understood that involving pharmacists in the prescribing pathway reduces risk to patients: the majority of errors picked up in the EQUIP study never reached the patient as they were rectified by the pharmacist. With a well-developed, mature pharmacist prescribing model there was an opportunity to determine if widespread pharmacist prescribing presented similar risks to patients as are known with medical prescribing.

Although limited to one Trust, the results of this study are encouraging, showing that embedding pharmacist prescribers into the patient pathway reduces prescribing errors and therefore risk to patients. We would like to put this study forward for consideration for the patient safety award.

References
UKCPA/Novartis Antimicrobial Management Award 2014
Design, development and multi-centre implementation of a smartphone and mobile device software application (app) for hospital infection treatment guidelines and antimicrobial stewardship
Hand K, Gupta S, Basarab A, Pallett A, Patel S, Faust S, University Hospital Southampton (UHS) NHS Foundation Trust, Southampton

Introduction
The Chief Medical Officer’s report on infections and the rise of antimicrobial resistance published in March 2013 called for action to preserve the effectiveness of existing antimicrobials through antimicrobial stewardship.1 Promoting adherence to evidence-based antibiotic treatment guidelines is a recognised stewardship strategy and has been associated with lower mortality and reduced antibiotic prescribing in a number of clinical trials.2 Summaries of infection treatment guidelines and the local antimicrobial stewardship policy were made available in the form of a pocket-sized printed pamphlet in this NHS teaching hospital in 2008 and these “pocket guides” were well-received by junior doctors. However, at induction training junior doctors frequently aired concerns over misplacing printed copies and requested a version of the pocket guide for their smartphones and mobile digital devices.

Objectives
- To make local infection treatment guidelines and antimicrobial stewardship policy accessible to prescribers via an interactive software application (app) for mobile devices.
- To exploit app software decision-support functionality to improve patient safety and promote effective and proportionate use of antimicrobials.
- To create a software system that could be easily adopted by other NHS Trusts and adapted to local needs, thereby making efficient and cost-effective use of scarce stewardship resources.

Method
A project team was convened by a consultant intensivist leading other content experts including specialist pharmacists, medical microbiologists and consultant paediatricians. A collaboration was established with a local software company—Horizon Strategic Partners—with experience of developing smartphone applications. The existing pocket guide was formatted specifically for Apple and Android-compatible mobile devices in HTML by designing a standard framework of headings and a template for content. Only Trust-approved guideline content was included and therefore ethics approval was not sought. A content editing and new version publishing function was provided to local clinicians with administrator rights to the system. The resulting app was tested with local prescribers and launched as MicroGuide on Apple iTunes on 26th July 2011 and shortly afterwards on the Google Play website.

Following expressions of interest from several other NHS Trusts through the UKCPA pharmacy infection network, the project team subsequently worked with Horizon to design a common framework for an antibiotic guidelines app that could be used by any NHS hospital to upload local infection treatment recommendations without having to design an app specifically for each organisation. Horizon subsequently commercialised the MicroGuide app by offering the software framework to other NHS organisations for a competitive licensing fee (although the app download remains free to users). This new multi-centre format for MicroGuide was launched in 2013 and provides flexibility to modify content and framework.

Results
Key facts about the app:
- Since launch on the iTunes and Android online stores in July 2011, the MicroGuide app has been downloaded over 75,000 times with over 13,000 downloads in the last six months to April 2014.
- Patient safety has potentially been improved by a colour-coding system incorporated into the app to alert users to the dangers of penicillin allergy and dosing calculators are provided for antimicrobials with a narrow therapeutic index as well as dosing advice in renal failure.
- A preliminary decision support system is incorporated to direct users to alternative treatments for patients with more severe infections or at risk of resistant pathogens.
- To date, 35 NHS Trusts have licensed the app software from Horizon and are in the process of uploading content material or have already launched their local versions of MicroGuide. A further 51 Trusts are in negotiations with Horizon for licensing.
- User registration is not compulsory but over 5,600 users have registered their details with Horizon and analysis of a random sample of 1,000 users revealed that 63% are doctors, 12% pharmacists, 11% nurses, 8% are students and 6% from ‘other’ groups.
- The most frequently accessed clinical sections of the app are treatment guidelines for: skin and soft tissue infections (20%); community-acquired pneumonia (14%); hospital-acquired pneumonia (8%); intra-abdominal infections (7%); and neutropenic sepsis (5%).

Discussion & Conclusion
The success of the MicroGuide app would seem apparent from the number of NHS Trusts that have licensed the software. A survey of 131 junior doctors from the East Midlands region in spring 2011 revealed that 75% owned a smartphone and 76% of the 98 smartphone owners reported using medical apps.3 When the junior doctors were asked about what type of app would be desirable for future development, the most popular response was an antibiotic formulary app but there is clearly scope for expansion of the concept into other therapeutic areas. The three initiatives ranked most likely to increase future guideline adherence in our local survey were: alternative treatment options for patients at risk of treatment failure; a desktop version of the app; and continuing availability of the smartphone app. This resonates with research from Imperial College Healthcare where users of an antibiotic app identified the provision of prescribing advice specific to certain patient groups, as one of the features most appealing to the end-user.

Apps it would seem are here to stay and the next generation of doctors and pharmacists has embraced the new technology with enthusiasm. The challenge for app developers will be ensuring clinical and information governance and capitalising on new device capabilities in this rapidly-evolving digital age to optimise the treatment of patients with infection. A limitation of this report is the lack of objective outcome data and evaluation of the impact of MicroGuide on patient outcomes and prescribing patterns is our next priority.

References
Introduction

The preparation of injectable medicines is a complex and high risk process. Pharmacy production units prepare cytotoxic medicines, parenteral nutrition and other intravenous injectable medicines. External preparation errors detected and reported after the medication has been released for use, can cause serious patient harm and death. In contrast, internal preparation errors are detected during the preparation process before the medicine has been released for patient use. Little is known about nature and causes of internal and external injectable preparation errors occurring within the pharmacy environment.

Objectives

This study aimed to determine the incidence, type and causes of internal and external errors in the preparation of injectable medicines within the pharmacy environment.

Method

A focus group was conducted with pharmacy staff to map and identify risk critical activities in the preparation of injectable medicines. The case study methodology, involving two purposively selected pharmacy production units across the UK (site A=large licensed unit preparing >1000 items per month; site B=small licensed preparing <1000 items per month), was employed to investigate the incidence, types and causes of preparation errors over a period of four weeks. Non-participant, structured observation was undertaken to determine the incidence and type of internal preparation errors. Data on external errors were recorded on the National Aseptic Error Scheme form. Quantitative data on internal and external errors were entered into SPSS and analysed using frequency tables. A chi-square test was used to compare the rate of internal errors at the small and large licensed production units. Face-to-face ethnographic interviews were also conducted with individuals involved in the errors to explore the causes of the preparation errors. Interviews were audio-recorded, transcribed verbatim and analysed in accordance with the principles of framework analysis based on Reason’s Organisational Accident Causation Model.2,3

Results

Critical stages in the preparation process identified by focus group participants were: technical and clinical check; worksheet preparation; label generation; assembly of materials; preparation of medication and product approval. There was no statistical difference between the internal error rate at site A (8%; 16 errors amongst 201 observed items) and site B (4%, 16 errors amongst 373 observed items; χ²=3.343, p=0.067). Twenty-four different internal error types were reported at site A and 25 different error types were reported at site B. Internal errors most commonly occurred at assembly and worksheet preparation (Table 1). The most common errors were assembly of the incorrect quantity of syringes (10.2%, n=5), errors in the recording of the batch number on the worksheet (8.2%, n=4), batch record (8.2%, n=4) and label (8.2%, n=4). One external error was reported at site A giving an external error rate of 0.09% (1 error amongst 1113 items dispensed). This external error involved printing the incorrect expiry date on the product label.

Seven interviews relating to eight errors were conducted with staff involved in injectable preparation errors. Injectable preparation errors were found to be caused by an interweaving of latent failures, error producing conditions and active failures. Latent conditions included inadequate staffing, high workload; poor design of computer software used to produce worksheets and poor layout of the storage area with similar packaged drugs located adjacent at each other on shelves. Error producing conditions included the pressure from high workload and lack of staff; interruptions, lack of staff knowledge and skills; unclearly written prescriptions and a lack of communication and team work. Active failures were divided into slips, lapses and mistakes. Slips included selecting the incorrect diluent and strength of drug; failing to identify the incorrect expiry date and time; and failing to complete the worksheet. Lapses involved making an error, but being able to notice and correct it. Mistakes were mistakes made by busy individuals who did not have the time to consult the computer to highlight under or over dosage. Lapses and mistakes could also be caused by removing the telephone from the worksheet preparation, assembly and clean rooms. In addition, improving the design of the pharmacy computer screens by ensuring that similar sounding drugs do not have the same computer short-codes, programming alerts into the computer to highlight under or over-doses and using different font colours or text styles for different strengths or forms of drugs may minimise the risk of errors. Disseminating details of errors was also identified as a key strategy for learning from errors and preventing future incidents from occurring. Newsletters, alerts, posters and incident briefing sessions or road shows were identified as methods of disseminating error and risk reduction strategies. Further work is necessary to evaluate the impact of these risk reduction strategies on injectable preparation errors.

Discussion

The incidence of internal and external errors in the preparation of injectable medicines was higher than previously reported by UK research (0.49%).4 However, internal error rate reported by participating sites in this study is consistent with Flynn and colleagues5 who reported an internal error rate of 8.6% in five US hospital pharmacies. Various strategies for minimising injectable preparation errors have been identified and include workforce planning to ensure adequate staffing, standardising the training of staff and review of medication packaging by drug procurement teams so that drugs which may be confused due to use of corporate images are not stocked. Improving the layout of storage areas ensuring look alike, sound alike drugs are stored separately and other drugs are placed so that they are not mixed. Active failures could be reduced by removing the telephone from the worksheet preparation, assembly and clean rooms. In addition, improving the design of the pharmacy computer screens by ensuring that similar sounding drugs do not have the same computer short-codes, programming alerts into the computer to highlight under or over-doses and using different font colours or text styles for different strengths or forms of drugs may minimise the risk of errors. Disseminating details of errors was also identified as a key strategy for learning from errors and preventing future incidents from occurring. Newsletters, alerts, posters and incident briefing sessions or road shows were identified as methods of disseminating error and risk reduction strategies. Further work is necessary to evaluate the impact of these risk reduction strategies on injectable preparation errors.

Table 1: Types of internal errors observed at site A and site B

<table>
<thead>
<tr>
<th>Types of internal errors</th>
<th>Site A (%)</th>
<th>Site B (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worksheet preparation errors</td>
<td>3 (13%)</td>
<td>11 (44%)</td>
<td>14 (28.4%)</td>
</tr>
<tr>
<td>Label generation errors</td>
<td>2 (8%)</td>
<td>5 (20%)</td>
<td>7 (14.2%)</td>
</tr>
<tr>
<td>Assembly errors</td>
<td>11 (46%)</td>
<td>6 (24%)</td>
<td>17 (34.5%)</td>
</tr>
<tr>
<td>Errors in decontaminating assembled materials</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Product preparation errors</td>
<td>5 (21%)</td>
<td>2 (8%)</td>
<td>7 (14%)</td>
</tr>
<tr>
<td>Labelling and packaging errors</td>
<td>2 (8%)</td>
<td>1 (4%)</td>
<td>3 (6.1%)</td>
</tr>
<tr>
<td>Product approval checking errors</td>
<td>1 (4%)</td>
<td>0</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Total number of the different types of errors</td>
<td>24 (100%)</td>
<td>25 (100%)</td>
<td>49 (100%)</td>
</tr>
</tbody>
</table>

References

Introduction
Medication errors are the leading cause of preventable harm to patients with reporting indicating an occurrence in approximately 10% of all inpatients. Review and investigation of these incidents often identifies learning that could be shared with other healthcare staff that may help prevent the incident recurring or reduce the potential harm to a patient. An organisation with a memory stated for the NHS to successfully change its approach to learning from failure it must develop a more open culture where errors and service failures are reported and discussed. More recently in Building a culture of Candour Sir David Dalton emphasised that a commitment to a "just culture" includes a focus on learning and improvement.

The trust medication incident review group was challenged to develop a method of communicating medication safety messages across the three acute hospitals and multiple community locations including community hospitals, residential homes and community nursing services within the trust. A newsletter is one method employed by high reliability organisations to share safety messages with staff in an efficient and non-threatening manner. A two-page newsletter was developed and distributed quarterly via trust wide email and in paper format across the trust. Learning within the newsletter was taken directly from medication incidents reported within the previous quarter. After one year (four issues) a survey was undertaken to determine if the newsletter had prompted a change in practice for staff.

Ethics approval was not required for this as the surveyed group involved healthcare staff acting within their professional role.

Objectives
1. Determine if staff are aware of the medication safety newsletter
2. Determine if change in practice occurred as a result of the newsletter

Method
A questionnaire was designed in consultation with the trust medication incident review group and piloted on a small number of medical and pharmacy staff. The survey was then distributed trust wide in both paper and electronic format during July 2014. Pre-addressed envelopes were supplied with the paper questionnaires to prompt a quick return.

Results
A total of 169 responses were received, (39 electronic). This was a response rate of 33% to the paper questionnaire. It was not possible to determine a response rate to the electronic questionnaire as a trust wide email was used. Responses were received from medical (27%) and nursing (62%) staff with 82% answering they were aware of the trust newsletter, table 1. When asked if the trust newsletter could be distinguished from other medication safety newsletters 70% of respondents answered positively.

Respondents were asked to state an example where they indicated a positive response to the question has anything you have read influenced your practice to identify if an actual change in practice had resulted. Examples of a change in practice included: 'I now write micrograms in full rather than mcg'; 'I now check the patient weight when prescribing IV paracetamol'; 'I'm aware to seek expert help'; 'Now know that oxygen cylinders must be transported upright'; 'I now know the dose of IV paracetamol for a patient <50kg is 15mg/kg'; 'I know how to access medicines out of hours'; 'The newsletter is included in the ward safety briefing'; 'I will look for this or something like it when I qualify'.

<table>
<thead>
<tr>
<th>Are you aware of the trust newsletter (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is the newsletter relevant to your practice (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
</tr>
<tr>
<td>Agree</td>
</tr>
<tr>
<td>Neither agree or disagree</td>
</tr>
<tr>
<td>Disagree</td>
</tr>
<tr>
<td>Strongly disagree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Has anything you have read influenced your practice (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>n/a</td>
</tr>
</tbody>
</table>

When asked for opinions on the newsletter articles content, length and detail 95% of respondents indicated that all three were ‘just right’.

Discussion
The survey demonstrated that the newsletter has been successful in both communicating medication safety messages to staff across the trust and in producing a change in practice in some staff. Many comments indicated that the newsletter was received with enthusiasm each quarter and actively displayed in both acute and community areas for both staff and patients to see. Not all respondents indicated that the newsletter had influenced their practice a possible reason for this may be the focus on acute sector incidents in the articles. Suggestions to improve the newsletter were the inclusion of more community articles and an increase in the quantity of colour copies available. The newsletter has already been amended to incorporate these with the addition of at least one community related article each issue and an agreement from senior management to fund external printing costs to increase the number of colour copies available.

Limitations of Study
Survey response was voluntary and may not have captured the views of staff members who do not engage routinely with medication safety. The possibility of the Hawthorn effect should also be considered when respondents answered the question ‘Has anything you have read influenced your practice

Future work
The trust incident review group hope to expand the reach of the medication safety messages within the newsletter by construction of a trust intranet page devoted to medication safety and exploring the use of social media. It is also planned to undertake work on identifying the reasons as to why some respondents were not prompted to change practice.

References
**Background**

Medicines reconciliation (MR) is the process of ensuring patients receive the correct medicines when transferring between care settings. Medication errors on admission to hospital have been demonstrated to increase patient morbidity, patient mortality and length of stay (LOS).1 Based on a single randomised controlled trial (RCT) reporting medication error rate as the primary outcome, the National Institute of Health and Clinical Excellence/National Patient Safety Agency (NICE/NPSA) guidance recommends pharmacists are involved in MR within 24 hours for all hospital admissions.2 This target is only met for 50% of admissions across the Eastern region.2 The cost and effect of expanding the pharmacy service to all admissions is currently unknown. In line with Medical Research Council (MRC) guidance on complex interventions it is necessary to perform feasibility and pilot studies prior to definitive trials where cost-effectiveness is determined.4 The aims of such preliminary work include identifying the most appropriate outcome measure for determining effectiveness and to provide data to inform a power calculation.

**Objective**

To identify the most appropriate outcome measure to demonstrate the potential effectiveness of pharmacist delivered MR and to provide data to enable calculation of sample size for a future definitive trial.

**Method**

The study was approved by the Essex Ethics Committee with a recruitment target of 200 patients. Patients were recruited from July 2012 to April 2013. Patients met the inclusion criteria if they were; 18 or over, admitted from the Emergency Department (ED) to one of the study wards within the previous 24 hours, taking prescribed medicines, and who had not received MR from the pharmacy team at the time of recruitment. Patients under 18, refused to provide consent, or who had already received MR by pharmacy were excluded. Patients were randomised to either receive MR by a pharmacist within 24 hours and at discharge, or usual care (which may have included elements of MR by the pharmacy team). LOS was nominally selected as the primary outcome measure. Other outcome measures tested included, planned and unplanned rehospitalisation rate within 3 months, mortality, quality of life and medication errors. Medication errors at each transfer of care were identified in both groups, by establishing the most up to date medication list and excluding intentional therapeutic changes as a result of clinical status of the patient. Errors were identified 3 months post-discharge and, any which were believed to be potentially serious were reported to the patient’s GP by a senior pharmacist. Baseline data was collected on admission for all patients and outcome data collected 3 months post-discharge. As a pilot study no power calculation was performed. Appropriateness of the different outcome measures was determined by considering the completeness of data obtained, potential size of effect and how this would affect the sample size required for a definitive study.

**Results**

29% of eligible patients were recruited at a rate of 5.2 per week, 200 patients were recruited (97 intervention vs 103 control) 95 patients received the intervention (2 patients did not receive the intervention) and 102 proceeded in the control group (one patient did not meet the inclusion criteria which was identified after randomisation). 15 patients died during the study (6 intervention and 9 control). The study groups appeared to be comparable at baseline for age (mean (SD) intervention 66.7 (18.9) control 65.7 (20.3) primary reason for admission, number of medicines taken prior to admission (5.84 intervention and 6.67 control), ward and health related quality of life. In the intervention group 46 (47.4%) were female compared to 61 (59.2%) in the control group. Small, negligible, differences were seen between quality of life and planned hospital readmission at the end of the study. Additionally quality of life data was only captured for two thirds of patients. Table 1 provides the results for three of the outcome measures where potential differences in effect size were identified. Assuming 80% power and a 5% significance level to detect the observed difference and 5% loss to follow up, LOS outcome would require approximately 3000 patients in each arm whilst unplanned readmission rates would require 750 patients in total.

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Intervention (n=95)</th>
<th>Control (n=102)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication errors on admission</td>
<td>Number 255</td>
<td>309</td>
</tr>
<tr>
<td>Medication errors remaining post discharge</td>
<td>Number 2 (&lt;1%)</td>
<td>268 (87%)</td>
</tr>
<tr>
<td>Unplanned Trust readmissions (within 3 months)</td>
<td>Number 17 (17.9%)</td>
<td>27 (26.5%)</td>
</tr>
<tr>
<td>Length of stay (hours)</td>
<td>Geometric Mean (GM) 100.7</td>
<td>109.5</td>
</tr>
<tr>
<td></td>
<td>Median 94</td>
<td>118</td>
</tr>
</tbody>
</table>

**Discussion and Conclusion**

MR at discharge in the intervention group included populating the electronic discharge letter with all medication changes, thus improving the quality of the discharge information so the GP received an accurate summary of the intentional changes to drug therapy during the admission. For most outcome measures, except quality of life, data capture was complete or almost complete. We would not recommend medication error as a primary outcome measure as it is a process measure and some medication errors may not have a clinical effect on the patient. Unplanned readmission within 3 months was identified as the most suitable primary outcome measure for a future trial as it is affected by all elements of the MR process during admission and discharge, the results suggest that a reasonable difference in effectiveness may be seen and the power calculation produces a sample size which is practical and feasible. As a pilot study it is not appropriate to perform statistical tests or expect significant differences. The variation in results which may arise from such relatively small sample sizes means that data from a systematic review of pharmacist provided MR is necessary to confirm the choice of outcome measure. Combining data from a systematic review with what has been learned from this study should enable a definitive study to be described. Drawbacks included, lack of response from GP for follow up data so incomplete, manual timing of all MR activities so under or over estimation of time taken for future costing analysis, strict visiting times meant it was difficult to access patients with reduced cognitive function, for potential recruitment under the Mental Capacity Act.

**References**

4. This abstract presents independent research funded by the National Institute for Health Research (NIHR) under its Research for Patient Benefit (RPB) Programme (Grant Reference Number PB-PG-0110-20116). The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.
3. Medication reviews for patients with COPD in a primary care setting
Firth C, Sharma R, Mackey S, Liddell H, NHS Leeds South and East Clinical Commissioning Group, Leeds

Background
- Chronic Obstructive Pulmonary Disease (COPD) is one of the biggest causes of premature mortality in Leeds South and East, with a higher prevalence rate compared to local and national averages.
- COPD is the second most common cause of emergency admissions to hospital and one of the most costly inpatient conditions to be treated.
- People with COPD over the age of 65 years have a mean of 4.5 co-morbid conditions and therefore patients are likely to have correspondingly complex medication regimes.
- People with COPD frequently score highly on risk stratification tools.
- The potential for optimising medicines in this group is high, and it is possible that by doing this we may also contribute to the avoidance of unplanned hospital admissions.

Objective
To identify patients in Leeds South and East CCG with COPD who are at high risk of healthcare usage / hospital admission and offer medication reviews, optimising medicines for COPD and any other co-morbidities these patients may have.

Method
Initially 6 practices were included in the pilot phase, and over 8 months this was rolled out to 22 practices. High risk patients with COPD were identified for medication review using the Adjusted Clinical Group (ACG) risk stratification tool, GP system searches or by specific GP request. A clinical medication review form, designed specifically for COPD patients, was used to record all the important information necessary to make recommendations to the GP.

A thorough review of the primary care record was carried out for each patient, including analysis of current medication (including a check of issue history and last issued dates, to identify adherence problems), past medication (including a check of issues of antibiotics and prednisolone used for exacerbations in the previous year), diagnosed co-morbidities, COPD annual reviews, pathology results, blood pressure, body mass index, smoking status, sensitivities, spirometry results and evidence of having completed pulmonary rehabilitation, recent GP consultation details / review of entries made in the journal from other healthcare professionals and incoming communications (including details of past hospital admissions and clinic appointments).

Although only a few patients were seen face-to-face, it was common to phone the patient to obtain further information about their medication regime before making final recommendations to the GP. We collected data on all the recommendations we made, provided feedback to the practices and asked the GPs to complete a SurveyMonkey questionnaire about how useful they had found the service. Ethics approval was not required, as this work was not considered to be research.

Results
In the 22 practices covered between August 2013 and March 2014, 306 patients were reviewed and details of the types of interventions made can be seen in table 1. At least one intervention was made in 292 of the 306 patients (95%) reviewed, with the average number of interventions being 3.5 per patient (range 0-9).

Interventions were further broken down within each category, for example we found that the most common reason for stopping a drug was that it was no longer used or needed, the most common reason for recommending starting a drug was lack of preventative therapy and the most common reason for switching a drug was for cost-effectiveness.

Table 1 Breakdown of intervention types

<table>
<thead>
<tr>
<th>Intervention type</th>
<th>Number of interventions</th>
<th>% of interventions</th>
<th>Drug related cost saving</th>
<th>% of cost saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug stopped</td>
<td>238</td>
<td>22.5</td>
<td>£14,862</td>
<td>38.3</td>
</tr>
<tr>
<td>Dose amended</td>
<td>229</td>
<td>21.6</td>
<td>£10,579</td>
<td>27.2</td>
</tr>
<tr>
<td>Ensuring systems</td>
<td>196</td>
<td>18.5</td>
<td>£2,397</td>
<td>6.2</td>
</tr>
<tr>
<td>Drug switched</td>
<td>155</td>
<td>14.6</td>
<td>£11,677</td>
<td>30</td>
</tr>
<tr>
<td>Investigations / drug monitoring</td>
<td>133</td>
<td>12.6</td>
<td>£0</td>
<td>0</td>
</tr>
<tr>
<td>Drug added</td>
<td>41</td>
<td>3.9</td>
<td>£699</td>
<td>-1.8</td>
</tr>
<tr>
<td>Referral</td>
<td>27</td>
<td>2.5</td>
<td>£0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>26</td>
<td>2.5</td>
<td>£38</td>
<td>0.1</td>
</tr>
<tr>
<td>Reviewed but no intervention</td>
<td>14</td>
<td>1.3</td>
<td>£0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>1059</td>
<td>100</td>
<td>£38,854</td>
<td>100</td>
</tr>
</tbody>
</table>

From the SurveyMonkey results, 100% of respondents rated the medicines optimisation review service as excellent or good and would recommend it to another practice.

Determining whether we had prevented any hospital admissions is more difficult to prove, but an approach was developed whereby we linked our interventions to established numbers needed to treat (NNTs) and costs of hospital events, to estimate potential hospital admissions prevented and the associated potential cost-savings from this.

Discussion
This work has demonstrated the benefits of offering a pharmacist-led medication review to patients with COPD. The high number of interventions made in this cohort, the high acceptance rate of our recommendations and high user satisfaction from the SurveyMonkey questionnaire all support the value of this service. The project enabled the time and expertise required to thoroughly review medication for a complex patient group, something that may not be possible to achieve within a 10 minute GP consultation.

Many benefits resulting from this work cannot easily be demonstrated through traditional cost-based measures, hence the importance of developing innovative approaches for estimating potential avoidance of endpoints such as falls or hospital admissions, and gathering patient stories to highlight particular examples of how our recommendations positively impact on patients’ quality of life.

A limitation of the work is that few patients were seen for a face-to-face review, where issues of adherence could have been more thoroughly addressed.

There are exciting opportunities to link these medication reviews in with the new unplanned admissions Enhanced Service, involving the case management of 2% of each practices at-risk adult population, as part of the GP contract for 2014-2015.

References
Introduction/Background/Context

Thrombocytopenia is a common condition in the intensive care environment and has been associated with increased mortality and morbidity. The causes are varied and often multifactorial. One rare but serious cause is an immunological reaction to the anticoagulant heparin, which can paradoxically cause a prothrombotic state that carries a high risk of thrombotic events. Identifying heparin induced thrombocytopenia (HIT) poses significant challenges to the clinician and misdiagnosis could lead to either severe haemorrhagic or thrombotic complications.

Treating HIT in the intensive care unit (ICU) and high dependency (HDU) usually relies on direct thrombin inhibitors (DTI) which are high-risk and high-cost drugs that are often unfamiliar to the doctors and nurses involved. Treatment with danaparoid or fondaparinux may occasionally be possible in the more stable ICU patients. Current UK guidelines recommend a combination approach of pre-test scoring and laboratory testing for the diagnosis and treatment of HIT. A low pre-test score indicates low risk of HIT and negates the need for alternative anticoagulation and for further laboratory testing with the associated respective risk and cost. An intermediate or high pre-test score, however, requires laboratory testing for antibodies, the discontinuation of all heparin containing products and full anticoagulation with an alternative anticoagulant agent.

It has been suggested that pre-test scoring may not be useful in the ICU setting as most scores would be expected fall into the intermediate risk category.

The most commonly used and best researched pre-test scoring system is the 4T score.

Aim and Objectives

The aim of this project was to evaluate the potential application and usefulness of 4T scoring to assess the likelihood of HIT in the ICU and HDU environment.

The objectives were to quantify the proportion of patients with low 4T scores and thereby
- to evaluate the potential to reduce unnecessary changes from heparin to alternative anticoagulation
- to estimate possible drug and laboratory cost savings
- to establish if there are grounds to recommend that a pre-test scoring system should be introduced into routine practice in ICU and HDU areas in a large UK teaching hospital.

Method

105 ITU and HDU patients, who had samples sent for laboratory HIT testing or who received alternative anticoagulation between April 2008 and March 2013, were identified using laboratory and pharmacy records. 4T scores were calculated retrospectively by the author for each patient based on the documentation in the patient’s medical notes up to the date of first HIT suspicion in an attempt to reduce bias. Further data on actual course of treatment was collected subsequently for comparison. 4T scores of 0 – 3 were considered low, 4 – 5 intermediate and 6 – 8 high. This project was approved as part of a submission for an MSc at the University of Portsmouth. It was reviewed by the local University Hospital Southampton research and ethics committee, which designated it as service evaluation.

Results

Laboratory testing and treatment with alternative anticoagulation in the low score group incurred costs of £8,700 over the 5-year study period. 51% of all calculated 4T scores (n=105) were low (see Table 1). Out of the 54 patients with low pre-test scores 14 (26%) had been changed from heparin to alternative anticoagulants. Out of the 51 patients with intermediate or high 4T scores 19 (37%) either remained on heparin or received no anticoagulation at all.

Table 1: Distribution of pre-test 4T scores

<table>
<thead>
<tr>
<th>4T score</th>
<th>Low</th>
<th>Intermediate</th>
<th>High</th>
<th>Proportion of low scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient sample (n=105)</td>
<td>54</td>
<td>45</td>
<td>6</td>
<td>51%</td>
</tr>
</tbody>
</table>

Discussion/Conclusion

Given the patient cohort in ICU and HDU environments pre-test scoring may seem futile based on an assumption that the vast majority of patients would fall into the intermediate to high risk 4T category. However, this project in a large UK teaching hospital showed that approximately half of the patients tested for HIT had low 4T scores. A low pre-test score should contravene the need for laboratory testing and (alternative) anticoagulant treatment of the patient. In this project, laboratory testing alone for patients with low 4T scores incurred costs of approximately £4,000 and drug cost for alternative anticoagulants added another £4700. More importantly, despite their low pre-test scores 5/54 (9%) patients were fully anticoagulated with the DTIs lepirudin, bivalirudin or argatroban, and a further 8/54 (15%) received danaparoid, fondaparinux or epoprostenol. Use of DTIs in this patient group has been linked with a bleeding risk of up to 22% and with a significant cost burden on the health system. Additionally, the use of drugs unfamiliar to medical, nursing and pharmacy staff is likely to increase rates of medication errors.

Meanwhile patients with intermediate or high pre-test scores should undergo laboratory testing for antibodies and receive full anticoagulation with an alternative while all heparin-containing products are stopped. In this study a considerable number of patients from this category (19/51; 37%) continued to receive heparin or had their anticoagulation stopped altogether, which has been linked with a 10-fold increase in the risk of developing new thrombosis.

In conclusion, possible over- and under-diagnosis of HIT continue to pose significant challenges for clinicians, particularly in ICU patients. This study at a large UK teaching hospital showed that the application of the 4T score in this setting could make a significant contribution in facilitating diagnosis and treatment. This may contribute to reducing risk in critically ill patients as well as saving resources for stretched NHS services.

References

5. Utilisation of Seroquel XL™ in primary care in England: results from a Modified Prescription-Event Monitoring cohort study

Layton D,1,2 Osborne V1, Davies M,1,2, Shakir SAW.1,2, *Drug Safety Research Unit, Southampton; 1University of Portsmouth, Portsmouth

Background
Current research and clinical practice suggests that atypical antipsychotics (AP) are as effective as conventional antipsychotics; however data on the safety and tolerability are still accumulating. 'Off-label' prescribing occurs when a drug is prescribed for an indication, a route of administration or to a group that is not included in the approved product information for that drug. Since the revised EU Pharmacovigilance (PV) Legislation came into force, every new medicinal product must have comprehensive Risk Management Plan (RMP) in place as part of its approval and to retain its approved status. [1] As part of PV requirements a RMP was developed for the novel formulation quetiapine extended release (Seroquel XL™) [2] by the manufacturer. This included a Modified Prescription-Event Monitoring (M-PEM) study to further understand safety during titration and use at higher doses as prescribed in primary care in England, particularly in special populations.

M-PEM is a national surveillance system whose principles originate post the Thalidomide disaster. [3] Through the use of customized questionnaires M-PEM studies systematically collect information on baseline characteristics of patients in relation to pre-specified risks, physician prescribing and decision making behaviour, and can quantify the incidence and prevalence of risks of adverse events after treatment initiation. As such M-PEM is recognised as a tool to conduct real world post-authorisation safety studies (PASS) that not only align with risk management objectives to gather additional safety monitoring information or assess a pattern of drug utilization but also satisfy key regulatory requirements for marketing authorization holder (MAH) RMP and execution needs.

Objectives
Study objectives included quantification of drug utilisation characteristics including dose titration patterns at initiation.

Method
M-PEM uses a non-interventional observational cohort design to provide active surveillance of targeted medicines on a national scale in England for research purposes (Figure 1).

![Figure 1. Process of a Modified Prescription-Event Monitoring (M-PEM) Study](image)

Post-marketing studies are generally classified as service evaluations; ethics approval is not required. [4] In brief, primary care dispensed prescription data are provided by the NHS Business Services Authority. Outcome data are derived from general practice primary care medical records for eligible patients. For this Seroquel XL™ M-PEM study, exposure (index/exit) data were derived from dispensed prescriptions issued by general practitioners (GPs) Sept 2008-Feb 2013. Outcome data (indication, psychiatric history, posology, identified and potential risks, deaths, selected risk factors-prior medical history/concomitant medicines) were derived from questionnaires sent to GPs 12+ months after first prescription for individual patients.

Results
Final cohort comprised 13276 patients; 59% (7828/13275) were female; median age 43 years (IQR 33,55); indication: Bipolar Disorder [30% (3820/12787)], Major Depressive Disorder (MDD) [22% (2844/12787)], schizophrenia (Schiz) [18% (2373/12787); Other [29% (3750/12787)]. One quarter (n=935) within Other group were 65+ years, of which 62% (577/935) had an indication associated with Dementia. 78 patients were <18 years. Where specified, 43% (4411/10209) had a history of depression whilst prior EPS [3% (303/9674)], somnolence/sedation [15% (1456/9438)] and Diabetes Mellitus [6% (612/10542)] were less common. Of final cohort, 41% (5407) were quetiapine naïve. Recent (<30 days prior to start) use of atypical antipsychotics was reported for 24% (2460/10091) and prior use of CYP3A4 inhibitors in 9% (595/6978). Psychiatrists most frequently initiated treatment [95% (120 978/12793)]. Median start dose where start dose specified (n=12028) was highest for Schiz [300mg/day (IQR 150,450) whilst MDD or Other groups were both 100mg/day (IQR 50,240)]. The median time to maintenance dose was 72 days (IQR 14,236); 16% within 10 days.

Conclusions
Consistent with recommendations included within NICE guidelines, Seroquel XL was mostly initiated by psychiatrists, with 70% having indications according to SPK recommendations. Although significant between-patient variability in terms of start and maintenance dose was observed, such differences and adjustments during treatment was expected as part of good clinical practice in individualising therapy. The cohort age and sex distribution was in accordance with that expected for populations treated for such mental health conditions. The prevalence of off-label prescribing in terms of indication and overdosing was common. However evidence suggests such prescribing is frequent in the treatment of mental health conditions, often driven by absence of approved indications for available drugs rather than inappropriate prescribing. This study demonstrates the ongoing importance of M-PEM to gather real-world clinical data to support the post-marketing risk: benefit management of new medications, or existing medications for which license extensions have been approved.

References
Introduction

Medicines are the main therapeutic intervention in improving health, preventing illness, curing disease and managing chronic conditions. The annual NHS drug budget is in the region of £13.8 billion and the number of prescribed items is increasing by 5.3% each year. However there is growing evidence to suggest that medicines are not being used effectively. Only 16% of patients take a new medicine as prescribed. Poor adherence to medication reflects a lack of agreement between patients and healthcare professionals and also a lack of support provided to patients with their medicines. Poor adherence limits the benefits gained from medicines and influences the achievement of health outcomes. Around £300 million worth of NHS supplied medicines are wasted each year, of which 50% is likely to be avoidable. Waste can be reduced by focusing on better use of medicines by improving adherence, and regularly monitoring and reviewing patients’ medication to ensure they are therapeutically required. Positive health outcomes are expected from the use of medicines but at least 6% of emergency hospital readmissions are due to avoidable adverse drug reactions. Safer working practices are needed to prevent avoidable harm and communication between healthcare professionals must be improved to ensure patient information is accurate and up to date. The ineffective use of medicines as described above has both personal and economic implications. Patients gain limited benefit from their treatment which is likely to result in poor health outcomes (lack of improvement in health or deterioration in health) and this places greater burden on the NHS and increases costs due to further demands of care due to poor outcomes. In response to the growing evidence of suboptimal medicines use, the Royal Pharmaceutical Society (RPS) of Great Britain has set out four important principles which form the Medicines Optimisation agenda. The four principles which claim to potentially revolutionise medicines use are: aim to understand the patients experience, use evidence based choice of medicines, ensure medicines use is as safe as possible and make medicines optimisation part of routine practice. Pharmacists have the most frequent contact time with patients and with expertise in medicines use, they are well placed to deliver medicines optimisation. The success of this agenda lies in pharmacists understanding this agenda and implementing the four above principles.

Objectives

To determine pharmacists’ understanding of the medicines optimisation agenda and whether they implement the four RPS principles of Medicines Optimisation: aim to understand the patients experience, use evidence based choice of medicines, ensure medicines use is as safe as possible and make medicines optimisation part of routine practice.

Method

Full ethical approval was obtained from the ethical committee. A questionnaire was designed for pharmacists across two local authorities to complete their understanding of the medicines optimisation agenda. The questionnaire consisted of both open and closed questions, mainly using 5-point Likert-Rating scales. An initial pilot questionnaire was sent to 10 non-participating pharmacists to validate the questionnaire. Following feedback the questionnaire was amended to produce a final improved questionnaire. Following permission from Superintendents and pharmacy owners, the questionnaire was sent out to 100 consenting pharmacists in a range of locations, all participants were anonymous throughout the research and were identified only by a number. The responses from the Likert-Scales were coded and input into IBM SPSS Statistics software to perform statistical tests and gain descriptive statistics (means and percentages), Microsoft Excel was used to produce graphs.

Results

Table 1: Pharmacists’ implementation of Medicines Optimisation principles into practice (%)

<table>
<thead>
<tr>
<th>Principle</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I aim to understand the patients experience</td>
<td>6.7</td>
<td>2.2</td>
<td>4.4</td>
<td>60.0</td>
<td>26.7</td>
</tr>
<tr>
<td>I use evidence based choice of medicines</td>
<td>4.4</td>
<td>4.4</td>
<td>8.9</td>
<td>55.6</td>
<td>26.7</td>
</tr>
<tr>
<td>I make medicines optimisation part of routine practice</td>
<td>4.4</td>
<td>6.7</td>
<td>24.4</td>
<td>48.9</td>
<td>15.6</td>
</tr>
<tr>
<td>I ensure medicines use is as safe as possible</td>
<td>0.0</td>
<td>6.7</td>
<td>2.2</td>
<td>28.9</td>
<td>62.2</td>
</tr>
</tbody>
</table>

Only 26% of pharmacists understand the medicines optimisation agenda well or very well and a significant difference (p=0.043) was found between age groups 23-29 and 50-59 their understanding of the agenda, with younger pharmacists understanding it better. There was also a significant difference (p=0.03) between the categories of health centre pharmacists and independent pharmacists and how well they ‘make medicines optimisation part of routine practice’, with health centre pharmacists making medicines optimisation more routine practice than independent pharmacists. From Table 1 it can be seen most pharmacists generally agree that they implement the principles of medicines optimisation in their practice as shown in Table 1 with 87% of pharmacists who agree or strongly agree they ‘aim to understand the patients experience’, 82% agree or strongly agree they ‘use evidence based choice of medicines’, 65% agree or strongly agree they ‘make medicines optimisation part of routine practice’ and 91% agree or strongly agree they ‘ensure medicines use is as safe as possible’.

Discussion

There is a need for greater education around the medicines optimisation agenda for pharmacists to understand how to translate the principles into practice in order to improve medicines use. Although most pharmacists generally agree they implement the principles, there appears to be a lack of understanding of the agenda and how the principles work together in concert to help patients get the best use of their medicines and maximise health outcomes.

References

Introduction

Behavioural disturbance in dementia has many causes and its treatment should be person-centred. Antipsychotic medication has been used to treat the Behavioral and Psychological Symptoms of Dementia (BPSD) but the evidence shows that it increases the risk of death, stroke and falls\(^1\), and is only effective in 20% of cases. There has been a national drive to cut prescribing of antipsychotics in dementia, reserving them for psychotic symptoms or situations where a person is at risk of harming themselves or others. A focus on alternative strategies for dealing with BPSD has thus arisen.

In response to the Right Prescription Call to Action\(^2\), a task and finish group was convened (The Leeds Antipsychotics and Dementia Task Group, LADTG). The group was chaired by the Leeds Dementia Lead and included representatives from the whole Leeds Health and Social Community. It was decided that guidance on the place of medication and person-centred strategies for dealing with BPSD, was needed to promote best, consistent practice, across the city. Two pharmacists (the authors) were engaged to draft the guidance and obtain comment and agreement from all key stakeholders.

Aims and Objectives

To reduce reliance on the use of antipsychotics in the treatment of BPSD, through the development of a guideline booklet that supports alternative treatment pathways to antipsychotic use, and provides explicit guidance on when antipsychotics can be considered and how to manage their use if prescribed.

Method

Ethics approval was not required for guideline development. The guideline had a broad scope, to be relevant and accessible to all healthcare professionals, and to carers, across Leeds.

Drafting began in March 2013. An introduction to the context of the guidance booklet was required, to include a definition of behavioural disturbance in dementia, and the medical and legal context within which it was set. A literature search was undertaken to identify key references and existing guidance, from which a set of patient-management flow charts were drafted. These drafts were then discussed with key stakeholders including medical, nursing, pharmacy and therapy experts from the local mental health and acute trusts; as well as GPs; primary care and community pharmacists; and staff and service users from local third sector providers Leeds Care Association, and Leeds Alzheimers Society.

The authors met regularly to assess and incorporate these expert comments, and circulated regular iterations of the guidance to the full LADTG, and to the expert stakeholders, for further discussion and comment. Examples of person centred care were included to illustrate how activity, the environment, personal history and interaction can influence the reactions of a person with dementia. Case studies of where medication may be appropriate were included. A final draft was agreed by consensus opinion of the above parties in August 2013, and was sent for professional design. The designer and authors worked together on further iterations to ensure the guidance was clear and usable. One iteration was piloted by GP volunteers in November 2013, and their comments on usability were incorporated. The final design iteration was ratified by the Leeds Area Prescribing Committee and released for general use in January 2014 at Prescribing Leads meetings and care home fora. Further awareness sessions will be offered according to need.

In response to feedback during the iterative process, it was identified that a simplified flowchart would be useful for carers and non-healthcare professionals, to help them access healthcare services for BPSD locally. The Communications Team at Leeds North CCG are now leading the development of this material, along with material designed to promote its awareness and use amongst healthcare professionals. Within Leeds North CCG, audit of antipsychotic prescribing in BPSD patients is carried out every six months, and once available, results will be compared with those obtained pre-guideline.

Results

A 20 page document was produced with illustrations and made available in hard- and electronic-copy for use across Leeds. Positive feedback on the applicability of the resource to practice has been received from the Leeds Acute Trust Dementia Strategy Committee, The Royal College of Psychiatrists’ National Audit of Dementia, The Yorkshire and Humber Dementia Strategic Clinical Network, and the National Dementia Strategy - all of which have requested to share the document with their members. Care Homes have been keen to receive the resource. Antipsychotic prescribing figures for a complete period following the document’s introduction are not yet available, but 86% of BPSD patients prescribed antipsychotics were reviewed within agreed guideline limits in the 6-month period during its introduction (an increase from 74%). The chart below shows low-dose antipsychotic prescribing figures during this period.

![Low-dose antipsychotic prescribed items](chart.png)

Discussion

This guideline brings together existing guidance, evidence, and expert opinion into a clear and usable framework within which to manage behavioural disturbance, which did not exist previously. Adherence to defined prescribing review intervals is already improving but it is difficult to say at this early stage if this is due to the document’s introduction. ePACT prescribing figures are not available specific to BPSD patients, but overall antipsychotic prescribing does not show a concerning increase in items. BPSD-specific prescribing figures, and an indication of the document’s impact on other prescribing safety parameters for BPSD patients are expected in December 2014, when the results of the latest antipsychotic prescribing audit are available. We anticipate these will show a decreased proportion of inappropriate antipsychotic use in BPSD patients; and an increase in governance in appropriate prescribing, thus reducing falls, death, and stroke risk in this vulnerable cohort.

References

8. Administration of intravenous omeprazole as a predictor of non-steroidal and aspirin induced gastro-intestinal bleeding
Gillian Cavell, Amber Lintz, Neda Pourdeyhimi, Pharmacy Department, King’s College Hospital, London.

Background
Trigger drugs are used to manage adverse drug events (ADEs) and are well recognised as a means of detecting drug related harm. Not all trigger drugs are good predictors of adverse drug events. Previous research within this trust has demonstrated that administration of the trigger drug, naloxone, is a reliable predictor of opioid adverse drug events. Other trigger drugs, such as chlorphenamine, are less reliable as the drug can be used for many indications.

Intravenous (IV) omeprazole is used to treat gastrointestinal (GI) bleeding in acute conditions and is therefore included in the trust’s list of trigger drugs. Within the electronic prescribing system, it is compulsory for prescribers to include the indication for omeprazole when it is prescribed. This indication enables pharmacists clinically verifying prescriptions to quickly determine whether this drug is being used for prophylaxis or treatment.

Patients prescribed and administered IV omeprazole and other trigger drugs are listed in a daily report ("trigger list") generated from the electronic prescribing and medicines administration system (EPMA) and sent via e-mail to the Medication Safety Pharmacist. This provides the opportunity for a daily retrospective review of patients who may have experienced an ADE which has been treated with a trigger drug.

The aim of this project is to identify the incidence of non-steroidal anti-inflammatory drug- and aspirin- induced (NSAID) gastrointestinal (GI) bleeding in hospitalised patients prescribed and administered IV omeprazole with an indication of haematemesis, melaena, or GI bleed.

Objectives
To identify patients prescribed IV omeprazole for the treatment of GI bleeding
To identify whether episodes of GI bleeding identified are drug induced
To determine whether IV omeprazole is a good predictor of ADEs due to NSAID or aspirin use.

Method
The daily trigger drug reports generated over a 48 day period between 8th May and 24th June 2012 were screened to identify patients prescribed IV omeprazole with the indications haematemesis, melaena, or GI bleed. Patients prescribed omeprazole for other indications, patients less than 18 years of age, and patients prescribed IV omeprazole on paper drug charts were excluded.

The electronic patient record was used to obtain demographic and clinical information for each patient which was documented on a data-collection form including:
- Use of NSAIDs and/or aspirin prior to the GI bleed
- Clinical evidence of GI bleed via presentation, laboratory values, and diagnostic testing
- Presence of contraindications or precautions to NSAID or aspirin use
- Relevant past medical history

The information was reviewed to determine whether or not an ADE occurred.

The incidence of ADEs with NSAID or aspirin use indicated by the use of IV omeprazole was calculated.

The project was approved as a service evaluation. Ethical approval was not required.

Results
Fifty-five patients who were administered IV omeprazole for an indication of haematemesis, melaena, or GI bleed were identified using the "trigger list". Fifty of these patients were confirmed to have a GI bleed based on their clinical presentation, laboratory values, and diagnostic testing. Evidence of GI bleed was not documented in the patient records of 5 patients. Of the 50 patients with confirmed GI bleed, NSAIDs and/or aspirin were implicated as a cause of the bleed in nineteen patients. The NSAIDs and/or aspirin were abruptly discontinued in all nineteen patients and only restarted in five of the sixteen patients who had been discharged at that time.

Six of the nineteen patients with confirmed NSAID- or aspirin-induced GI bleeds were using an NSAID and fifteen were using aspirin (Table 1). Two patients were using both NSAIDs and aspirin.

<table>
<thead>
<tr>
<th>Table 1: Number of ADEs found based on gender and medications previously used</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Discussion and Conclusion
Previous work has identified that administration of the trigger drugs Vitamin K, naloxone, and calcium resonium can be used to identify potential ADEs. The incidences of ADEs identified for these drugs were 77%, 100%, and 60%, respectively (number of ADEs / number of triggers x 100%). This study has shown that in 38% (19/50) of patients prescribed IV omeprazole for haematemesis or gastrointestinal bleeding were likely to have experienced a drug induced gastrointestinal bleed secondary to NSAID or aspirin use.

Although this is a preliminary report on a small sample size, the use of IV omeprazole appears to be a positive predictor of NSAID- or aspirin-induced GI bleeds, although drug induced GI bleeds represent only a proportion of all GI bleeds treated with IV omeprazole. A larger study over a longer period of time, and including other drugs known to cause GI bleeding is planned.

Using IV omeprazole as an ADE trigger drug could increase the rate of adverse drug event detection and reporting. Improving medication safety incident reporting is becoming increasingly important and safe use of medicines is a priority. Pharmacists and other healthcare providers responsible for reporting adverse drug events, including adverse drug reactions should be encouraged to use the administration of IV omeprazole and other trigger drugs to detect and report ADEs in clinical practice.

References
Introduction:
In 2010, the National Patient Safety Agency (NPSA) issued a Patient Safety Alert, along with ‘Action for the NHS’, which made recommendations to increase medication safety and limit the number of adverse effects experienced as a result of gentamicin use. The recommendations, in the form of an NPSA care bundle, included the following: use of 24hour clock format during prescribing of gentamicin, use of a double-checking prompt during preparation and administration of gentamicin, wearing of a coloured apron during preparation and administration of gentamicin and administration of the dose within one hour of the prescribed time. The local Trust gentamicin prescribing guidance was updated to incorporate this care bundle. Local dosing guidance is based upon weight and gestational age and requires manual calculation. Local target peak and trough levels are standardised for all neonates, irrespective of the medical condition. Adherence to this new guidance had not been audited previously.

Aim: To audit adherence to Trust guidance for prescribing, administering and monitoring of gentamicin on the neonatal unit (NNU).

Objectives:
- To identify all neonates prescribed gentamicin during a 3 month period, to collect prescribing and administration details from prescription charts and compare with recommendations from Trust guidelines.
- To determine compliance with audit standards based on Trust guidance (see Table 1).
- To assess compliance with the NPSA care bundle elements.
- To understand NNU nursing staff opinions on the NPSA care bundle.
- To review audit results and make recommendations for quality improvement.

Method: Prospective sampling was used to audit all neonates initiated on gentamicin during the data collection period: 01/11/13-31/01/14. A data collection tool was developed and piloted over a one week period with 4 neonates. A key finding during the pilot period concerned identifying the timing of blood collection for serum gentamicin monitoring. To resolve this, the clinical chemistry department agreed to retain all request forms for gentamicin serum levels sent from the NNU during the audit period to capture these data. A short questionnaire was developed and administered during semi-structured interviews with nurses; data were collected by a single individual to avoid inter-rater variation. Due to time restraints, however, it was not possible to pilot the questionnaire. A convenience sample of 20 NNU nurses was used and themes identified through interview were grouped. Ethics approval was not required for this audit. See Table 1 for full results.

Results: See Table 1 for full results. Poor documentation was found to be a common theme, and missing data hindered accurate reporting of results. Interviews suggested that this was due to lack of awareness of nursing staff as to the importance of documentation or to pressures on the ward such as time restraints, staff shortages and emergencies. Of the 20 nurses interviewed, 8/20 reported not having read the Trust gentamicin guidance and 9/20 reported not having received training on how to implement this guidance, yet 19/20 nurses reported being confident to administer and monitor gentamicin therapy. Specimen times were faithfully transferred from request forms to the Trust pathology system in all but 2/46 first serum level requests.

Table 1. Audit results (Denominators may vary due to missing data)

<table>
<thead>
<tr>
<th>Audit targets</th>
<th>% Compliance</th>
<th>Exception comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% of neonates receive the correct initial dose for their weight</td>
<td>92% (23/25)</td>
<td>2 neonates prescribed a lower dose.</td>
</tr>
<tr>
<td>100% of neonates are prescribed the correct initial dosing interval.</td>
<td>92% (23/25)</td>
<td>2 neonates prescribed a longer dosage interval.</td>
</tr>
<tr>
<td>100% of neonates have the time of first drug administration recorded</td>
<td>72% (18/25)</td>
<td>-</td>
</tr>
<tr>
<td>100% of neonates have the time of first trough blood collection documented</td>
<td>74% (17/23)</td>
<td>-</td>
</tr>
<tr>
<td>100% of neonates have first trough blood taken at the correct time</td>
<td>41% (7/17)</td>
<td>4 neonates had a level taken after dose administration.</td>
</tr>
<tr>
<td>100% of neonates have the time of first peak blood collection documented</td>
<td>70% (16/23)</td>
<td>-</td>
</tr>
<tr>
<td>100% of neonates have first peak blood taken at the correct time</td>
<td>37.5% (6/16)</td>
<td>5 neonates had a level taken too long (&gt;1hr15mins) after dose administration.</td>
</tr>
<tr>
<td>At least 80% of first serum levels are within the desired therapeutic range for peak and trough.</td>
<td>Peak 5-8mg/L 62% (13/21)</td>
<td>8 neonates had high peak levels.</td>
</tr>
<tr>
<td></td>
<td>Trough &lt;1mg/L 86% (18/21)</td>
<td>3 neonates had high trough levels.</td>
</tr>
<tr>
<td>All NPSA Care Bundle elements adhered to on the 1st dose.</td>
<td>73% (16/22)</td>
<td>-</td>
</tr>
</tbody>
</table>

Discussion:
This audit suggests that initial prescription of gentamicin for neonates is mostly accurate and target peak and trough serum levels are usually achieved. However, there is clearly room for improvement in documentation of time of dose administration and time of specimen collection for serum gentamicin levels. Uncertainty over timing of dosing and sampling clearly represents a risk of harm to patients due to misinterpretation of serum level results. Introduction of a barcode scanner system to electronically record the time of blood collection for all serum level requests may represent a solution.

The audit also highlighted an unmet need for formal training of NNU nurses. Overall, NNU nurses supported use of the NPSA gentamicin care bundle, reporting a perceived decrease in the incidence of gentamicin-related errors since its introduction. However, interviews identified barriers to compliance with the NPSA guidance, suggesting that maximal positive outcomes are not being achieved.

The small sample size of 25 patients was a limitation of the audit; however 100% of neonates were included from the audit period. Furthermore, some NPSA care bundle elements required observation of nursing practice on the ward but this was not possible so self-reported data were used, but this may have not been reflective of true behaviour.

References:
Introduction

Improvement science (IS) has led to measurable improvements in healthcare. Sustained improvements in outcomes has resulted from multicomponent interventions and use of centralised data collection and feedback systems1,2. In 2013, Talpaert et al demonstrated improved results in antimicrobial use but did not find that audit alone encouraged achievement of their 90% target for antimicrobial stewardship (AS) standards3. We describe the impact of two multi-faceted and multidisciplinary AS campaigns (the national “Start Smart–Then Focus” and the local “Green for Go!” campaign), using IS to aim for 95% compliance with a composite AS standard (CASS), Trust wide4. The CASS being: documentation of indication/rationale for antimicrobial therapy, compliance with antimicrobial choice (as stated in the Trust guidelines), documentation of a management plan (including stop or review date), review of microbiology results to focus therapy and undertake intravenous to oral switch within 48 hours where appropriate.

In April 2011, a pharmacy led, monthly, electronic audit commenced using a real time information portal. On audit days all antimicrobial prescriptions were identified and patients’ electronic medical records were reviewed (ethics approval was not required as this was an audit). Each AS standard was ticked if performed and results were presented as a single overall percentage, which reflects the number of times there was compliance with the CASS. In November 2011, the national “Start Smart–Then Focus” campaign encouraged compliance with the CASS. Results of the monthly audits were reported using a ‘red-amber-green’ (RAG) system to the Trust board; divisional; directorate; and ward level. Results were categorised as green for 95-100% compliance, amber for 90-95% and red for less than 90% compliance. A monthly report was generated, collated and circulated by microbiology staff via email to divisional and governance leads, infection control, clinical directors and pharmacists.

In October 2012, the Trust medical director launched the multidisciplinary “Green for Go!” campaign. All directorates were challenged to achieve at least 95% compliance (Green RAG status) with the CASS before antimicrobial awareness day in November 2012. Prominent leaders championing the campaign led to higher visibility of the above reports during divisional meetings and nursing huddles. Report distribution was supplemented by microbiology attendance at divisional governance meetings. Wards with less than 90% compliance were re-audited by a microbiologist and the antimicrobial pharmacist and provided with detailed verbal advice and feedback. For these ward visits, a detailed report with patient level data was provided to ward consultants, clinical directors, divisional leads and ward pharmacists. Consultants were asked to feedback results to their ward teams. Further follow up actions included repeat targeted visits and formal teaching to prescribers.

Objective

To assess the impact of the “Start Smart–Then Focus” and “Green for Go!” campaigns on achieving 95% Trust wide compliance against a CASS.

Method

Principles of IS are widely used as part of the Trust’s ongoing quality improvement (QI) work. The principles analyse data over time and use Statistical Process Control (SPC) Charts to understand variation in systems. SPC charts use rules which identify whether changes made have led to improvement (for example eight data points above or below the centre line). This helps to understand any special cause variation (a change occurring by chance due to factors within the system). To assess the impact of our campaigns, percentage compliance scores with the Trust CASS from monthly audits have been displayed in an SPC chart (Figure 1).

Results

Between April 2011 and March 2014, 6384 antimicrobial prescriptions were audited. Figure 1 shows that overall compliance with the CASS was good from the outset (mean 94.72%). Following the launch of the “Green for Go!” campaign in October 2012, we witnessed greater than eight data points occurring above the mean, indicating a positive change in our system. The Trust sustained an increased mean of 96.7% compliance to the CASS. Such sustained improvement is unlikely to be due to chance.

Discussion

A multi-faceted approach to AS has been promoted through the “Start Smart–Then Focus” and the “Green for Go!” campaigns. Assessment of the impact has been achieved through QI methodology. Electronic forms have made the data collection and analysis more efficient and supporting reports provide quick visualisation of trends using a RAG rating. Clinicians have responded positively to detailed feedback from targeted ward rounds. Limitations are that this is a single centre study and the audit data only provides a snapshot each month. The results demonstrate that a multi-faceted, multidisciplinary approach, championed by medical leaders, has been successful in achieving sustained QI in compliance with the CASS. This is in line with other IS projects, which demonstrate a multicomponent programme of evidence based technical intervention, adaptive intervention, targeting culture and systems and a centralised data collection and feedback system result in substantial outcomes4. Campaigns may need to be repeated periodically to maintain compliance to the CASS.

References

Background
Acute Kidney Injury (AKI) is predictable and deemed preventable in 20-30% of cases\(^1\). Renal auto-regulation prompts the standard hospital practice of temporarily withholding nephrotoxic medication during AKI and ‘at risk’ periods. In primary care this is not yet ‘routine’. Between April 2006 and March 2011, local tracking* of suspected medication-related admissions (n=201) highlighted 15.9% (n=32) involving diuretics\(^2\). Causal factors included AKI associated with acute illness, and nephrotoxic drugs/combinations. On noticing similar trends, Senior Admissions Pharmacists* in a sister hospital developed an in-house pharmacy advice leaflet ‘dehydration & preventing side-effects of medicines’. Although still in its infancy, the leaflet’s public health safety potential needed progressing to maximise improved clinical outcomes. Developing self-care is required to meet National Institute for Health and Care Excellence (NICE) AKI Clinical Guidance\(^3\) section 1.6.2 recommendation and 1.6.4 foci on risk and prevention.

Objectives
- To qualitatively and quantitatively analyse AKI admissions involving medication as a suspected contributory factor
- To identify, collaborate on, and implement interventions to drive AKI risk reduction
- To stimulate MHRA yellow card submissions involving AKI and medicines

Method
Between 1/1/2011 and 31/7/2013, ward pharmacists in Wrexham Maelor Hospital recorded AKI admissions involving medicines using a data collection form. Yellow MHRA cards were submitted either on admission, or retrospectively to help catalyse any required manufacturer patient information leaflet, BNF and summary of product characteristics changes. The Patient Safety Pharmacist tracked the patient (study limitation) and additional information was gleaned via healthcare records. Root cause analyses (RCA) then ensued to help inform for whom and where patient empowerment/increased awareness was needed. To assist with ownership and engagement, collaboration with key stakeholders began, to transform developed an in-house pharmacy leaflet usage into a cross-sector organisation-wide initiative. An AKI medicines risk reduction strategy driver diagram was created and the revised leaflet launched in July 2012. There was written communication to and, AKI admissions/leaflet awareness-raising sessions for, local healthcare professionals. In Phase One, secondary care specialist teams (renal and heart failure) adopted the leaflet as standard for relevant patients and one Community Pharmacist used it during medicines usage reviews (MURs). In Phase Two, the leaflet was for general cross-sector use, and incorporated a minor revision regarding combination products. Practitioners were encouraged to use the leaflet during everyday practice, (with verbal counselling being mandatory), to feedback, and report any adverse incidents. Suspected medication-related admission monitoring processes were and still are in situ. This project was supported by the Local General Practitioner (GP) Prescribing Leads and the healthcare organisation management. Ethics approval was not required. This was a project to empower healthcare professionals and patients to implement standard practice in primary care.

Results
Of the medication-related AKI admissions (n=90), 22% (n=20) had existing chronic kidney disease. RCA (see Table 1) revealed patients on acute or chronic ‘aggravating medication’, and/or with an acute clinical episode. Clinical impact was significant; three needed renal replacement therapy; one metformin patient had severe acidosis. Presenting complaints included falls with postural hypotension, or complications due to accumulation of renally cleared drugs. Others were admitted on acutely contra-indicated drugs, e.g. methotrexate (n=2), or those requiring acute dose adjustment e.g. gabapentin (n=2). Origin included intra-hospital transfers (n=2), and Care Homes (n=5). 83.3% (n=75) were > 70 years. During admission, it transpired that GPs had advised two patients to temporarily withhold nephrotoxic medication in the 24 hours preceding. The adverse event outcome was expected, in the opinion of the leaflet’s pharmacist author, because leaflet sections on hydration, NSAIDs and renal failure were clear. RCA identified findings e.g. a chemotherapy patient (n=1) was discharged home without leaflet information. Community Pharmacists were welcomed the new safety information for MURs. Two adverse incidents were communication failure post hospital transfers (n=2), and Care Homes (n=5). 83.3% (n=75) were > 70 years. During admission, it transpired that GPs had advised two patients to temporarily withhold nephrotoxic medication in the 24 hours preceding. The admission analysis information helped acceptance of the required change in cross-sector practice. The AKI medicines risk reduction leaflet was well received, praised for its pragmatic approach; patients under a specialist team being advised to contact their specialist or out of hours medical services in the first instance. The Heart Failure team reported a positive culture change. Patients increasingly telephoned them when acutely unwell. Community Pharmacists welcomed the new safety information for MURs. Two adverse incidents were communication failure post-discharge and out of hours advice. To date S2 yellow MHRA cards have been submitted.

Table 1: Themed analysis of AKI admissions involving medicines (n=90)

<table>
<thead>
<tr>
<th>AKI involved:</th>
<th>Potential contributory factors: (may be &gt;1 factor/patient, not mutually exclusive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Clinical Episode</td>
<td>Nausea, vomiting, diarrhoea (n=34) ; poor oral intake specified (n=4)</td>
</tr>
<tr>
<td></td>
<td>Infection (Chest n=21, urine n=17, sepsis n=8, psoas abscess n=1)</td>
</tr>
<tr>
<td></td>
<td>Hypovolaemia (gastrointestinal bleed n=5), other e.g. hyperglycaemia n =4</td>
</tr>
<tr>
<td>Acute medication</td>
<td>Post chemotherapy(n=2); post contrast agent (n=1); trimethoprim (n=4); NSAID/Cox ii inhibitor (n=2); Non-steroidal anti-inflammatory drug (NSAID) in intentional overdose (n=1)</td>
</tr>
<tr>
<td>Chronic medication</td>
<td>Angiotensin ii receptor antagonist (n=15), ACE inhibitors (n=50), trimethoprim (n=1), NSAID (n=10), Cox ii inhibitor (n=4), metformin (n=9)</td>
</tr>
<tr>
<td></td>
<td>Diuretics: Thiazides (n=9), loop (n=46), potassium sparing (n=13)</td>
</tr>
</tbody>
</table>

Discussion
AKI admission analysis correlated with some of NCEPOD’s\(^2\) AKI risk factors, guided the project, verified AKI awareness /leaflet need and drove acceptance of the change. Collaboration was vital to initiate spread. RCA for AKI identified critical points such as cancer units, or GP consultations and the implementation strategy attended to these. Healthcare professionals were interested in AKI which is vital as 60% of AKI is community acquired\(^4\). Continued research is needed on the longer term impact of patient and healthcare professional education on incidence of AKI and chronic kidney disease (study limitation).

References
Introduction
Proton pump inhibitors (PPIs) are amongst the most widely used medications worldwide. Studies have suggested that PPIs are often prescribed outside of the product licence. Short term use of PPIs at the recommended dose is generally considered safe and well tolerated with few significant drug interactions. Moreover, they remain the mainstay treatment for gastric ulcers. However, long term use and at high doses are associated with electrolyte abnormalities, C. difficile and community acquired pneumonia. Additionally, they are known to increased risk of fractures by increasing secretion of gastrin and inhibiting calcium absorption.

Aim
The aim of this audit was to assess clinician prescribing of PPIs on the care of the elderly wards in relation to the licensed indications.

Objectives
- Audit against the following standard:
  - 100% of PPIs should be prescribed to patients within the indications as specified in the manufacturer’s guidance.

Method
We would expect that 100% of PPIs are prescribed within the indications as specified by the manufacturers. This is a pilot audit carried out over a 5 day period on the care of the elderly wards. These wards were selected as this patient group are at an increased risk of the complications associated with PPIs such as C. difficile and fractures. Data was collected after the medicines reconciliation had been completed and was collected by the care of the elderly pharmacist. All data was collected by the same person to avoid inter-rater variability. Each drug chart was reviewed and checked for the presence of a PPI. Where a PPI was prescribed, details of prescribing were noted such as the dose, indication and how long the patient had been on the drug for. Medical notes were checked for a documented indication for the PPI prescription. If the information was unavailable, the patient’s GP was contacted to find out how long they had been on the drug for and the indication. Data were collected during standard working hours Monday to Friday. Ethics approval was not required for this audit.

Results

<table>
<thead>
<tr>
<th>Licensed reasons for PPI prescribing (information from EMC)</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention of relapse of duodenal ulcers</td>
<td>2</td>
</tr>
<tr>
<td>Prevention of duodenal ulcers</td>
<td>1</td>
</tr>
<tr>
<td>Prevention of NSAID-associated gastric and duodenal ulcers</td>
<td>3</td>
</tr>
<tr>
<td>Treatment of reflux esophagitis</td>
<td>1</td>
</tr>
<tr>
<td>Treatment of symptomatic gastro-oesophageal reflex disease</td>
<td>2</td>
</tr>
<tr>
<td>Dyspepsia</td>
<td>5</td>
</tr>
<tr>
<td>Treatment of gastric ulcers</td>
<td>3</td>
</tr>
<tr>
<td>Upper GI bleed</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unlicensed reasons for PPI prescribing</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSAID/steroids discontinued but PPI continued</td>
<td>4</td>
</tr>
<tr>
<td>Gastritis/unknown lower abdominal pain</td>
<td>2</td>
</tr>
<tr>
<td>Antplatelet treatment/prednisolone but no risk of gastric bleed</td>
<td>4, 2 respectively</td>
</tr>
<tr>
<td>No reason found</td>
<td>7</td>
</tr>
</tbody>
</table>

Of the 71 patients, 38 (54%) of the patients were prescribed a PPI. 90% (34) of these patients were admitted into hospital with a PPI. Of these 38 patients, 19 (50%) had a prescription for a PPI outside of the product license. 4 patients continued to be prescribed a PPI after discontinuation of a NSAID. 6 patients were prescribed a PPI after prescribed either antplatelets or steroids with no history of dyspepsia. A likelihood ratio was calculated at 1 with a 95%CI of 0.63415 to 1.5769. Therefore, the likelihood of correct prescribing of PPIs is just as likely as incorrect prescribing.

Discussion
There are a number of patients on PPIs for inappropriate indications. These drugs have been shown to increase the patient’s susceptibility to C. difficile infections. This audit suggests that only 50% of prescriptions are appropriate. This supports the research by Naughten et al (2000) which found that only 37.1% of patients had been prescribed a PPI within the product license.

According to the NICE guidelines, patients with un-investigated dyspepsia should be given a full dose of PPI for one month to assess response. They also recommend short courses for non ulcer dyspepsia with follow up. This study identified 7 patients prescribed a PPI for the treatment of non ulcer dyspepsia. Each of these patients had been on the drug for greater than a year and two of them were on high doses of 40mg daily omeprazole. This pilot audit was on a small sample of only 71 patients. Therefore, a larger sample size is needed. Moreover, PPIs are known to cause disturbances in electrolytes such as magnesium and sodium. Further studies to explore whether these electrolytes are in range can help identify whether the prescribing of such drugs is appropriate.

The current issue that we are faced with is that PPIs are too frequently prescribed with lack of evidence to support. Educational intervention focusing lifestyle changes may help to reduce the number of prescriptions. Staff at the hospital should be educated so that they patients initiated on a PPI in hospital should do so with a clear indication and the intended duration should be made clear to the GP. A larger audit is required once these interventions have been implemented.

References
Introduction
The recent expansion of treatment options and evolving knowledge of antiretroviral (ARV) therapy has resulted in a dramatic decrease in AIDS-defining conditions and their associated mortality and advances in ARV therapy have turned HIV into a chronic, manageable disease. Patients requiring ARV therapy often require treatment for co-morbid conditions as well as HIV, and consequently, pharmacokinetic interactions between ARVs and other drug classes are an increasing concern. ARVs used in the treatment of HIV are prone to drug interactions because many are largely metabolised through the CYP450 system. Medication histories taken in outpatient clinics are an important opportunity to identify drug-drug interactions and are consequently an excellent opportunity to reduce risks to patients caused by sub-optimal HIV control or by the adverse effects of drug interactions. Patients are seen by a range of healthcare professionals in our HIV clinics.

Aims
The aim of this audit was to establish whether accurate medication histories were completed when patients were seen as outpatients in HIV clinics.

Objectives
To identify:
- The number if patients with a complete and accurate medication history
- The number of patients with potentially significant drug interactions
- The variation in quality of medication history between healthcare professionals

Standards
- 100% of medication histories completed in clinic are accurate (including non-ARV medicines)
- 0% clinically significant interactions are identified from a retrospective review of clinic annotations in patients’ medical notes, clinic letters and summary care record (SCR)
- 0% variation in the quality of medication histories taken amongst various healthcare professionals

Method
Data collection was carried out retrospectively from the annotations in the medical notes of 100 patients who had been seen in an HIV outpatient clinic in the six months prior to data collection. An audit tool was used to pilot the study on twenty patients, after which it was modified accordingly to collect the data. The data was collected over one week in October 2013 (over approximately 18 hours). The information from the medical notes was compared to the clinic notes and the SCR. Interactions were identified using the hivdruginteractions website from the University of Liverpool. Consent to access the SCR was obtained when patients were seen in clinic. No ethics approval was required as this was an audit project. The data collected were collated using Excel.

Results
Forty nine (49%) of patients seen in the outpatient clinic had all their ARVs noted in their medical notes. Sixty two (62%) were found to be taking other medicines in addition to their ARV treatment. Of these 62 patients taking other medicines only 7 (11%) had all their other medicines recorded in the medical notes (see table 1).

Table 1: The documentation of other (non-HIV) medicines

<table>
<thead>
<tr>
<th>Patients with all other medicines noted in clinic annotation in medical notes</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with some of their other medicines noted in clinic annotation in medical notes</td>
<td>11 (18%)</td>
</tr>
<tr>
<td>Patients taking other medication with no information documented in clinic annotation in medical notes</td>
<td>44 (71%)</td>
</tr>
</tbody>
</table>

Of the 100 patients attending the HIV clinics, 56 were found to have discrepancies between the annotations in the medical notes and the clinic letter produced after the outpatient clinic visit. Of the 88 patients with an SCR, 34 (39%) had discrepancies between the clinic annotations in the medical notes and their SCR. A total of 65 drug interactions were identified (of which 48 (74%) were clinically significant); 9 (14%) of these interactions were found from the clinic annotations in the medical notes, 27 (41%) from the clinic letter, 29 (45%) from the SCR. The variation in the accuracy of medication histories completed by Clinical Nurse Specialist (7), Medical Consultant (32), Medical Registrar (34) and Pharmacist (27) varied from 100% of ARVs noted to 24% of ARVs noted.

Conclusion and recommendations
The advancement of ARVs in recent years has turned HIV into a chronic, manageable disease. However, ARVs present a high risk of drug-drug interactions in patients taking medicines for co-morbid conditions. Taking accurate medication histories in outpatient clinics is an excellent opportunity to identify such interactions. We didn’t meet our audit standards and identified a number of weaknesses in our current practice. We propose to encourage the use of a standard medication history form and for this to be updated regularly. That, all patients attending HIV clinics as outpatients, should have a SCR or a GP summary available and that all discrepancies are discussed with the patients. The prescribing dates on the SCR were not taken into account when collecting the data which could have accounted for some discrepancies in the medication histories taken. Electronic record keeping and medical notes could be one way of reducing poor documentation. We see an important role for pharmacists to ensure drug interactions are managed in this patient group.

References
Background
The use of medicines is the most frequent intervention amongst all healthcare interventions. Medication incidents are the second most commonly reported incident type in UK hospitals. Developing a culture of safe medication use is a key component of improving medication safety outcomes. A better understanding of safety culture specifically related to medication use is important to improve medication safety. Numerous questionnaires have been developed to measure patient safety culture in healthcare. The Safety Attitudes Questionnaire (SAQ) and the Agency for Healthcare Research and Quality (AHQR) Hospital Survey on Patient Safety Culture (HSOPS) are two of the most commonly used and rigorously validated tools for measuring patient safety culture in America and Europe. There are currently no known validated tools to measure medication safety culture.

Objectives
- To develop a questionnaire to measure medication safety culture through adaptation of existing validated patient safety culture instruments
- To investigate the reliability and validity of the medication safety culture questionnaire

Methods
All 41 items from the SAQ instrument (these grouped into six factors – Teamwork, Safety climate, Job satisfaction, Stress recognition, Perceptions of management and Working conditions) and nine items from the HSOPS (three factors – Organisational learning, Feedback and communication about error and Management support for patient safety) were adapted to develop a 50-item, 9-factor medication safety culture questionnaire. The questionnaire was reviewed by an interdisciplinary medication safety expert panel to determine face and content validity and then converted to a web-survey. The response format was a 5-point Likert scale, plus ‘Not applicable’ and ‘Don’t know’ options. The survey was piloted on a sample of 839 doctors, nurses, pharmacists, pharmacy technicians and operating department practitioners working in one directorate of the teaching hospital, over a two-week period.

The internal consistency reliability of the factors was calculated with Cronbach’s alpha. Alpha values of 0.6 or higher suggest that the different items are measuring the same concept. Negatively worded items were reversed so that a higher score reflected a more positive response. The construct validity was studied by calculating scores for each factor and Pearson correlation coefficients between the factors. The construct validity of each factor is reflected in scores that are moderately correlated (r ≥ 0.3). Descriptive statistics were calculated to examine response variability and missing data. Statistical analyses were conducted using IBM SPSS 21. Approval was received from the University Ethics Subcommittee and Trust Research and Development department.

Results
In total, 124 individuals returned the survey – response rate 15%. Pharmacy staff had the highest response rate (11/17, 65%), followed by nurses (55/590, 9%) then doctors (8%). The majority of respondents were female (82%). Half of the respondents had worked in the Trust for more than 5 years. The overall score was 80%, suggesting that the staff working in the directorate had a positive medication safety culture.

The reliability of the factors is shown in Table 1. Cronbach’s alpha scores ranged from 0.64 to 0.87, indicating acceptable reliability (≥ 0.6), with an average of 0.78. Overall, the correlations between the factors ranged from 0.17 to 0.7, and the majority (67%) were moderately correlated (≥ 0.3). Correlations were higher between the factors adapted from the SAQ instrument (except attitudes about Stress Recognition which had low correlations with other factors) that between SAQ and HSOPS.

<table>
<thead>
<tr>
<th>M</th>
<th>SD</th>
<th>Alpha</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Teamwork</td>
<td>4.75</td>
<td>.375</td>
<td>0.83</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2 Safety Climate</td>
<td>4.48</td>
<td>.539</td>
<td>0.64</td>
<td>.70</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3 Job Satisfaction</td>
<td>4.60</td>
<td>.536</td>
<td>0.83</td>
<td>.66</td>
<td>.56</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4 Stress Recognition</td>
<td>3.77</td>
<td>1.049</td>
<td>0.87</td>
<td>-.03*</td>
<td>-.04*</td>
<td>-.12*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5 Perceptions of management</td>
<td>4.16</td>
<td>.612</td>
<td>0.87</td>
<td>.38</td>
<td>.45</td>
<td>.57</td>
<td>.001*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 Working conditions</td>
<td>4.49</td>
<td>.502</td>
<td>0.68</td>
<td>.53</td>
<td>.54</td>
<td>.56</td>
<td>.07*</td>
<td>.51</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7 Organisational Learning</td>
<td>4.45</td>
<td>.610</td>
<td>0.79</td>
<td>.46</td>
<td>.63</td>
<td>.47</td>
<td>.11*</td>
<td>.39</td>
<td>.50</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8 Feedback and communication about error</td>
<td>4.34</td>
<td>.831</td>
<td>0.85</td>
<td>.34</td>
<td>.53</td>
<td>.17</td>
<td>-.08*</td>
<td>.41</td>
<td>.15</td>
<td>.43</td>
<td>-</td>
</tr>
<tr>
<td>9 Management support for patient safety</td>
<td>3.98</td>
<td>.687</td>
<td>0.64</td>
<td>.28</td>
<td>.35</td>
<td>.46</td>
<td>-.07*</td>
<td>.63</td>
<td>.24</td>
<td>.37</td>
<td>.36</td>
</tr>
</tbody>
</table>

M = mean score, SD = Standard deviation, * Correlations that were not significant, all other correlations significant p < 0.01

Discussion and Conclusion
The study showed that the SAQ and HSOPS can be successfully adapted for measuring medication safety culture. The tool has good reliability and validity. Stress recognition needs further investigation as it may not fit the overall safety culture construct. The overall medication safety culture was positive. Emerging research suggests that there may a relationship between a positive safety culture among healthcare workers and reduction in patient harm due to medication errors.

The development of a medication safety culture questionnaire may be an important milestone for medication safety research and medication safety improvement efforts. It holds great promise if it can be shown to also be a proxy for observed safety improvements. The low response rate reflects the short time to complete the survey (2 weeks). Maximising response rates in survey research is a major challenge and future work could consider strategies such as incentives to improve response rates. Positive scores could also be due to the preponderance of pharmacy staff completing the questionnaire.

The questionnaire could be used to assess baseline medication safety culture and track culture change over time. Future work would include factor analysis and assessment of the relationship between medicines safety culture and patient outcomes, as demonstrated with patient safety assessment instruments, in order to establish construct and criterion validity, respectively.

References
Introduction
In 2007, the National Institute for Health and Care Excellence (NICE) and the National Patient Safety Agency (NPSA) introduced joint guidance to the National Health Service (NHS) on how to improve the process of medicines reconciliation (MR). This guidance prompted a review of processes and staffing to improve both the rates and timeliness of MR.

On average 762 patients are admitted monthly to the AMU on one of the trusts two acute sites. Approximately 20% of these patients are currently recognised by the AMU pharmacy team prior to their transfer to a base ward. Prioritisation tools have been developed both locally and regionally to help target pharmacy resources quickly to those patients at high priority who are most likely to benefit. However, implementation of these is often time-consuming. Referrals from non-pharmacy staff are often communicated indirectly via the medical notes and may be missed. To improve identification of these patients it was decided to implement a formal referral system involving the MDT (including all grades of nursing, medical and pharmacy staff). As this was a service implementation, no ethics approval was required.

Aims and Objectives
To establish a system to enable the MDT to both identify and directly refer patients considered at high priority for clinical pharmacy intervention. This will be achieved by providing education to the MDT on criteria for prioritisation and promoting the referrals system on AMU. The appropriateness of referrals received pre and post implementation will be compared.

Method
Prioritisation criteria have been developed locally\(^1\). Patients with certain disease states and specific drug classes which are more likely to benefit from clinical pharmacy input have been identified from these prioritisation criteria.

Baseline data was collected over a one week period on one of the trust sites prior to implementation of the referral system. Data was collected using a data collection tool and included number of indirect referrals (i.e., via notes entry), number of direct referrals (i.e., verbal requests or requests via communication whiteboard), number of referrals considered appropriate as high priority, total number of MR completed, and number of MR completed for referred patients.

Subsequently, education sessions were held for the MDT who work on AMU over a one week period. These ten minute sessions were delivered on AMU to groups of four. The pharmacist discussed examples of those patients likely to benefit from clinical pharmacy intervention and an explanation of how to refer patients was given. Additionally, supporting material including leaflets and posters were created to promote the referral system and highlight examples of high priority patients. These were then displayed and distributed around AMU.

Magnets illustrated with a green cross were provided to members of the MDT. To make a direct referral, patients were allocated a magnet next to their name on the AMU communication whiteboard. This allowed the pharmacy team to target patients that would most benefit from clinical pharmacy intervention. Two weeks following the implementation of the referral system, a re-audit was conducted over a one week period. The data was collected using the same data collection tool as previously used. Results were then compared and analysed.

Results
Pre-implementation 40 patients had their MR completed by a member of the pharmacy team; post-implementation, 42 MRs were completed. Table 1 summarises the types and number of referrals received pre- and post-implementation over each one week audit period.

<table>
<thead>
<tr>
<th>Types of referrals</th>
<th>Pre-implementation of referral system (n=40)</th>
<th>Post-implementation of referral system (n=42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total referrals</td>
<td>19 (47%)</td>
<td>47 (100%)</td>
</tr>
<tr>
<td>Indirect referrals</td>
<td>3 (16%)</td>
<td>0</td>
</tr>
<tr>
<td>Direct referrals</td>
<td>16 (84%)</td>
<td>47 (100%)</td>
</tr>
<tr>
<td>Appropriately referred priority patients</td>
<td>9 (47%)</td>
<td>32 (76%)</td>
</tr>
<tr>
<td>No. MRs completed on referred patients</td>
<td>16 (40% of total MRs')</td>
<td>42 (100% of total MRs')</td>
</tr>
</tbody>
</table>

There was a 147% increase in referrals and a 60% increase in the number of MRs completed on patients referred as high priority patients. The proportion of referred patients that actually met the priority criteria increased by 29%.

Discussion
Implementation of a priority-based MDT referral system has improved the use of clinical pharmacy resources on AMU. Both appropriate identification and referral of high priority patients increased as a result of the service development. Contributing factors included education sessions and provision of leaflets for the MDT. Additionally, posters displayed on AMU raised awareness of the referral system and encouraged members of the MDT to refer appropriately.

The number of direct referrals post implementation was 100% because a formal system was implemented. The absence of indirect referrals greatly decreased the chance of priority patients being missed by the pharmacy team. Although a similar amount of patients were reconciled pre and post implementation of the service, there was an increase in the amount of high priority patients that were reconciled. This was because the MDT was able to identify the high priority patients more effectively and refer them appropriately. Moreover, because the MDT prioritise and highlight these patients, the pharmacy team do not have to spend time performing this activity and therefore have extra time to complete MR.

A one week sample time was restrictive; however on reflection, the data collected was representative of the average patient turnaround. Maintaining momentum is a limitation. Staff will need to be encouraged to continue to refer appropriate patients until it is established as routine practice. New and rotating staff will need to be educated, which will take up pharmacy staff time. As computer technology develops, there may be the potential to identify referrals via electronic systems instead of manually which would further streamline the system.

References
Introduction
Around 37,000 people are estimated to die of sepsis each year in the UK. Adherence to 6-hour sepsis care bundles is associated with a significant survival benefit. Six interventions are recommended in this 1,100-bed university teaching hospital for early management of severe sepsis and septic shock (the ‘Sepsis Six’): 100% oxygen; blood cultures; broad-spectrum IV antimicrobials; fluid resuscitation; lactate and haemoglobin measurement; and urinary catheter insertion. The aim of this audit was to determine adherence to the ‘Sepsis Six’ interventions (S6I) and associated patient outcomes.

Objectives
• To identify patients reviewed by the critical care outreach team and diagnosed with severe sepsis or septic shock at this teaching hospital.
• To audit against the following standards:
  • All patients will have antimicrobials initiated within one hour from onset of hypotension (audit standard 100%) and all S6I within 6 hours from diagnosis (audit standard 100%).
• To explore the impact of the S6I on patient outcomes (Intensive Care Unit transfer, Discharge, Length of stay, Mortality).

Method
The audit included patients with possible severe sepsis, identified from a database of patients referred to the critical care outreach team (CCOT) with initial recordings of systolic blood pressure ≤90mmHg and body temperature of >38.3°C or <36°C. Case notes were reviewed for patients meeting a standard severe sepsis/septic shock case definition to evaluate implementation of the S6I and associated outcomes.1 This audit project was registered with the Trust R&D department and ethics approval was not deemed necessary.

Results
53 patients out of 2,612 (2%) referred to CCOT from September 2011 to October 2012 met the audit inclusion criteria for possible severe sepsis. 40 sets of case notes were reviewed and 24/40 patients met the case definition for severe sepsis or septic shock. Patients in this audit represented a broad range of age groups and clinical specialties. The patient population varied from 2 patients under 10 years in cancer care to 3 patients between 90-100 years old. Half of the patients reviewed that met the case definition for severe sepsis or septic shock (12 out of 24) were >65 years old.

Table 1 shows that only 3/24 patients reviewed (12.5%) received all six S6I within 6 hours of the onset of hypotension thereby failing our audit standard. 23/24 received broad-spectrum antimicrobials within 6 hours (19 within one hour; 79%) again failing our audit standard. 15/24 patients (62.5%) received five of the S6I within 6 hours with 7 of the 9 remaining patients not receiving 100% oxygen. No trends in morbidity or mortality were evident from this small dataset.

Table 1. Patient outcomes by number of S6 interventions implemented within 6 hrs.

<table>
<thead>
<tr>
<th>Number of interventions Implemented</th>
<th>Number of patients (n=24)</th>
<th>ICU admission (n)</th>
<th>Discharge from ward (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>6 (audit standard 100%)</td>
<td>3 (12.5%)</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Discussions/Conclusions
This audit demonstrates that there is room for improvement in the timely management of patients presenting with signs of severe sepsis or septic shock. However, prompt administration of IV antimicrobials was in line with current international guidelines for the majority of patients that recommend initiation of antimicrobial therapy within an hour of presentation with severe sepsis and septic shock.2 Interpretation of patient outcome data according to number of S6I implemented or types of S6I implemented are not straightforward. Patients that appear more haemodynamically stable may receive fewer interventions and unstable patients are likely to receive more interventions, so correlation of outcomes with number and type of S6I is not appropriate.

Although including a relatively small sample size, the data in this audit were collected from every patient referred to the CCOT with potential severe sepsis or septic shock in this teaching hospital over a one year period. Therefore, the patient sample should be comparable and generalisable to patients referred to similar CCOTs in other hospitals. A limitation of this audit is that it is possible that not all patients with severe sepsis or septic shock were referred to the CCOT and there is currently no alternative means of reliably identifying this patient group.

Further research is required to validate the relative importance of individual bundle components and 2012 guidance recommends 4 interventions within 3 hours.2 Oxygen and urinary catheter insertion are no longer recommended urgently. Therefore, whilst there is room for improvement in timely implementation of the S6I in this hospital but according to more recent surviving sepsis campaign guidance, 22/24 (92%) of the patients audited met current recommendations of 6 S6I within 6 hours of onset of hypotension.

The latest surviving sepsis care bundle recommendations will be incorporated into the hospital pocket guideline for antimicrobials and adherence re-audited within one year.

References
Introduction

Why should a patient be denied their regular medications just because they come into hospital? A Serious Untoward Incident (SUI) at University Hospital Aintree (UHA) in 2012 resulted in a fatal seizure when regular anti-epileptic medication in a known epileptic failed to be prescribed on admission and motivated this audit.

Delays in prescribing, particularly ‘time critical’ medications such as anti-epileptics, has potential for harm. The clinical pharmacy service across hospitals has long been established. However use of pharmacists in acute areas such as the Accident and Emergency Department (AED) has yet to find a well-defined role. A preliminary audit had shown 64% of patients on critical medications waited more than 4 hours to have medications prescribed. Interventions focussing on teaching for junior doctors rotating into AED and modest pharmacy support (0.5 of a band 6 pharmacist) were introduced.

Aims and Objectives

To undertake an audit to evaluate response to the initial interventions placed, further investigate the extent of the acute prescribing problem and identify areas for development to improve patient safety and efficient prescribing in the acute setting.

Method

The audit was undertaken using a collaborative approach. The team included a consultant in medicines management, an admissions pharmacist and a junior doctor.

Every AED admission over a week period in August 2012 was included. Inclusion was triggered when a decision to admit (DTA) was made and therefore a hospital stay likely. A standard of 100% of patients to have their regular medications prescribed within 2 hours (as per local and national guidelines) was set. The time until prescription of the first medication (potentially an acute) and until prescription of the first regular medication were evaluated using an electronic prescribing system. Drug histories and medicines reconciliation notes were reviewed. The grade of the prescriber and number of reviews prior to prescription of regular medications were also recorded. Electronic case notes were reviewed and the patient’s path through the hospital tracked to identify delays.

Results

189 patients were included in the audit. Of those, 76% of patients had their regular medications prescribed within 2 hours, with only 5% failing to have critical medications prescribed within 2 hours.

Of those that had exceeded 2 hours, 70% had been seen by a prescriber within the 2 hour period. The average time taken to prescribe regular medications was 11 hours 20 minutes, with some patients waiting days for regular medications to be prescribed. They were reviewed an average of 3.4 times before their medications were prescribed. Less than 5% of prescribing was carried out by a senior doctor (registrar and above). Medical patients made up 69% of the delayed prescribing cohort, with the remaining 31% being surgical. DTA in these was often after 5pm therefore falling into the remit of the busy on call teams.

An average of 9 medicines reconciliations were done in AED on weekdays. These were focused on patients in the clinical decision units (CDUs) and those acutely unwell, for example RESUS patients.

Discussion

This audit shows vast improvement in acute prescribing with simple educational interventions and limited clinical pharmacy support. However when medications failed to be prescribed by the first clerking doctor, patients waited a significant time. Training junior AED doctors in the importance of prescribing medications on admission needs to be a core part of AED training with each new rotation, changing the culture of the unit. AED doctors should be responsible for prescribing on admission, with medications checked by each doctor reviewing thereafter.

A number of areas for improvement were identified. Patients initially thought to be short stays that later went on to be admitted, frequently experienced prescribing delays. Those that were acutely unwell requiring intensive initial management and specialist beds were often too unwell to obtain accurate histories from and management focused on their acute problem (e.g RESUS patients and those destined for the Intensive Care Unit, Ventilation Unit, Coronary Care Unit). Patients moved quickly to ward beds (e.g. Stroke patients) bypassed the robust acute admission units’ prescribing measures and therefore also experienced delays. Surgical patients, particularly out of hours where prescribing was falling to skeleton on call staff, were identified as experiencing delays. Post Take Ward Rounds (PTWR), with Senior medical staff failing to check and prescribe medications or delegate this to juniors was also found to be a problem area. More prescribing needs to be done by senior doctors.

A part of this improved performance is likely to be due to increased pharmacy support in AED. However with an average of 9 medicines reconciliations done per weekday there is scope and need to improve the service offered. As a result, UHA will be appointing a highly specialist lead pharmacist (Band 8a) to develop the AED service. This increased clinical pharmacy support will increase medicines reconciliation rates, reduce delays to the administration of time critical medicines, continue antibiotic stewardship through daily microbiology ward rounds, facilitate and provide patient education in relation to their drugs and provide drug use advice for all clinicians in the AED.

Our novel approach introducing a dedicated AED pharmacist is part of a wider picture NHS England is trying to address to improve the care patients receive in urgent care and to address and improve the interface between care providers.

References

Introduction
In 2007, the National Patient Safety Agency (NPSA) revealed that omitted and delayed medication was the second largest cause of incidents reported to the National Reporting and Learning System. This lead to production of NPSA RRR009: “Reducing harm from omitted or delayed medication in hospital”, from which all NHS trusts were required to identify a list of critical medications where undue delay should be avoided, such as antibiotics, anticoagulants, insulin and other medications as identified locally. Since 2000, Derby Hospitals has operated an on-site 24/7 clinical pharmacy service, as one of the principle objectives of this way of working is to facilitate rapid access to urgent medication. Hence the defined audit standard was that 0% of all critical medications should be unduly omitted or delayed due to being unavailable. Where a medication is not available, this is indicated by the nursing staff onto the electronic administration record as “OMS – Medicine not available.”

Objectives
- Define a list of critical medications to audit against and generate a sampling frame
- To identify the total number of OMS in a two week period
- To quantify the percentage of OMSs which involve critical medications
- Identify action plan(s) if the audit demonstrates that clinical areas require a change in practice, eg stock list adjustment, nurse education.

Method
The Trust waived the need for ethics approval as this was classified as an audit. Using the Trust formulary and RDH guidance on RRR009 a list of critical medicines was produced which included: systemic antimicrobials, anticoagulants, opioids, antiepileptics, insulin and medication for Parkinson’s Disease. Data was collected retrospectively over a two week period, from 1st October 2013 – 14th October 2013 inclusive, over 30 general medical and surgical wards, excluding the Intensive Care Unit and paediatrics.

The electronic prescribing system was queried to ascertain; the number of doses scheduled to be given, the number of doses given and how many of these were critical medicines during the audit period.

No pilot phase was carried out because this was a retrospective audit. Some doses of critical medications were omitted because stat doses of medications were not easily retrievable using the method employed. This would include reversal agents, antidotes and resuscitation drugs.

Results
The total number of doses scheduled for administration over the study period was 170886. Of these 170886 a total of 37817 were omitted (22.1%). A total of 4673 of the omitted medications were coded as ‘OMS – medication not available’, representing 12.3% of all omitted medications, and 2.5% of all doses scheduled over 2 weeks

193 (4.1%) of the OMSs involved critical medication. The breakdown of omissions in each medication category is illustrated in Table 1 below.

The antiepileptics were the most prevalent class of medication omitted over the study period. Of the 97 omissions, gabapentin and pregabalin were the most frequently omitted medications, with 24 and 26 OMS codes assigned to their non-administration respectively. Conversely there were no omissions for anticoagulants or antimicrobials.

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Number of OMSs (n = 193)</th>
<th>% of total critical medicine OMSs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimicrobials</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Insulin</td>
<td>7</td>
<td>3.63%</td>
</tr>
<tr>
<td>Opioids</td>
<td>42</td>
<td>21.76%</td>
</tr>
<tr>
<td>Antiparkinsonians</td>
<td>47</td>
<td>24.35%</td>
</tr>
<tr>
<td>Antiepileptics</td>
<td>97</td>
<td>50.26%</td>
</tr>
</tbody>
</table>

Table 1: Critical medication omissions by drug class at RDH over two weeks in October 2013

In our secondary analysis, of where the omitted medications were occurring, nearly a quarter of instances were accounted for by patients in the discharge lounge (22.3%). This was nearly three times more prevalent than the second highest clinical area for occurrences, a general medical ward, which observed 15 omissions.

No clinical ward audited had zero critical medicine omissions over the study period.

Discussion
To the best of our knowledge, this is the first audit presented for publication which has used electronic prescribing to manipulate the data and allow for efficient collation and analysis.

There were some limitations to the study design. The retrospective nature of data collection meant that it was not possible to establish if the correct omission code had been assigned to the patient record. Subsequently it can be expected that over or underreporting of omitted critical medicine occurs. Gabapentin and pregabalin both are commonly used in neuropathic pain, as well as epilepsy. Without cross reference to the patient notes or summary care record, it would not be possible to accurately grasp which of these omissions were for epilepsy. Time constraints prevented cross referencing of the omitted medicines to stock lists for clinical areas or previous dispensing history for that patient. This will be investigated in further work as part of the re-audit cycle.

It may seem unrealistic to expect a 0% prevalence of OMSs, as in reality, the staff nurse would not know the medication was not available until performing the ward round. The main determinant is how soon the medication omission is reported and subsequently supplied to the ward. On reflection, cross referencing each medication omission with the pharmacy dispensing record (JAC) and breaking down the data into stock and non-stock may give a more accurate picture of drug omission. Looking at the JAC record will also indicate repeat dispensing in close succession, to reflect where patients have been transferred between clinical areas without medications. Another useful secondary analysis would be the number of consecutive omissions for a given patient and critical medication, to identify the clinical areas who would benefit most from pharmacy education.

Nevertheless, there are a few recommendations from our analysis. As no clinical area had zero omissions, it would appear that there is scope to educate nursing staff, both on the subject of critical medications and the importance of ensuring medications are transferred between different clinical areas and care providers.

References

19. A retrospective audit on cinacalcet prescribing in the management of hyperparathyroidism secondary to end-stage renal failure in patients on haemodialysis

Chai MO and Conlon L, King's College Hospital, London

Introduction

Hyperparathyroidism secondary (sHPT) to end stage kidney disease (ESRD) is a result of poorly managed corrected serum calcium (CCa) and phosphate (PO4) together with decreased calcium-sensing receptor (CaR) activation on the parathyroid gland. Extreme elevated intact parathyroid hormone (iPTH) levels exaggerate hyperphosphataemia and may cause hypercalcaemia. Cinacalcet is a calcimimetic agent that directly lowers iPTH by activating sensitivity of the CaR. This drug has been in use for 6 years in our renal unit and average total daily cinacalcet dose was 60mg. Higher cinacalcet doses are generally not well tolerated. The most common side-effect is gastrointestinal intolerance. This is one of the common reasons which affected concordance and failure to optimise dose. Cinacalcet use is supported by the National Institute of Clinical Excellence (NICE) for the treatment of refractory secondary hyperparathyroidism (sHPT) in ESRD patients established on dialysis who fulfilled all of the following criteria:

- Criteria A: plasma levels of iPTH >800pg/ml, refractory to standard therapy including dietary reduction in PO4 intake, PO4 binder use, alfalcacidol/paricalcitol, and modification of dialysis regimen. For the purpose of this audit, all patients who failed on standard pulsed alfalcacidol therapy were labelled with criteria A.
- Criteria C: normal or high CCa (for the purpose of this audit: CCa≥2.2 or ≥2.5mmol/L)
- Criteria D: contraindications to parathyroidectomy (PTx), such that risk outweighs clinical benefits.
- Criteria E: only continue on cinacalcet if reduction of iPTH≥30% is attained within 4 months of starting therapy.

Objectives

The objectives were to quantify if practice adhered to NICE criteria, and whether continuation of treatment was maintained a reduction in iPTH. Audit standards were:

1. 90% of patients started on cinacalcet as per NICE criteria [A, B, C and D].
2. 90% of patients achieved a reduction in iPTH≥30% within 4 months of cinacalcet initiation.
3. 90% of patients maintained a reduction in iPTH≥30% on cinacalcet therapy while on cinacalcet therapy.
4. 90% of patients maintained CCa and PO4 within Renal Association (RA) targets: CCa 2.2-2.5mmol/L and PO4 1.1-1.7mmol/L.

Methodology

Audit was carried out in all haemodialysis patients who are on cinacalcet for at least 6 months from 2009 to present. The unit database was used to identify patients, details of drug doses, treatment duration, serum iPTH, CCa, PO4 levels and if concomitant drugs such as alfalcacidol and PO4 binders were prescribed. Data collection form was piloted prior to initiation and data collection was carried out over 2 weeks. Ethics approval was not required. Approval was received from the departmental Research & Audit group. The data was analysed descriptively. During analysis, it was noted that some patients had stopped and restarted cinacalcet, which resulted in fractured data. In order to prevent skewing of the data analysis, patients who had been off cinacalcet for >3months were classified as ‘new starter’.

Results

The number of haemodialysis patients screened was 58. Patients excluded were patients on cinacalcet less than 6 months (n=17) due to insufficient data for analysis, patients established on cinacalcet (n=2) whilst in a different renal unit and those with missing data (n=2). A total of 37 patients were audited. There were 86% (32/37) with iPTH>800pg/ml refractory to standard therapy. 78% of these 37 patients failed on pulsed alfalcacidol therapy, which is one of the standard therapies for the management of sHPT. 11% (4/37) of patients were not suitable for PTx. Audit findings showed low adherence to audit standards.

<table>
<thead>
<tr>
<th>Adherence to audit standard</th>
<th>% (Patient numbers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard 1: Patients were started on cinacalcet as per NICE criteria</td>
<td>11(4/37)</td>
</tr>
<tr>
<td>Standard 2: Fall in iPTH ≥ 30% within 4 months of initiating cinacalcet therapy.</td>
<td>41(15/37) at 3 months</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard 3: Maintained iPTH reduction ≥30% while on cinacalcet</td>
<td>24 (9/37)</td>
</tr>
<tr>
<td>Standard 4: Maintained serum CCa as per the RA targets.</td>
<td>35 (13/37)</td>
</tr>
<tr>
<td>Standard 4: Maintained PO4 as per the RA targets.</td>
<td>41 (15/37)</td>
</tr>
</tbody>
</table>

If criteria D (evidence of contraindication to PTx) was excluded then 51% (19/37) fulfilled NICE criteria A, B, C and E. Of the 4 patients who fulfilled all criteria in standard 1, 50% (2/4) had iPTH reduction ≥30% at 3 months and 75% (3/4) had iPTH reduction ≥30% at 6 months. Result indicated dose optimisation was not carried out once cinacalcet was initiated. Findings revealed a low percentage of patient attained target CCa and PO4. This low percentage may be a reflection of poor concordance to medication and optimisation of drug therapy by prescriber. Table below summarises audit findings.

Discussion

In summary, audit findings showed poor adherence to NICE guidance. NICE based its recommendation on trial data from a pooled analysis of 3 randomised controlled trials (RCTs) and 2 other studies. In RCTs, 62% of cinacalcet patients achieved at iPTH reduction of ≥30% and only 38% and 53% of patients in the other 2 studies. Audit was carried out in a small number of patients and may be underpowered compared to the large RCTs. There are three main factors which may have influenced prescribing and dose titration. Firstly, it is standard practise to measure iPTH at 3 monthly intervals, and this may have influenced dose titration prior to that. NICE recommendation allowed sufficient time to optimise dose, albeit more frequent blood tests initially. Secondly, the trust waiting time for PTx is approximately 6 months to 1 year. This may have influenced prescribers’ decisions to initiate cinacalcet in symptomatic patients. Patients may not be aware of the clinical benefits of cinacalcet, PO4 binder and alfalcacidol. Concordance to these drug therapies needs further exploration. These audit results confirmed the need for meticulous drug review, which enable better resource utilisation. Audit results have been fed back to prescribers and have prompted regular review along with a plan to carry out annual review within each unit. Patient and nurse education can increase awareness and help to improve concordance.

Reference:

Introduction
Cancer continues to be one of the main causes of mortality and morbidity in teenagers and young adults (TYAs) aged between 13-24 years in the United Kingdom, with six teenagers diagnosed with cancer every day.¹²

TYA cancer patients are a distinct group compared to other age groups as they differ in terms of their medical and psychological needs.³ It is therefore important to tailor medicines information to their needs and to ensure that the information given is ‘age appropriate’.¹ The aim of this project was to develop a suitable survey tool to assess patients’ need and satisfaction with medicines information within the teenage and young adult (TYA) population, in an ambulatory care setting.

Objectives
1. To identify the main information sources used by TYA patients before and during their visit to the cancer centre.
2. To see whether TYA patients require extra information prior to their visit to the cancer centre.
3. To ascertain the level of TYA patients’ satisfaction with the medicines information they receive.
4. To compare the information sources, the need and satisfaction of medicines information between TYA patients aged 13-18 years and those 18-24 years.

Method
A survey tool was developed and administered in person in over a four week period. All patients (aged 13-24 years) attending an ambulatory cancer centre at an academic tertiary care hospital in central London in March/April 2014 were invited to participate. The survey questions were based on the National Cancer Experience Survey and two survey tools identified from the literature.⁴⁻⁵ Data was collected by a pharmacy undergraduate student. All responses were included in the analysis; number of patients who responded to a question was used as denominator when reporting proportions. Ethics approval was not required as this was a service evaluation.

Results
Sixty patients were invited to take part in the survey; 51 patients (85%) completed the questionnaire, but some patients did not answer all the questions. Of the 51 patients, 24 patients (47.1%) were aged 13-18 years and 27 patients (52.9%) were >18 years.

Patients reported that they were most likely to receive information about their medicines from a doctor (38/49, 77.6%), nurse (35/49, 71.4%) or from a pharmacist (29/49, 59.2%). Of the 50 patients who answered whether they had the opportunity to speak to a pharmacist whilst at the cancer centre, six patients (12%) reported that they had never been given the opportunity to. Nineteen patients (38.7%) reported using other sources of information, with the majority (24.5%) using the internet prior to their visit to the cancer centre. Nearly all patients (50/51, 98.0%) preferred to receive information verbally.

There were notable differences in information needs between 13-18 year olds and over 18s. A higher percentage of patients over 18 wanted more information on whether alcohol could be taken with their medicines (8/24, 33.3%), with far fewer (2/23, 8.7%) 13-18 year olds wanting information on this. Nearly twice as many patients over the age of 18 (8/24, 33.3%) compared to 13-18 years (4/23, 17.4%) stated that everything about their medicines had been explained to them.

In general, (48/50, 96.0%) of TYA cancer patients were satisfied or very satisfied with the information in relation to the (i) clarity of the information received, (ii) amount of written information given, (iii) amount of verbal information given, (iv) detail of the information given, (v) quantity of information you received, (vi) way the staff explained the information. Although patients were largely satisfied with the medicines information they received, (16/47, 34.0%) of all TYA cancer patients surveyed would have liked more information on side effects.

Discussion and Conclusion
This study showed that TYA patients were largely satisfied with the medicines information they received, however they expressed a need for more information on potential adverse effects. As side-effects may influence adherence, the importance of counselling patients in this area should be of top priority.

The findings also highlight that patients had little opportunity to speak to a pharmacist on most visits and that the provision of medicines information was mainly from doctors and nurses. Pharmacist input and availability to this patient group needs to be reviewed and optimised.

The study has some limitations: the sample size was relatively small in a single site using a survey tool that requires further development and validation; test retesting which involves the study being carried out again to assess reliability could not be done due to the short time period the study was performed in.³ Some patients did not answer all the questions and the nine patients who did not complete the questionnaire at all may have had very different views from those surveyed, which restricts any firm conclusions from being drawn.

The study assessed patient need as well as satisfaction with medicines information. As there is no standard tool available in the UK which assesses these two concepts in TYA cancer patients, the further development of such a survey tool is necessary. Future work could explore the relationship between medicines information received, satisfaction and quality of care.

References
Introduction

Non-steroidal anti-inflammatory drugs (NSAIDs) are some of the most commonly prescribed drugs in both the community and hospital settings. Recent MHRA alerts have highlighted the importance of safe prescribing of these drugs. The alerts were mainly concerned with the cardiovascular risks associated with NSAIDs with special reference to diclofenac. As a direct consequence of these MHRA alerts Buckinghamshire NHS Trust created an NSAID guideline in June 2013 which highlights the risks associated with using these drugs and recommends that ibuprofen should be used as a 1st line NSAID followed by naproxen and diclofenac respectively.

Aim

To establish whether the guideline for prescribing NSAIDs in adults is being adhered to throughout the Trust.

Objectives

- To design an audit tool to enable the collection of appropriate data.
- To collect relevant data using the audit tool for adult patients across the Trust.
- To collate this data and interpret the results.
- To establish if the guidelines are being followed correctly.

Method and standards

Ethics approval was not required in order to undertake this audit project.

To assess the Trust’s compliance to the new guideline a 4-day point prevalent audit was carried out in October 2013. This was done Trust wide across both community and acute settings using a data collection tool designed and piloted on one general ward within the Trust. In order to evaluate the results collected the standards were set based on the Trusts previous usage of NSAIDs and what we expected based on the NSAID guideline.

The standards set were:

- 100% of patients not otherwise contraindicated to paracetamol should be tried on that first before being prescribed an NSAIDs.
- 80% of those that are prescribed an NSAID should be prescribed them as per the Trusts guideline and
- The usage of NSAIDs expected is 65% ibuprofen, 25% naproxen and 10% diclofenac.

Results

A total of 538 patients charts were assessed as part of this audit and from these only 13% [69] were prescribed an NSAID. From those 69 patients, 94% [65] were first tried on paracetamol before being prescribed an NSAID, although 1.4% [1] were not prescribed it to a maximum dose of 1g QDS due to error. The 6% that were not first tried on paracetamol was due to contraindications. The use of NSAIDs across the Trust can be seen below in figure 1.

![Figure 1: Trust wide usage of NSAIDs.](image)

Across the entire Trust 84% [58] of patients treated with NSAIDs were prescribed them as per the NSAID guideline. 13% of patients were prescribed ibuprofen at a suitable dose according to the BNF although these doses were not covered by the Trust guideline. Breakdown of the results into acute and community settings was carried out to ensure adherence was being carried out across all setting within the Trust.

Discussion

All the standards were met and some exceeded expectations. This was across all the individual sites and across the entire Trust. Showing that the Trust is compliant with the NSAID guideline and hence MHRA advise. Although the standards were met and only 6% (4) of patients received diclofenac in all 4 of these patients it was inappropriate according to the NSAID guideline and all 4 were treated on a surgical ward.

Limitations

One of the main limitations of this audit was the fact during the audit data collection there were stock issues with naproxen at Wycombe hospital at the time of data collection. This reduced the choice of NSAID and could have potentially skewed the results. The other limitation is that this audit only assessed the compliance with the guideline over a period of a week. A further audit would need to be carried out over a longer period to test if the results were reflective of current practice.

Recommendations

The first recommendation would be to review the guideline in terms of NSAID dose choice to incorporate other appropriate BNF doses. A suggested recommendation would be;
1. Ibuprofen 200mg-400mg TDS/QDS* (*400mg QDS is limited to patients with no CV risk factors)

As well as reviewing the guideline further education may be of benefit especially within the surgical teams as they were the only area who prescribed the diclofenac.

References

Background
An intestinal stoma is a surgically created opening of the intestine on to the abdominal wall. There are currently 120,000 people with a stoma ("ostomates") in the UK. Approximately 21,000 permanent or temporary stomas are formed each year for a range of indications, including inflammatory bowel disease, diverticular disease and bowel cancer. The most common types of intestinal stoma are colostomies and ileostomies, with a limited number of patients requiring a jejunostomy. During surgery a section of intestine is either resected or bypassed, resulting in a reduction in residual functional intestinal length and an associated reduction in surface area. These physiological changes can result in reduced fluid and electrolyte reabsorption, and the potential for the absorption of orally administered medication to be reduced.

Minimal literature and evidence-based guidelines exist to inform prescribing in this patient group. Drug absorption problems are more commonly associated with small intestinal stomas as residual intestinal length is the key factor influencing drug absorption, rather than solely the presence of a stoma. Insufficient drug absorption may result in lack of control of the medical condition and may be accompanied by the appearance of intact capsules or tablets in a stoma bag; resulting in clinical instability and concerns for the patient, at a time when they may be already experiencing significant quality of life issues. Pharmacists in primary and secondary care need to be aware of these potential issues so that they can counsel and advise ostomates appropriately regarding both Over-the-Counter (OTC) and prescription medicines.

Objectives
- To determine the incidence and nature of medication-related problems, such as suspected reduced absorption, as perceived by intestinal stoma patients.
- To identify what action patients took if they suspected absorption problems and how helpful they found the information provided.

Method
University Faculty ethics committee approval was gained before the study commenced. An on-line questionnaire was constructed via Survey Monkey® consisting of 12 questions regarding the stoma, regular medication taken and any medication-related problems that they perceived they may have experienced since stoma formation. Those respondents that had experienced problems were asked to detail the action they took and how useful they found the information that they were given. Some of the questions required a simple tick-box response, whilst others were designed to include a free-text option to facilitate more detailed responses. The questionnaires were completed anonymously and no personal information was requested. Two stoma patient support groups posted links to the questionnaire and an accompanying patient information leaflet on their closed Facebook® groups during January and February 2014. All respondents were required to be aged 18 or over with an intestinal stoma. Quantitative data was analysed using Excel and a basic thematic analysis of the qualitative data was undertaken.

Results
70 responses were obtained, with most common respondents being in the 55-64 years age range. The most common stoma type was a colostomy (74%), followed by ileostomy (23%) and just 3% having a jejunostomy. Stomas had been formed between 1984 and 2013. 86% of respondents were taking regular medication. Proton pump inhibitors, loperamide, analgesics, cardiac and thyroid medications were most commonly listed. The most common change to medication regimens was the addition of loperamide to regulate stoma output. 35% (24) of patients suspected that they had experiencedproblems with their medication since their stoma was formed. Of these, 32% (8) had noticed tablets or capsules in their stoma bag and 44% (11) perceived reduced efficacy of their medication. One respondent explained: "My epilepsy was well controlled with only levetiracetam before surgery. After surgery I found it no longer controlled my epilepsy, and I needed to up the dosage and take another drug..."

The most common action taken by individuals when they suspected a medication-related problem was to visit their GP, with only 11% speaking to a pharmacist, as shown in Table 1.

Table 1: Action taken when medication-related problems suspected

<table>
<thead>
<tr>
<th>Action taken</th>
<th>% respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP</td>
<td>36% (13)</td>
</tr>
<tr>
<td>Consultant</td>
<td>33% (12)</td>
</tr>
<tr>
<td>Stoma nurse</td>
<td>22% (8)</td>
</tr>
<tr>
<td>Support groups</td>
<td>14% (5)</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>11% (4)</td>
</tr>
<tr>
<td>Online forums</td>
<td>8% (3)</td>
</tr>
<tr>
<td>Internet site</td>
<td>8% (3)</td>
</tr>
<tr>
<td>No action</td>
<td>31% (11)</td>
</tr>
</tbody>
</table>

41% (14) of those that sought advice found the information provided was helpful compared to 21% (7) of people that did not: "Dr and consultant didn’t really know what to do other than raise the doses..."

Discussion and Conclusion
Whilst only 70 responses were obtained, this study provides a unique insight into the ostomate’s perspective of medication-related issues. Responses were obtained from a representative range of ostomates, with respect to stoma type and time since stoma formation. Whilst there are access issues and a potential response bias associated with the use of an on-line survey this method facilitated accessing a large population within a short time period. It is not be proven that clinically significant absorption problems were experienced in these individuals, but it is important to acknowledge the patient’s concerns and the potential impact on their quality of life and ability to manage their stoma and any comorbidities. Ostomates would appear to perceive the medical profession as their preferred source of advice rather than pharmacists, but with a concerning similar number opting to take no action. Further research is planned to investigate the level of knowledge in this area amongst community pharmacists, who are an easily accessible source of advice to ostomates and other health professionals.

References
Introduction
In February 2010, a rapid response report in relation to the ‘reduced harm from omitted and delayed medicines’ was published by the National Patient Safety Agency (NPSA). The report reviewed evidence of harm from the clinical outcomes of incident reports of omitted and delayed medicines. Between September 2006 and June 2009, the NPSA received reports of 27 deaths, 68 severe harms and 21,383 other patient safety incidents relating to omitted or delayed medicines.1 Medicines are omitted for many reasons. In most cases, omitted and delayed doses may not seem serious; however with certain critical medication or conditions this is can be extremely harmful and may even lead to death.1

Objectives
- To quantify the number of omitted and delayed doses
- To explore therapeutic drug classes with the highest number of omitted and delayed doses
- To gain insight into the most common reason(s) for the omitted and delayed doses
- To determine whether the highest proportion of omitted doses were for newly prescribed medicines

Standards
- No unintentional missed doses of any medication, particularly the critical medicines outlined in the NPSA Alert ‘Reducing harm from omitted and delayed medicines in hospital in-patients’.2
- Nursing staff should document on the drug chart the reason for any missed doses using the code specified on the front of the drug chart under the section ‘Guidance for recording administration’. (See method for details of the code)
- Doses should not be delayed by more than two hours. The Trust’s Medicines Policy2 on Administration of Drugs states ‘medicines should be given at the prescribed times’. The NPSA defines a delayed dose as ‘Administration of a drug two hours or more after the time the dose is due’

Method
Data was collected on all inpatient wards (except one ward where self-administration of medicines takes place) by pharmacy staff at the Royal National Orthopaedic Hospital (RNOH) on Friday 20th September 2013. An audit tool was piloted on 5 patients to ensure that it was fit for purpose. All drug charts were reviewed to identify omitted or delayed medicines documenting which drug was omitted, whether it was the first dose, the reason for the omitted dose and the number of times and hours the medicine was delayed. Doses omitted on previous days were also documented.

Omitted doses were coded as stated on the front of the date chart under guidance for recording administration. The codes for medicine omissions were (1) medication not required, (2) patient refusal, (3) patient not on ward, (4) nil by mouth, (5) prescription not clear/signed, (6) unable to administer (Specify reason in nursing notes) and (7) medicine not available. Any dose omissions recorded as ‘not available’ were investigated to establish the cause by checking the patient’s supply of medication, checking the nursing notes or asking the nurse in charge. Ethics approval was not required as this was considered to be an audit.

Results
A total of 56 out of 196 patients (29%) from 11 wards were found to have either omitted/delayed or both omitted and delayed medicines on their current inpatient charts. A total of 623 doses were omitted or delayed. Of these 623 omitted/delayed doses, 515 doses (83%) were omitted and 108 doses (17%) were delayed.

Thirty five percent of doses were omitted at the first prescribed dose; however it was not possible to determine if the medicine was newly prescribed. The most common omitted medicines were analgesics and laxatives. The diagram in figure 1 below illustrates the common reasons for medication omissions.

The most common reasons for medication omissions were the medication not being required and patient refusal. Out of 515 doses omitted, only 15 doses (3%) were recorded as omitted due to the medicine not being available. Almost 50% of doses were delayed by more than 2 hours; however a reason was not documented.

Discussion
The results imply that medicines initiated post-operatively for acute pain are not reviewed regularly. Another factor for patient refusal may be the fear of adverse effects or addiction to analgesia. This may lead to a delay in discharge due to inadequate pain control, and the development of chronic pain. A lack of education from healthcare staff may be a contributing factor. A small proportion of medicines were omitted due to lack of availability (3%) and unnecessary omissions where the medicine was actually available. This could be avoided by ensuring nursing staff check the patient’s medication locker more carefully through nurse education. Encouragingly only one critical medicine was omitted which resulted in no harm to the patient.

Limitations
- Data only collected on one day
- Data not collected on weekend
- Data not collected indicating how many days post-op the patient was
- Data not collected for whole length of patient’s stay if greater than 2 weeks

Recommendations
Regular review of inpatient prescription charts should form an everyday part of a doctor’s role, particularly for newly prescribed medicines post-operatively. Doctors can be informed of the audit results through their ward meeting. Patients should be educated by medical staff on post-operative analgesia requirements. Pharmacy and nursing staff should consult patients on newly prescribed medicines to ensure maximum benefit is obtained from their use. Patients should be given the information leaflet (available on all adult wards) about analgesics and laxatives by pharmacy or nursing staff. This will be addressed through audit feedback at meetings. Patients are given a ‘green bag’ at pre-assessment clinic to bring their medication in to hospital to ensure doses of critical medicines are not missed. However, to capture all patients green bags should be posted to all patients. A re-audit is recommended with modifications to the audit tool to capture more specific data over a longer period in one year.

References
d’Ancona GM, Guys and St Thomas’ NHS Foundation Trust, London, Madarbus N, University of Hertfordshire, Hatfield and Murphy AC, University Hospital of Leicester NHS Trust on behalf of the UKCPA Respiratory Committee

Background
Chronic obstructive pulmonary disease (COPD) and asthma are two of the commonest chronic conditions worldwide, with the UK having 835,000 people diagnosed with COPD (and a further estimated 2 million undiagnosed) and up to 5.4 million people with asthma. Guidelines on the management of these conditions include treatment with a regular inhaled corticosteroid (ICS), long-acting β2-agonist (LABA) and an “as required” short-acting β2-agonist (SABA) when the patient feels breathless.

In the UK, to support medication adherence, practitioners often describe the SABA inhalers to patients as “relievers” and they are traditionally blue. Likewise, the usually brown/red/purple ICS containing inhalers are called as “preventers”. In January this year, GSK Pharmaceuticals launched a newly licensed once-daily ICS/LABA combination inhaler called Relvar® Ellipta. Although it is a ‘preventer’, the inhaler casing was blue and the name was considered to sound like “reliever”. Recognising the potential for confusion and subsequent safety risks this would pose, the UKCPA-Respiratory Group pharmacists wrote to the Pharmaceutical Journal raising their concerns. These risks were acknowledged as theoretical and based on expert practice, so this study was designed to investigate whether people with asthma and/or COPD were indeed misled by the name and blue colour of Relvar®, by asking their opinion in a semi-structured interview.

Objectives
To determine the views of people with asthma and/or COPD on:
- the colour of Relvar®
- the name of Relvar®
- the use of a once daily regimen to manage their condition
- the product labelling of Relvar®

Methods
The study was registered and permission granted by the host hospital information and clinical governance team. A questionnaire was designed to facilitate data collection from adult patients admitted onto the acute respiratory ward or attending an asthma/COPD out-patient clinic. People were asked to participate in the study, with the only exclusion criteria being that the patient was unwilling to be involved or they were not prescribed inhaled therapy. Patients were interviewed face-to-face and on being shown a picture of Relvar® Ellipta device, were asked to state what type of inhaler they thought it was (preventer or reliever) based on its colour and name. Patients were also asked whether they thought the colour should be changed, if a once daily regimen was easier than twice daily and whether having the drug name in several languages on the product label was confusing. Answers were recorded and collated using Microsoft Excel; no patient identifiable data were recorded.

Results
Patients were approached to participate and 70 agreed to be interviewed (11 in-patients and 59 out-patients) of whom, most (43 (61%)) were female and the majority had asthma (60 (86%)). Five patients did not fully complete the questionnaire and this data was not included in the study whilst 8 other patients declined to be involved in the study. Table 1 shows that significant numbers of patients thought Relvar® was a ‘reliever’ based on its colour (94%) and name (100%). Eighty-two percent of the patients surveyed, said that the colour of Relvar® should be changed to look more like current ‘preventer’ inhalers.

Patients were asked about the once-daily inhaler regimen versus twice daily use. Forty-eight patients (68%) stated that it would be easier than their current twice daily regimen, 7 patients (10%) suggested that it would be more difficult to remember and 15 patients (21%) stated that it would make no difference to them. Patients were also asked about the several languages printed on the inhaler label. Twenty (29%) patients stated that having several languages made it more confusing, 9 (13%) patients considered it helpful, while 41 (58%) patients said that it makes no difference.

Table 1. A summary of patient responses to questions about Relvar® (n=70)

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on its name, what type of inhaler do you think Relvar® is?</td>
<td>70</td>
<td>0</td>
</tr>
<tr>
<td>Based on its colour, what type of inhaler do you think Relvar® is?</td>
<td>66</td>
<td>4</td>
</tr>
<tr>
<td>Should the colour of Relvar® be changed?</td>
<td>58</td>
<td>12</td>
</tr>
</tbody>
</table>

Discussion
In this study, all 70 patients interviewed assumed that Relvar® was a ‘reliever’ inhaler, supporting the concerns of the UKCPA-Respiratory Group committee. Similar concerns regarding the colour and name of the Relvar® have been raised by other national respiratory specialist groups. As 94% of patients considered blue inhalers to be ‘relievers’, the colour of Relvar® Ellipta should be reviewed and healthcare professionals must counsel patients appropriately, be vigilant in detecting inappropriate “as required” use and report adverse reactions to the product. Fifty-eight patients stated that the colour should be changed to avoid confusion and while they were not asked what colour they thought the inhaler should be changed to, it is reasonable to recommend a colour currently associated with an ICS-LABA containing inhaler (e.g. purple or red).

One of the benefits of this new inhaler purported by the manufacturers is the once daily regimen, a view shared by 68% of patients interviewed. It is however interesting that almost a third of patients didn’t see this as a positive change, so suggests caution in equating this regimen to better adherence. It was reassuring that for most patients, labelling with the drug name in several different languages posed no additional confusion and indeed, some patients found it helpful.

However, there are limitations to this study. When asking patients about what type of inhaler they thought Relvar® was and whether the colour of Relvar® should be changed, there should have also been an ‘unsure’ option as the yes/no option forced a choice. Patients could have been asked what colour the inhaler should be changed to, to further inform the manufacturers with whom we shared these results.

Conclusion
According to this study, patients mistakenly considered the blue Relvar® inhaler to be a ‘reliever’. This misinterpretation could cause patients not to use it appropriately (e.g. irregularly or too frequently) with consequences for both their clinical management and risk of developing side-effects. We would advise that a review of the colour and name be considered by the manufacturer and to support safe medicines use, that pharmaceutical companies agree and adhere to UK convention around future inhaler colours and purpose.

References
Background
NHS Accident and Emergency (A/E) departments are under more pressure than ever before as patient throughput increases, illustrated by the government’s £500 million grant to support the NHS over the next 2 years. Consequently, workable solutions are sought to reduce unnecessary presentations to A/E, notably readmissions.

Hospital readmissions are regarded as a marker of suboptimal healthcare and in 2010 the Department of Health set a national target that unplanned readmissions within 30 days (subject to exclusion criteria) must account for less than 5% of total Accident and Emergency admissions. Financial penalties are in place for trusts failing to meet this target, which continues to cost the NHS an estimated £1.6 billion a year. There are no national targets for EU or other wards, but there are large financial penalties. From 2012-13 Payment by Results (PBR) guidance recommends that hospitals are only reimbursed the proportion of the original tariff reflecting the percentage of readmissions that were considered unavoidable, which is determined by a clinical audit. Local data calculated this to be 22% and this is echoed in similar studies where 24% of readmissions are considered unavoidable.

Readmissions to hospital are often multi-factorial but often precipitated by medication-related problems (MRPs) post discharge. Pharmacists are commonly regarded as the experts in drug pharmacology, interactions, administration, counselling and monitoring and as such are best qualified to identify any MRPs, take appropriate action, counsel the patient on drug therapy and screen for barriers to compliance.

 Aim and Objectives
- To calculate the proportion of readmissions that could potentially be prevented with pharmacist intervention.
- To review the baseline characteristics of readmission cases.
- To compare the readmission rates of EAU with the remainder of the hospital.
- To make a prospective evaluation of the contributing risk factors for subsequent readmission to hospital.
- To review the financial implications of the pharmacists role in re-admission avoidance.

Methods
This study was designed as a cohort study and carried out at Luton and Dunstable NHS Trust. As it falls under the heading, Quality Improvement no ethical approval was required. All patients discharged and readmitted solely to EAU within a 30 day period between 1st March 2012 and 1st March 2013 were identified via the IT department and included. As no pharmacist is present on EAU it can be concluded that no direct contact with a pharmacist had taken place. The following patients were excluded: elective readmissions, cancer patients and those under 16 years of age. The investigator reviewed the medical notes to determine if the readmission could have been prevented if direct contact with a pharmacist had taken place during the first admission. The primary outcome measured was the percentage of readmissions classified as preventable with pharmacist intervention. The preventability of each readmission case was reviewed in the context of ‘current’ and ‘gold standard’ ward pharmacy service models. The gold standard model was based on a much more in depth patient review, monitoring and consultation process at ward level. To ensure the investigators interpretation of an ‘avoidable admission’ was aligned with their peers, a 10 case validity check tool was designed using Kappa’s measure of inter-rater reliability.

Results

<table>
<thead>
<tr>
<th></th>
<th>Current ward pharmacy service</th>
<th>Gold standard pharmacy service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preventable:</td>
<td>7 cases (11%)</td>
<td>16 cases (25%)</td>
</tr>
<tr>
<td>Not preventable:</td>
<td>58 cases (89%)</td>
<td>49 cases (75%)</td>
</tr>
<tr>
<td>Total cases reviewed</td>
<td>65</td>
<td></td>
</tr>
</tbody>
</table>

Kappa’s inter-rater reliability was calculated as 0.83 (p < 0.001) and indicates an almost perfect level of agreement. The readmission rate for EAU was 11.6% based on 680 readmissions from a total of 5850 discharges. NHS average for 2009-10 was 11.15%.

58.5% of patients reviewed were male, the mean age was 62 years, CI, 0.95 (56.8 to 67.7 years). The median time interval between admission and readmission was 8.0 days, 35.4% of readmissions occurred in the first 4 days post-discharge. The median length of stay for the readmission episode was 3.0 days and 49.2% were 2 days or less.

A co-morbidity of diabetes was more likely to produce readmission episodes that were preventable, using ‘current’ ward-pharmacy model, Chi-square, P=0.019. Similarly a co-morbidity of COPD/asthma was more likely to produce readmissions episodes that were preventable, using ‘gold standard’ ward-pharmacy model Chi-square, P= 0.044. Medications such as warfarin, anti-parkinsons and antibiotics are more likely to produce preventable readmissions when using ‘current’ ward-pharmacy model, Chi-square, P= 0.031.

Discussion and Conclusion
This study demonstrates that pharmacists can potentially reduce the readmission rates of EAU by up to 25%, meaning that a pharmacist would need to review 4 patients to prevent one readmission case. This could potentially equate to 170 readmission cases over a 1 year period and could realise a cost saving of circa £130K to the trust, based on DOH costing guidance for 2011. To achieve this patients with either a co-morbidity of diabetes or COPD/asthma or patients taking warfarin, antibiotics or anti-parkinsons medicines should be targeted for pharmacist review. It is hoped that this will bring optimal clinical outcomes and minimise readmission penalties. The study was limited by the reliance placed on complete and accurate documentation in the medical notes and the inability to detect compliance problems retrospectively. However readmissions could be further reduced in ‘real-life practice’ as the pharmacist will have an opportunity to complete a level 2 Medicines Reconciliation, identify compliance issues, obtain a full medication list and note any recent changes to medication.

This study has demonstrated its positive impact on readmissions but also contributes favourably to patient safety, patient experience and reduction in omitted or delayed doses of medications, all of which are key drivers in the NHS, but their added benefits have neither been quantified financially or clinically in this study.

References
4. Compendium of Population Health Indicators, Hospital Episode Statistics NCHOD FY, Feb 2011 and National Statistics
26. Audit on the appropriate completion of the Self Administration of Medicines (SAM) Assessment Form

Dodhia, R. Buckinghamshire Healthcare NHS Trust

Introduction
The Care Quality Commission\(^1\) (CQC) has stated that self administration of medicines (SAM) by patients should be undertaken if deemed appropriate and competent to do so.

Self administration of medicines (SAM) is proven\(^1\) to:
- Improve patient knowledge regarding their medications
- Improve patient confidence through supervision and assessment of their self administration routine
- Increase patient empowerment and concordance

The potential SAM benefits outweigh potential risks providing careful patient selection and controls are in place such as appropriate completion of the assessment form and different SAM supervision levels\(^2\). The Trust piloted the Self Administration of Medicines (SAM) policy\(^2\) at an acute surgical ward, testing a newly developed SAM assessment form, which if successful, would potentially develop to a Trust wide policy – forming the basis of the audit.

Aim
The aim of this audit was to assess the appropriate completion of the Self Administration of Medicines (SAM) assessment form, in line with the Trust Medicines Policy\(^2\).

Objectives
- To quantify the number of patients assessed for SAM suitability
- To determine whether the SAM assessment forms are being accurately completed

Method
The audit monitored a newly developed SAM assessment form, with the potential of rolling it Trust wide. A data collection form and strategy was designed and tested over a 2 day pilot in October 2013. Following this, data was collected prospectively over a 3 week period (October – November 2013) with no changes required in the audit tool. Data was collected twice a day on weekdays (mid morning and mid afternoon) of patients to be discharged on that day whilst weekend discharges data collection occurred on the following Monday morning. Data was collected towards the end of the patient stay so as to see if patients were assessed daily and if there were any instances of non self administration documented. All data was collected using patient notes, drug charts and the SAM assessment forms. This being an audit, ethics approval was not needed.

Results
A total of 44 patients were reviewed, of which, 15 patients (34%) were not assessed for suitability to self administer their medication (SAM). From the 29 patients assessed for SAM (Table 1), 9 patients (32%) declined to participate, whilst, 3 patients (10%) were unsuitable for SAM as per the criteria. A further 3 patients (10%) were assessed as unsuitable but the assessment form was incomplete and certain decisions unjustified such as no reasons stated why the patient is unsuitable to self administer their medications. 2 patients (7%) had their SAM assessment largely incomplete with only the medication list filled in by the pharmacist and no doctor’s signature granting approval. 1 patient (3%) withdrew his consent to self administer citing he was no longer happy with the process in place.

All in all, 11 from the total patients assessed (38%) self administered their medication. Forms were filled in appropriately for 6 patients (55%), whilst 5 patients (45%) had some data missing in their assessment forms such as: consent section not filled in (1 patient); compliance section not filled in despite the patient being assessed as a “SAM 3” (can self administer, no supervision required), as well as, the SAM medication approval list only being signed by the doctor (no pharmacist/nurse signature present as per policy) for 2 patients; 3 patients not being re-assessed for 3 days, 3 days and 1.5 days respectively.

<table>
<thead>
<tr>
<th>Patient Groups Assessed</th>
<th>Actual (n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total patients assessed</td>
<td>29</td>
<td>100</td>
</tr>
<tr>
<td>Declined to be a part of SAM</td>
<td>9</td>
<td>32</td>
</tr>
<tr>
<td>Unsuitable for SAM</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Assessed as Unsuitable (incomplete)</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Assessment Incomplete</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Withdrew from SAM</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Patients on SAM</td>
<td>11</td>
<td>38</td>
</tr>
</tbody>
</table>

Table 1: The actual number of patients of the different patient groups assessed and as a % of the total patients assessed

Discussion
The ward was chosen by the Chief Nurse and Clinical Governance Pharmacist due to it being a relatively small (14 bed) and high turnover ward.

Limitations of the audit strategy, as well as, of the overall audit project include, but are not only confined to the following:
- Audit being carried out quite early in the SAM scheme - thus, initial SAM assessment occurred at ward level as opposed to being done at the pre-operation clinic which could have deterred many patients from participating in the SAM scheme as their thoughts were acutely pre-occupied with the surgery they just underwent, as well as, ward staff were not in favour to initiate the SAM assessment process now
- Ward pharmacist and junior doctors changed rotations, which could have affected the results since new staff had to now adapt to their role in the SAM process
- Ward having a relatively high turnover (average 2-3 day stay) - may not have been the most appropriate ward to have a SAM pilot as the staff may fail to appreciate the benefits brought about by the self administration of medicines process due to the short length of stay of each patient.

Recommendations put forward following completion and reflection of the results include:
- Rereation & emphasising the advantages brought by self administration of medicines to all staff members
- Repeating the nursing staff training on self administration of medicines and reinforcing the importance of completing the SAM paperwork in relation to patient safety
- Reinforcing the importance of assessing all patients for SAM suitability, hence allowing the choice to self administer to all patients
- Undertaking a re-audit in 2 months time, letting the initial assessment be done in the pre-operation clinic, lowering SAM paperwork workload on the wards as well as giving patients time to think about SAM much before the operation
- Undertaking a patient satisfaction survey regarding the SAM scheme

References
Background
Readmission is a growing problem for the NHS; rates have risen steadily over the last decade. Preventable readmissions are expensive, and are not in the interests of patients, the public or the NHS. Monitor’s 2014/15 National Tariff encourages better discharge planning by providers, including coordinating with primary care regarding medication in order to reduce readmissions. A recent study demonstrated that pharmacist involvement in the discharge process reduced readmissions in a selective sample. This study evaluated the impact of pharmacist validation of discharge prescriptions on reducing readmissions in a more generic sample, and is part of a larger project that aims to generate evidence to enable the allocation of pharmaceutical interventions according to readmission risk, with the goal of improved quality and efficiency of care.

Objectives
To quantify the effect of mandating pharmacist validation of discharge prescriptions during normal working hours on a medical short stay unit of a district general hospital, to determine the impact on readmission rate, and to characterise prescription factors associated with readmission.

Method
Data was collected retrospectively from the electronic discharge summaries (EDS) of all patients 18 years of age and over discharged from Calderdale Royal Hospital’s Medical Short Stay Unit between 26th August 2013 and 23rd February 2014. Pharmacist validation of EDS became mandatory during normal working hours from 25th November 2013 by automating submission for validation at the point of completion. Data collected included demographic and prescription details such as age, whether the medicines were reconciled, whether the EDS had been validated by a pharmacist, as well as admission/discharge dates, and whether the patient had been readmitted or died within 30 days. Readmission within 30 days was the primary outcome measure; death within 30 days was also recorded to account for all patients after 30 days. Data was analysed using SPSS. Ethical approval was not required as the study was conducted by a Trust employee to evaluate the clinical service.

Results
887 patients were discharged during the study period. The mean length of stay was four days (SD ± 4.9 days) and the mean age of patients was 66.9 years (SD ± 20.1 years). Table 1 shows the number of discharges completed in each evaluation phase categorised according to prescription and/or readmission factors. The proportion of EDS validated by a pharmacist was doubled by enforcing validation during normal working hours (75.5% vs. 38.3%), a significant improvement of moderate magnitude (p<0.01, φ=0.38). A modest but important reduction of one-fifth in readmission rate was also observed (16.1% vs. 12.9%), although this was not statistically significant (p>0.05).

During the baseline evaluation patients using an MDS had an elevated readmission rate (25.4%, 18/71) compared with those who were not (14.4%, 54/375). This effect of small magnitude was statistically significant (p<0.05, φ=0.11), and was not observed during the intervention evaluation (p>0.05). Ten per cent (7/71) of EDS for MDS patients in the baseline evaluation were not validated by a pharmacist, indicating the prescriber may have changed the EDS since pharmacist approval; this figure is more than double that observed in the intervention evaluation (6.7%, 4/61). Patients using an MDS had a higher average age (78.6 vs. 64.7 years, p<0.01, 95% CI for the difference: 11.3-16.6), and a longer average length of stay (LOS) (6.0 vs. 3.8 days, p<0.01, 95% CI for the difference: 1.0-3.4), however there was no significant difference in the average age or LOS, whether using an MDS or not, when comparing patients in the baseline and intervention evaluations (p>0.05).

Table 1: Discharges

<table>
<thead>
<tr>
<th></th>
<th>Baseline Evaluation N (%)</th>
<th>Intervention Evaluation N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharges</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDS</td>
<td>171/446 (38.3)</td>
<td>333/441 (75.5)</td>
</tr>
<tr>
<td>MDS Validated by a pharmacist</td>
<td>64/71 (90.1)</td>
<td>68/71 (95.8)</td>
</tr>
<tr>
<td>MDS Medicines reconciled</td>
<td>173/195 (88.7)</td>
<td>314/343 (91.5)</td>
</tr>
<tr>
<td>MDS Readmitted within 30 days</td>
<td>57/71 (80.3)</td>
<td>67/71 (94.4)</td>
</tr>
<tr>
<td>MDS Died within 30 days</td>
<td>20/446 (4.5)</td>
<td>18/441 (4.1)</td>
</tr>
<tr>
<td>MDS</td>
<td></td>
<td>5/71 (7.0)</td>
</tr>
</tbody>
</table>

Discussion
Ensuring pharmacist validation of all discharge prescriptions during normal working hours almost doubled the proportion validated, providing evidence that three-quarters of discharges were completed while a clinical pharmacist was available and suggesting that less than half required medication supply at the point of discharge. Considering the Trust operates a one-stop dispensing strategy, this may provide an indication of how many prescriptions are changed at the point of discharge.

The modest but important reduction in readmission rate observed reflects that readmission is a complex and multifactorial issue, yet provides assurance that pharmacists can contribute to the NHS’ efforts to reduce readmissions in their routine clinical practice.

The association of compliance aids with readmission observed in the baseline evaluation could be due to a number of factors, and considering the average age and LOS of MDS patients was similarly higher in both stages of the study, age and LOS may not be independent indicators of readmission in this group; further analysis will be undertaken to identify confounding variables and pin-point the true association. The improvement in clinical validation and medicines reconciliation rates may have been influential in reducing readmissions. Further analysis will be undertaken to evaluate the groups within which clinical validation had the most impact, for example those prescribed particular medicines, and further work is planned to evaluate impact of medicines reconciliation with respect to reducing readmissions.

References
Context
The General Pharmaceutical Council (GPhC) review of registrants’ CPD involves a review of the process of CPD rather than the content of CPD. The GPhC has declared that although CPD is important as evidence of learning, they need to be able to receive and assess evidence of the impact [or outcomes] that CPD has in providing assurance that learning is effective and pharmacy professionals are up to date1. The current CPD review system does not provide this assurance so how do we know if pharmacy professionals consider CPD outcomes for themselves, patients and service users when undertaking and recording CPD?

Aim
To explore the extent to which pharmacy professionals consider the outcomes of their learning when planning and recording CPD.

Objectives (between 31 October 2013 – 13 May 2014)
- Develop research questions and use as a basis for designing survey questions
- Conduct a pilot survey, identify emerging themes and evaluate question validity
- Design final online questionnaire and conduct wider survey with pharmacy professionals from all sectors of practice, collate data against research questions and analyse findings

Method
A pilot survey was conducted to explore respondents’ knowledge of CPD outcomes and the extent to which these were considered when undertaking and recording CPD. Key themes were identified and used to design the final online survey. The online survey used statements and a 4-point Likert scale for respondents to indicate the extent to which they agreed with the statements to gather quantitative data. Comment boxes enabled respondents to provide descriptive text to generate qualitative data. The survey was distributed to pharmacy professionals from all sectors of practice by email and through online professional CPD discussion fora. Collated responses were themed and analysed against the research questions. Ethics approval was not required as this was a survey of pharmacy professionals.

Results
221 respondents (pharmacists and pharmacy technicians) replied. There were respondents from all sectors of practice with the majority (69% n = 167) from NHS hospitals.

Knowledge of CPD Outcomes: CPD outcomes were identified from questions in the GPhC CPD recording template and knowledge of these outcomes were tested2. There was a strong level of agreement that 3 out of the 10 statements were CPD outcomes: The ability to maintain professional registration (87% n=196); Benefits of the learning to the individual themselves (81% n=178); Extent of new knowledge gained or skills developed (80% n=175). There was less than 80% agreement that the other 7 statements were CPD outcomes.

Choosing what to record as CPD: Quantitative data indicated that respondents did consider CPD outcomes when choosing what to record. Qualitative data however indicated their choice was influenced by other factors: “Deciding on what to record is difficult. Sometimes there are many opportunities where learning will make ‘good’ CPD entries; other times there are hardly any...to ensure 9 are complete we end up using learning such as annual mandatory training...” Respondents also commented they considered the benefit of the learning to themselves as more important than the benefit to anyone else: “.....most of all it [CPD] should benefit yourself”.

Recording CPD Outcomes: Table 1: Extent of Recording CPD Outcomes in CPD Entries

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Strongly agree (SA) %</th>
<th>Agree (A) %</th>
<th>Total agreement SA+A %</th>
</tr>
</thead>
<tbody>
<tr>
<td>I describe relevance of learning to my scope of practice</td>
<td>28 (n=62)</td>
<td>64 (n=139)</td>
<td>92 (n=201)</td>
</tr>
<tr>
<td>I describe benefit of my learning to myself</td>
<td>17 (n=37)</td>
<td>69 (n=151)</td>
<td>86 (n=188)</td>
</tr>
<tr>
<td>I describe benefits of my learning to patients or service users</td>
<td>12 (n=26)</td>
<td>65 (n=142)</td>
<td>77 (n=168)</td>
</tr>
<tr>
<td>I describe benefits of my learning to my colleagues or the organisation</td>
<td>9 (n=19)</td>
<td>62 (n=135)</td>
<td>70 (n=154)</td>
</tr>
<tr>
<td>I describe the improvements my learning has made to my practice</td>
<td>11 (n=24)</td>
<td>58 (n=127)</td>
<td>69 (n=151)</td>
</tr>
<tr>
<td>My CPD entries demonstrate safe and effective practice of pharmacy</td>
<td>6 (n=14)</td>
<td>57 (n=125)</td>
<td>63 (n=139)</td>
</tr>
<tr>
<td>I often do not have the opportunity to apply the learning I record</td>
<td>7 (n=15)</td>
<td>36 (n=79)</td>
<td>43 (n=94)</td>
</tr>
</tbody>
</table>

92% of respondents described the relevance of their learning to their scope of practice. Learning related to scope of practice has the potential for application to practice, however 43% of respondents said that they often did not have the opportunity to apply their learning to practice. One reason cited for not recording CPD outcomes was that the GPhC review focused on the recording process and not content of CPD entries; therefore did it matter?

Discussion and Conclusions
The small number of respondents with a majority from the NHS hospital sector means the findings are not generalisable across the whole pharmacy profession. There are competing factors which determine the extent to which respondents consider CPD outcomes when choosing what to record. There are respondents who approach learning as Continuing Education, in which they may fulfill their personal desires for learning, but not necessarily apply it and demonstrate CPD outcomes. Respondents may not know how to define their scope of practice and undertake relevant learning and therefore cannot apply the learning. There may also be lack of commitment to using learning even when relevant. In summary, the current CPD process is inadequate and contributes to a lack of engagement in demonstrating CPD outcomes to patients, service users, colleagues, the organisation etc. The GPhC plans to review the current CPD process and shift towards a peer review system which may improve engagement. However lack of knowledge of CPD outcomes and challenges in respondents being able to define their scope of practice will need addressing.

References
2. General Pharmaceutical Council; CPD [online] for Pharmacists and Pharmacy Technicians in Great Britain; www.uptodate.org.uk Accessed 10 June 2014
Introduction
Magnesium is essential for the reabsorption of calcium and potassium in the kidneys but hypomagnesaemia occurs in up to 12% of hospitalised patients. The normal range for serum magnesium is 0.7-1.0mmol/L. Below 0.7mmol/L patients may display symptoms such as cramps, tetany, convulsions, arrhythmias and electrocardiogram changes. United Kingdom medicines information (UKMI) released a document in 2010 about the treatment of hypomagnesaemia in response to the nationwide number of requests for this information.

Aim/Objectives
To audit current practice of oral and intravenous (IV) magnesium supplementation for adult inpatients with hypomagnesaemia against hospital guidelines and the British National Formulary in Oxford University Hospitals (OUH) (excluding maternity, neurology, cardiothoracic critical care and those based at the Horton hospital)
- To determine if IV and oral magnesium is being given at the correct dose based upon magnesium levels and for the correct duration over a 2 week period.
- To measure the number of patients suffering from toxicity as a result of magnesium supplementation over a 2 week period.
Magnesium glycerophosphate is the oral magnesium preparation of choice at OUH. See Table 1 for standards. All standards were set at 100%.

Method
Patients were identified by ward pharmacists and through the pharmacy dispensing system over a 2 week period. Data was collected using a specifically designed data collection tool from drug charts, medical notes and Case Notes. The data collection tool was piloted for four days, amended and then used during the audit period. No ethical approval was required.

Results

<table>
<thead>
<tr>
<th>Standards</th>
<th>Overall results</th>
<th>Standard met?</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% patients will:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receive 20mmol IV magnesium if their level is &lt;0.5mmol/L</td>
<td>75% (n=3/4)</td>
<td>No</td>
</tr>
<tr>
<td>Receive 10mmol IV magnesium if their level is 0.5-0.7mmol/L OR</td>
<td>4% (n=1/24)</td>
<td>No</td>
</tr>
<tr>
<td>Receive 24mmol daily of oral magnesium if their level is 0.5-0.7mmol/L</td>
<td>52% (n=12/23)</td>
<td>No</td>
</tr>
<tr>
<td>Have the correct formulation written in full and dose prescribed in terms of mmol</td>
<td>52% (n=64/121)</td>
<td>No</td>
</tr>
<tr>
<td>Have magnesium level not being in normal range. Only 52% (n=64/121) electronic prescribing was used.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Audit standards and results

There were 79 patients identified on magnesium supplementation during the audit. There were four patients found within the audit that had a severe magnesium deficiency of less than 0.5mmol/L, three of these patients received the recommended supplementation. The audit identified 47 patients with magnesium levels between 0.5mmol and 0.7mmol; 24 of these received IV treatment and 23 oral treatment (see Table 1). A total of 28% (13/47) patients received the recommended dose for this magnesium range. There were 28 patients who received magnesium supplementation despite their magnesium level being greater than 0.7mmol/L.

The total number of patients receiving the correct dose of magnesium based upon their magnesium level was 16/79 (20%). Patients that were monitored daily were mainly those who would have had regular electrolyte monitoring regardless of their magnesium supplementation. In 11 patients there were no subsequent magnesium levels taken once treatment was commenced and in seven patients treatment was stopped despite the magnesium level not being in normal range. Only 52% (64/121) of prescriptions were prescribed in terms of mmol and had the correct formulation written in full, of these correctly written prescriptions 91% (58/64) electronic prescribing was used.

Discussion/Conclusion
This study only captured patients with hypomagnesaemia who had been prescribed treatment as there was no way of identifying those who had not. Although it can be certain that all patients given oral magnesium were captured, due to this being unlicensed and not ward stock, patients administered IV magnesium in areas where it is ward stock may have been missed as it relied upon ward pharmacists to report them.

Current guidance was designed to aid nurses in the administration of IV magnesium; and therefore does not include information on how patients should be monitored, the dose to prescribe based upon blood results or how to dose patients with oral magnesium. Prescribers are therefore unsure of how hypomagnesaemia should be treated and monitored, particularly with oral therapy, and the guideline should be updated to include this information so that all this information can be found in one document. Currently within OUH all other electrolyte replacement guidelines are in the format of a medicines information guideline; however magnesium is not and is located in a separate place within the trust intranet. Therefore new guidance should be created in the same format and stored in the same location as other electrolyte guidelines to help prescribers to access this information.

A medicines information leaflet will be designed and implemented using improvement methods to draw all the necessary information into one guideline. Follow-up audits will be conducted as part of this to determine if prescribing and monitoring of hypomagnesaemia has improved.

References
Introduction

Electronic prescribing is a government agenda with the intention of reducing errors, improving prescribing quality and enhancing communication. The impact of introducing ePrescribing system on nursing, medical and pharmacy practices and drug errors requires careful consideration. The aim of this study was to review medication errors within the CUH, to identify those errors which healthcare professionals (HCPs) believe may be addressed by ePrescribing and identify their subsequent concerns and beliefs regarding implementation of the ePrescribing. The role of the hospital pharmacist has developed on the basis of needing to reduce errors and improve prescribing quality; consequently ePrescribing system has the potential to impact on the need for hospital pharmacists. This research should therefore provide some insight into where pharmacists may consider refocusing their role post ePrescribing implementation.

Objectives

- Identify, categorise and analyse different types of medication errors
- Characterise the perceived effect of ePrescribing system on medication errors and current working practices

Methods

UK governance approval from CUH Research and Development Committee was received for this study. Error reporting system at CUH was searched for medication errors reported and classified over the previous three years. Four focus groups, one per profession were selected from the HCPs at CUH including five doctors, six nurses, seven pharmacists and six pharmacy technicians. Focus groups were chosen as they allow group of diverse participants more likely to express different views in a group setting than one-to-one. Participant recruitment involved approaching CUH staff via trust generic e-mail with an attached information sheet and recruiting those fulfilling the inclusion criteria. To initiate discussion each group was presented with the results of error analysis and prompted with open-ended questions originated from this study’s objectives at the start of each session such as “how will the new system impact your working practices?” When deviated from the topic the researchers guided them back on track with a follow up question. The discussions were audio-recorded and the data was transcribed and analysed using ‘scissors and paste’ approach with a qualitative method known as thematic analysis to report patterns and themes within the data.

Results

The incident reports recorded between April 2010 and September 2013 reported a total of 7638 medication errors.

Table 1. A comparison of categories and most common sub-categories of medication errors

<table>
<thead>
<tr>
<th>Administration</th>
<th>Prescribing</th>
<th>Dispensing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect dose</td>
<td>34.9% (n=244)</td>
<td>54.1% (n=529)</td>
</tr>
<tr>
<td>Incorrect drug</td>
<td>22.0% (n=153)</td>
<td>11.3% (n=111)</td>
</tr>
<tr>
<td>Incorrect form</td>
<td>16.3% (n=114)</td>
<td>9.7% (n=95)</td>
</tr>
</tbody>
</table>

During discussions on the impact of ePrescribing system on healthcare, a general theme of ‘one record system’ was perceived to contribute to enhance patient care, improve safety and workflow efficiency by speeding up discharge process that would in-turn support fast patient-turn-over, reduced waiting times and increased hospital bed availability.

“It increase efficiency so as well as being able to do more clinical work on wards time spent will be more efficient so if it is processing discharges they will done more promptly which could have an indirect effect on patient safety if you clearing enough beds etc.” (Pharmacists)

Participants seemed to share positive views about the transformational changes in their working practices. Pharmacists believed that the new system will save time on prescription clarifications thus allowing them to shift more towards clinical aspects of their jobs.

“You might find if certain aspects of the job become quicker...because as we move away from routine prescription legibility and more towards where I said to be pharmacists are therapeutic advisors...” (Pharmacists)

The new system was perceived to reduce prescribing errors, however, uncertainties that it will affect administration errors remained. Participants anticipated that the new system will introduce new types of prescribing errors e.g. incorrect drug selection and dose doubling.

“I can’t see how ePrescribing will stop administration errors. I think administration errors is not going to make any difference.....” (Doctors)

“I guess you start finding different kind of errors or problems. So rather than misspelt drugs I guess that shouldn’t really happen but I don’t know what’s the possibility of them choosing the wrong drug all together...” (Pharmacists)

Discussion and Conclusion

Our findings support the results of the previous study. By showing all prescribing, dispensing and administration at once on one electronic chart ePrescribing was perceived as being able to enhance patient safety and workflow efficiency particularly around discharge. Additionally a significant gain in work productivity and job performance would potentially be achieved by the standardisation of electronic prescription that would improve prescription completeness and legibility. It was believed that the system would enable pharmacists to spend less time on correcting drug charts for administrative omissions and spend more time confirming clinical appropriateness.

Whilst reported errors do not reflect actual prevalence the database suggests that a large proportion of errors seen are those related to administration and dispensing. The focus groups identified that the main impact of ePrescribing will however be on prescribing errors. Additionally research suggests that ePrescribing introduces new errors and therefore pharmacists will need to monitor more carefully for selection errors. The research suggests that ePrescribing should enable pharmacists to focus more on the clinical appropriateness of prescriptions and this may be appropriate as additional errors will be introduced. Administration errors are common within the hospital setting and many of these will not be addressed by ePrescribing. Consequently pharmacists may want to additionally focus on this element of medicines management.

References

Introduction
Buckinghamshire Healthcare Trust (BHT) is one of the largest Trusts in the south central region and accounts for approximately 10% of all hospital admissions. In 2013, approximately 91,307 patients were admitted to hospitals within this Trust. It is crucial upon admission, that patient prescriptions issued to patients, are completed fully and correctly in order to prevent medication errors from occurring. The Buckinghamshire Healthcare Trust (BHT) Medicines Policy sets out the key principles for the control of medicines to ensure that medicines are prescribed, stored, administered and managed correctly. The Trust’s adherence to the medicines policy is regularly audited and it was last reviewed in 2012.

Aim
To assess adherence of the Buckinghamshire Healthcare Trust (BHT) Medicines Policy on describing guidelines for inpatient prescriptions for all hospitals within the trust.

Objectives
Audit to assess adherence of the following standards derived from the BHT medicines policy regarding the correct completion of;

- The front page of the inpatient prescription including patient, prescriber details, allergy status and reaction.
- Prescribed medication
- Prescribed antimicrobials
- Medicines reconciliation within 24 hours of patient admission written in the appropriate section of the inpatient prescription.

All standards were set at 100%.

Method
A prospective audit was carried out using a sample of inpatient prescriptions, from 30 wards within BHT hospitals including acute sites such as Stoke Mandeville and Wycombe hospital and community sites such as Amersham, Thame, Marlow and Buckingham hospital.

A systematic sampling method was used, as within the trust each ward has three bays that hold approximately an equal number of patients. Inpatient prescriptions were selected and reviewed from the first patient in each bay, totalling three inpatient prescriptions per ward.

All results were recorded on the data collection tool, which was derived from the medicines policy. The study was piloted on a ward, which identified the need to specify the names of the supplementary charts. The final audit data collection tool would include this.

Although ethics approval was not obtained, the study was reviewed by the Lead Clinical and Governance Pharmacist beforehand. The audit was carried out in November 2013 and data was collected over a 5 day period. Each site was visited for one day to ensure enough time for complete data collection.

Results
In total, 90 inpatient drug charts from 30 wards were reviewed. See table 1.

Table 1: Standard achievement results

<table>
<thead>
<tr>
<th>STANDARD (all set at 100%)</th>
<th>Achieved (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The front cover of the inpatient prescription is correctly completed with all mandatory patient information (name, date of birth and MRN / NHS number). The prescription is dated, legible and written in blue or black ink; the number and use of supplementary charts are also indicated.</td>
<td>78</td>
</tr>
<tr>
<td>The prescriber’s details (name, signature and bleep number) are indicated on the inpatient prescription.</td>
<td>53</td>
</tr>
<tr>
<td>The prescribed medicines are clearly written with the correct name, dose, and BNF abbreviation. Minimum and maximum doses of as required medication are clearly stated.</td>
<td>88</td>
</tr>
<tr>
<td>Medicines Reconciliation (MR) is completed by a pharmacist within 24 hours of patient’s admission and recorded in the correct section of the inpatient prescription.</td>
<td>50</td>
</tr>
<tr>
<td>The allergy status and reaction is recorded on the inpatient prescription.</td>
<td>72</td>
</tr>
<tr>
<td>If the patient has been prescribed an antimicrobial it is recorded accurately with the indication and duration in the correct section of the inpatient prescription.</td>
<td>89</td>
</tr>
</tbody>
</table>

For accurate completion of the front page it was found that all charts had the correct patient details recorded but prescriptions were not always dated and legible. Some wards had their own system whereby the inpatient prescriptions are placed in an indexed file containing tabs and therefore did not mark the supplementary charts on the prescription. All sites collectively appeared to score poorly on MR completed within 24 hours of patient admission (50%), often a MR was completed but no date was recorded therefore this was considered to be non-compliant. This also may be due to the fact that not all wards are visited daily.

Community units in particular scored poorly on prescriber detail completion (53%), this may be due to regular doctors working for the units. Allergies were found to be generally indicated however the nature was not regularly specified and therefore only scored 72%. Medicines were generally prescribed with the correct name and dose, however maximum doses were not specified for as required medication (88%).

Discussion
The audit highlights specific areas where the Trust’s medicines policy is currently not adhered to and were improvements can be made: sufficient completion of prescriber’s information; name and bleep number to be included on all prescriptions, date of patient admission to be written promptly, MR completion dated on the chart and the maximum dose written for as required medication; especially on the spinal wards were analgesia is used regularly. The main limitation from this audit was the short time period of 5 days for data collection for such a broad audit. A re-audit after 3 months is recommended to make comparisons and observe trends. As well as a further study assessing the understanding of the BHT medicines policy amongst pharmacists, and to see what extent this affects adherence.

References
32. A survey of prescription dosage instructions contained on electronic prescription service 2 (eps2) dispensing tokens.
Ilal M, Rodgers R. Medway School of Pharmacy, Universities of Kent & Greenwich at Medway, Chatham Maritime, Kent

Background
The Electronic Prescription Service (EPS), NHS England’s service for Electronic Transfer of Prescriptions (ETP) has recently moved into a second phase (EPS2). EPS was established in 2005 as part of the National Programme for Information Technology (NPfIT) by the Department of Health agency, Connecting for Health. Since March 2013 it has been managed by The Health and Social Care Information Centre. EPS2 was designed to allow the transmission of digitally-signed prescriptions and prescription messages from primary care prescribers to community pharmacies via a central network, the Spine. Prescriptions can be downloaded for dispensing, and then sent electronically to the NHS Prescription service for reimbursement.

In addition, the system allows dosage instructions to be generated automatically to dispensing labels, thus avoiding the need for pharmacy staff to manually enter the details; reduce transcription errors. The usefulness of this aspect is dependent on the quality of dosage instructions written by prescribers in order to produce prescription labels that are clear for patients to understand. Prescribing errors have been shown to be the most common form of avoidable error. By conducting a survey on the dosage instructions of prescription items from EPS2 dispensing tokens, it is hoped that issues relating to labelling errors can be identified and advice issued to prescribers before the widespread adoption.

Aims and Objectives
To survey and identify the prescribing instructions provided for individual medicines on EPS2 dispensing tokens received by community pharmacies. To identify the preferred forms of instruction that will produce a pharmacy dispensing label meeting the standard described in the NPSA ‘Design for patient safety’ guidance-A guide to the design of dispensed medicines. In addition, to evaluate the impact on pharmacies on workload resulting from having to make corrections to dispensing labels to minimise the risk of patient error and misunderstanding.

Method
Data was collected from all EPS2 dispensing tokens received from a pharmacy in Kent within a 28 day period in November 2013. All information from the dispensing tokens (apart from patient identifiable details) were entered to Microsoft Spreadsheet database. Ethical approval was granted by Medway School of Pharmacy (MSoP). NHS Research Ethics approval was not required as there was no contact with patients and no patient identifiable information was collected. The NPSA guide provides recommendations for presentation of labels rather than standards for specific dosage instructions. As a result, a standardised rating tool was generated for rating the dosage instructions depending on whether the instructions contained verb, dosage form, quantity per administration, frequency per administration, or whether they were clear to read. Pharmacy staff gave consent and filled in a questionnaire on the impact on their workload of the EPS2 computer system of having to amend dosage instruction errors.

Results
A total of 145 dispensing tokens with 346 prescription items were surveyed. Solid oral preparations were the most commonly prescribed (85.3%). The majority of dosage instructions that had missing dosage form were 53%, 19% had missing verb, 12% had missing frequency, 10% were written with figures, 3% had missing quantity per administration, 2% had unclear instructions and 1% written with Latin abbreviation. All pharmacy staff found that the EPS2 computer system increased their workload as extra time had to be put to amend the instructions on the labels.

Conclusion
The NPSA guidance provided recommendations on the presentation of labels, rather than specific wordings on instructions. Although the majority of dosage instructions surveyed from EPS2 tokens could produce ‘Acceptable’ dispensing labels, strategies need to be developed to ensure that all instructions are ‘Excellent’. Strategies for reducing the prevalence of prescribing errors should include: making GPs aware of their errors and training them on the best way to enter dosage instructions to the system (such as avoiding the use of Latin abbreviations). Furthermore, the development of a software containing standard dosage instructions would be beneficial before the roll-out of EPS2 to a large geographical area in England.

References
A. An Evaluation of Valganciclovir Prescribing for CMV Prophylaxis in a Single Centre Transplant Population.
Shah, S., Vincent, M (Supervisor), Central Manchester University Hospitals NHS FT, Manchester

Background
Patients undergoing kidney or Simultaneous Pancreas and Kidney (SPK) transplants have a high incidence of cytomegalovirus (CMV) infection in the early months post surgery. With the use of more potent immunosuppressant therapy post-transplant, prophylactic therapy is indicated to prevent early recurrence or de novo CMV infection[1,2]. At the Manchester Royal Infirmary, valganciclovir is prescribed for all ‘at risk’ patients in the first 100 days post-transplant (see table below for definition). Valganciclovir, an oral pro-drug of ganciclovir, produces virustatic activity through inhibition of viral DNA synthesis[3]. Due to the extensive excretion through the kidneys, dosing of valganciclovir must be adjusted to the recipient’s current kidney function[4,5]. Additionally, the variability in kidney function as calculated by the two commonly accepted estimates of GFR (Cockroft & Gault (C-G) and Modification of Diet in Renal Disease (MDRD)) could further complicate valganciclovir prescribing. In the first 100 days post-transplant, unstable kidney function increases the risk of prescribing errors[2,3].

Definition of transplant recipient patients ‘at risk’ of CMV infection post-operatively[1]

<table>
<thead>
<tr>
<th>All renal transplant recipients (high risk)</th>
<th>Alemtuzumab treated SPK patients (high risk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donor CMV Status</td>
<td>Positive</td>
</tr>
<tr>
<td>Recipient CMV Status</td>
<td>Positive</td>
</tr>
<tr>
<td>Positive</td>
<td>Negative</td>
</tr>
</tbody>
</table>

Failure to review valganciclovir dosing on a regular basis with current kidney function could result in sub-therapeutic or supra-therapeutic dosing resulting in CMV infection or drug toxicity. This study was undertaken to assess compliance with local guidelines when dosing valganciclovir post transplantation.

Objective(s)
1. To determine if all ‘high risk’ transplant recipients received the correct dose of valganciclovir in line with the best estimation of their renal function derived from either Cockcroft-Gault or Modification of Diet in Renal Disease (MDRD) formula.
2. To analyse the differences, if any, in prescribed valganciclovir doses with the Cockroft-Gault and MDRD calculations.
3. To determine if all ‘high risk’ transplant recipients received valganciclovir for the correct duration (90-100 days from the date of transplant).
4. To determine the cost implication where an excess valganciclovir tablets were prescribed or dispensed.
5. To analyse the differences, if any, in prescribed valganciclovir doses with the Cockgroft-Gault and MDRD formulas.

Method
A retrospective study looking at all ‘high risk’ CMV transplant recipients at Central Manchester University Hospitals NHS Foundation Trust (CMFT) during April-December 2011 receiving prophylactic valganciclovir. As this was an audit project, ethics approval was not needed.

1. Obtained a list of patients who were prescribed and dispensed CMV prophylaxis and the details of their initial Valganciclovir prescription from the dispensing programme; Ascribe.
2. Hospital data programs (such as Clinical Work Station (CWS) and MediSec), were used to determine renal function, dose changes and patient details.
3. CMV infection post-transplant was defined as positive CMV viraemia or those started on therapeutic valganciclovir during the prophylaxis period. Problems were also seen with therapy is indicated to prevent early recurrence or de novo CMV infection[1,2]. At the Manchester Royal Infirmary, valganciclovir is prescribed for all ‘at risk’ patients in the first 100 days post-transplant (see table below for definition). Valganciclovir, an oral pro-drug of ganciclovir, produces virustatic activity through inhibition of viral DNA synthesis[3]. Due to the extensive excretion through the kidneys, dosing of valganciclovir must be adjusted to the recipient’s current kidney function[4,5]. Additionally, the variability in kidney function as calculated by the two commonly accepted estimates of GFR (Cockroft & Gault (C-G) and Modification of Diet in Renal Disease (MDRD)) could further complicate valganciclovir prescribing. In the first 100 days post-transplant, unstable kidney function increases the risk of prescribing errors[2,3].

<table>
<thead>
<tr>
<th>Objective</th>
<th>Criteria/Standard</th>
<th>Target</th>
<th>Exceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 &amp; 2</td>
<td>The correct dose of valganciclovir will be prescribed according to the best estimation of renal function.</td>
<td>100%</td>
<td>If transplant was incomplete</td>
</tr>
<tr>
<td>3 &amp; 4</td>
<td>The duration of the prophylactic course will be 90-100 days from the date of transplant.</td>
<td>100%</td>
<td>If complications/ADRs developed</td>
</tr>
<tr>
<td>5</td>
<td>High risk renal transplant recipients will remain CMV negative and at risk for CMV disease and formed the population of this study in which 151 prescriptions were prescribed and dispensed. 27.81% (42/151) of prescriptions were not dosed correctly according to either one (Cockroft-Gault or MDRD) of the two formulas for measuring renal function. Only 28.39% (44/151) of prescriptions were dosed correctly according to both C-G and MDRD formulas. The results of this audit show that patients received sub and supra-therapeutic valganciclovir during the prophylaxis period. Problems were also seen with patients receiving shorter courses with no clear indication for early cessation of treatment. Additionally, patients received excessive supply of valganciclovir, placing a further financial burden.</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Results
A total of 102 patients received valganciclovir in this 9 month period from the dispensing records. From this, 52 patients received valganciclovir for prophylaxis of CMV disease and formed the population of this study in which 151 prescriptions were prescribed and dispensed. 27.81% (42/151) of prescriptions were not dosed according to renal function and fell outside of the dosing for both Cockcroft-Gault and MDRD methods of calculation. 32.26% (50/151) of prescriptions where dosed correctly according to only one (Cockroft-Gault or MDRD) of the two formulas for measuring renal function. Only 28.39% (44/151) of prescriptions where dosed correctly according to both C-G and MDRD formulas. The results of this audit show that patients received sub and supra-therapeutic valganciclovir during the prophylaxis period. Problems were also seen with patients receiving shorter courses with no clear indication for early cessation of treatment. Additionally, patients received excessive supply of valganciclovir, placing a further financial burden. CMV viraemia following sub-therapeutic therapy by either formula was not found to be statistically significant.

Discussion/Conclusion
Frequent over dosing of therapy increases the risk of high concentrations of the active metabolite within the plasma and subsequently adverse effects. In contrast, under dosing, increases the risk of CMV viraemia and infection, and may result in the need for treatment therapy of valganciclovir.

Data analysis within this audit shows that finances are being wasted through unnecessary stock use. Recommendations included promoting trusts’ CMV prophylaxis protocol to medical staff to address the issues around sub and supra-therapeutic levels of valganciclovir. Furthermore, this audit provided an opportunity to put forward plans to introduce a pharmacist (now employed) in transplant clinics to monitor valganciclovir use.

Limitations include:
- Single weight obtained at transplant date or during therapy to calculate GFR using C-G as access to weights at various time points during therapy was incomplete.
- IBW not being used for obese patients due to figures for height not fully documented.
- Dosing was assumed accurate for prescriptions written as ‘TMDU’ or those with no instructions ((9.93%) 15/151 prescriptions).
- Post-transplant CMV status was unidentifiable for 3/52 patients ((5.77%).

References
Reference No.: MMC-G44
3. Pham P. Valganciclovir (Valcyte). Infectious Diseases In Clinical Practice. 2011 10(5):281-282
B. Audit of missed doses to patients due to medication supply according to hospital procedures, October 2013

Hollins, N. Chelsea and Westminster Hospital, London

Introduction
This audit reviews the extent of missed doses on the acute admissions unit (AAU) and availability of doses to patients. AAU requires a large amount of medication, both stock (items kept on the ward) and non-stock items (ordered on an individual patient basis). The current system relies on a pharmacy assistant ordering stock according to set levels. This audit compares the accessibility of drugs to the patient against standards, and investigates reasons behind downfall that may compromise safety.

Missed doses have been highlighted in a NSPA alert and this audit targets the recommendations. Finally this audit can determine how an automated cabinet can affect the level of missed doses and in this instance captures pre-implementation data.

Aim and Objectives
To quantitatively review the medication supply to AAU and the impact of missed doses due to supply issues.
- Highlight the extent of missed doses on AAU between 21st - 27th October 2013
- Review causes of the missed doses identified and those specifically due to medication supply.
- Identify if medication supply issues were stock or non-stock related.
- Quantitatively examine the extent of stock request forms fulfilled.
- Highlight the number of reported missed dose incidents in the relevant yearly quarter.

Standards
1. 95% of doses prescribed are given according to Lastword as confirmed by nurses on drug rounds assessed week commencing 21/10/13.
2. 99% of stock medicines are given according to Lastword as confirmed by nurses on drug rounds assessed week commencing 21/10/13.
3. 90% of non-stock medicines are given according to Lastword as confirmed by nurses on drug rounds assessed week commencing 21/10/13.
4. Zero ad-hoc stock items processed by on-call staff or supplied against request sheets for extra stock in the week commencing 21/10/13.
5. Zero stock availability related medicine incidents on AAU reported July-September 2013.

Methodology
Missed doses on three AAU drug rounds were investigated through nurses’ entries into Lastword (electronic prescribing system). The NSPA alert suggested a two hour administration window, hence doses administered beyond this were defined as ‘missed’. Reports from Lastword were generated of doses that doses recorded as ‘missed’ and those not signed for after two hours (unchart) were compiled. Stock and non-stock items were differentiated through the ward stock list. The nurses were interviewed about the circumstances of missed doses and the stock room was checked for missing items. Missed doses weren’t included if they were due to the patient’s clinical situation. IV fluids were not included as they are prescribed at different times.

Missed doses were categorised as being not received within two hours or those due to poor documentation despite timely administration. The number of stock requests sent to pharmacy from AAU was recorded. This process is instigated by nurses upon shortage of stock items. The number of requested lines was recorded, including the items requested in ‘on-call’ hours. The number of incidents on AAU was recorded through the hospital’s reporting system. The error was included if it concerned dose supply or documentation.

Results

<table>
<thead>
<tr>
<th>Standard</th>
<th>Target</th>
<th>Audit result</th>
<th>Result difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>95%</td>
<td>89.5%</td>
<td>5.5%</td>
</tr>
<tr>
<td>2</td>
<td>95%</td>
<td>91.2%</td>
<td>7.8%</td>
</tr>
<tr>
<td>3</td>
<td>90%</td>
<td>85%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Figure 1. Table of results and deviation from standard. Number of patients = 51, doses due = 95.

50% of missed doses were due to poor documentation but were administered within two hours, the remaining 50% were not given within two hours. Reasons for the missed doses were as follows: bank nurses having administered the dose did not have access to the electronic prescribing and so were unable to document the administration (30%), the medication had been given but was not signed for within the two hour timeframe (20%). The item was ordered but not received (10%), dose for the patient prescribed but had not been screened by a pharmacist at ward level (10%).

Stock requests
- 6 stock lines via request sheets and 9 stock lines (plus 9 unclassified) requested in on-call hours.

Medicines incidents
Standard 4: 15 lines supplied, standard not met.

Discussion and Conclusions
None of the standards were met. Firstly the stock items were more efficiently supplied than non-stock item indicating a more efficient stock supply.

Causes can be split into the doses the patient didn’t receive and missed doses due to missing documentation.
- Items were out of stock and only ordered at the end of the drug round, hence exceeding the timeframe.
- A drug had been ordered but not received within the timeframe; this was in on-call hours with limited pharmacy staff.
- Another dose was missed as it had not been screened by a pharmacist (in on-call hours) however guidelines state the dose is able to be administered despite this.

Where true missed doses occurred it was ensured that steps were then taken to provide the dose from pharmacy. Documentation reasons included:
- The nurses due to a high workload had not signed for administration until beyond the two hour critical window.
- Bank nurses could not sign for administration. This could lead to repetition.

The number of stock requests and on-call requests did not meet the standard, but realistically this is hard to achieve in a dynamic patient basis. The medicine incidents reported again did not meet the standard. The timescale was however different to the other standards. In addition, not all errors that are made are reported. Limitations to the audit included nurses being more vigilant due to a pharmacy presence and underreporting of medicine incidents on wards.

Recommendations for improvement include the provision of login ability for Lastword for bank nurses by 31/3/14. Also recommended is the introduction of the automated cabinet on the ward by 31/5/14. Re-audit is also necessary, with completion by 31/12/14.

References
Introduction
Timing to first dose of antibiotics is crucial on Adult Critical Care Unit (ACCU) where the outcome for the patient is determined by the speed of diagnosis and administration of treatment. Sepsis is a common reason for admission in intensive care units and a common complication of a critical care stay. In the UK, the mortality rate from severe sepsis is estimated between 28-50% and accounts for approximately 36,800 deaths annually.
The Surviving Sepsis Campaign recommends that all antibiotics should be administered within the first hour of recognition of severe sepsis. This was supported by Kumar et al. (2006) study who established a strong correlation between delay in first dose of antibiotic and in-hospital mortality. The survival rate was 79.9% in those given antibiotics within first hour and for each hour of delay during the subsequent six hours, the chances of survival decreased by 7.6%. Thus, the time of first dose of antibiotics was the strongest predictor of survival. As prompt administration has been shown to improve outcomes in sepsis, ACCU has applied this concept for treatment of all infections. Hence, ACCU guidelines state that first dose of antibiotics should always be given within one hour.

Aim
- To determine the time to first dose of antimicrobial therapy and assess if guidelines are being followed appropriately.

Objectives
- To measure the time taken to administer the first antimicrobial dose from the time prescribed during the two week audit period.
- To determine if the administration of antibiotics are within the recommended timeframe as per ACCU guidelines.

Standard
100% of newly prescribed dose of antibiotics for treatment of infection on ACCU should be administered within one hour.

Exclusion criteria
- Any patient prescribed antibiotic prophylaxis.
- Any patient transferred from other wards or theatres where the first dose was administered prior to admission to ACCU.

Method
The audit was carried out on ACCU at Royal London Hospital from 30/10/2013 to 15/11/2013. Drug charts, medical notes and microbiology sheet were all examined on a daily basis for details of time of prescribing and administration.

Results
The total data was collated from 75 patients and 66 new antibiotics had been prescribed during the audit period. The time of prescribing could not be ascertained in 23 out of 66 new antibiotic prescriptions. Of the 43 new prescriptions assessed, 19 (44%) antibiotic prescriptions met the standard of administering the first dose within one hour of being prescribed and 24 prescriptions (56%) failed to meet the standard (Figure 1). The longest period between prescribing and administering was 7.25 hours.

Discussion
Overall, the audit standard was not met as 44% of antibiotics prescribed for the treatment of infection were administered within the first hour of prescribing. The average time delay in administering the first treatment dose of antibiotics was found to be 1.7 hours which is longer than the guidelines recommend. Thus, antimicrobial awareness and education is needed in order to improve compliance.
The time of prescribing could not be ascertained for 35% of data (n=23), hence it was not possible to determine if these prescriptions met the standard. Drug charts, medical notes and microbiology sheets were found to be poorly documented. This highlighted the issue of poor communication. The ‘STAT’ side of drug chart did not always include time of prescribing and indicated poor adherence to hospital prescribing policy. Delay to first dose was found to be greater in the evenings and at night. All of the antibiotics prescribed were available as stock on the ward.

Recommendations
1. First dose of antimicrobials to be prescribed as ‘STAT’ doses and subsequent doses prescribed on the regular sides to enable the prescriber to specify the time of first dose.
2. Pharmacists to deliver education programmes to raise awareness of the importance of timing to first dose of antibiotics including teaching sessions for new intake of doctors on ACCU.
3. Pharmacists to participate in microbiology ward rounds daily to promote adherence to microbiology documentation, improve communication and expedite supply of non-stock antimicrobials.
4. To re-audit in 6 months to determine if the time delay has reduced after implementing recommendations and to involve the doctors and nurses in audit to increase awareness.

Conclusion
Administration of the first dose of antibiotic within one hour from prescribing is not yet the standard practice on ACCU. The main focus should be on improving communication and documentation through training and education programmes, with pharmacy leadership to drive practice changes. The audit findings were disseminated to the Critical Care Governance team and further presented and discussed with Consultants and senior staff. The recommendations above have all been taken on board and are being implemented.

References

Ethical approval was not required as this was an audit project.
Introduction
Medication errors are a leading cause of harm in healthcare. The National Patient Safety Agency (NPSA) reported 7,070 incidences of medication errors from November 2003 to March 2007, including 2 cases of fatalities and 30 cases that caused severe harm. A major risk in medicines management is the miscommunication and unintended changes to medication. As a number of healthcare professionals are involved in the transfer of a patient, the quality of the handover of information regarding their medication is of great significance. It is vital that when a patient is admitted or discharged from hospital, the transfer of information between care settings is accurate and reliable.

Medicines reconciliation aims to reduce the risk of medication errors occurring at the interfaces of care by obtaining an up-to-date and accurate medication list, compared to the most recently available information.

Aim
To collect data to assess whether accurate printed information about a patient’s discharge medication are received and actioned by the GP practice in a timely manner.

Objectives
To note whether specific long term changes to medication have been identified on the discharge summary or To Take Home (TTH) Prescription.
To quantify the proportion of TTHs that arrive within 14 days of the patient discharge.
To assess whether the TTH received by the GP practice was printed or handwritten.
To assess whether any changes in prescription have been updated in the GP clinical record.
To assess whether the patient had requested a prescription since discharge with updated information from hospital.

Method
Ethics approval was obtained. A standard letter was sent to GP practices in the Pembrokeshire area and to GP surgeries across Wales, to inform them of the purpose of the audit and to request their assistance in the data collection. Pharmacy medical teams were emailed asking to identify 50 TTHs with clearly indicated long term medication changes. Faxed copies of the prescription records were requested from GP surgeries, 14 days after patients were discharge. The prescription records were then compared against the TTHs and information was collated into a spreadsheet for analysis in order to identify whether the standards had been met.

Results
0% of the 50 TTHs collected from Withybush General Hospital (WGH) were printed. 100% of the long term medication changes were noted on the TTHs. 98% of these TTHs arrived at the GP surgery in a timely manner. 28% of prescribing systems were not updated within 14 days after discharge. 56% of patients from WGH requested a repeat prescription within 14 days of discharge. 68% of noted medication changes were updated in primary care. There were a total of 32 discrepancies present on the TTHs collected at WGH. As can be seen in table 1, 47% of the discrepancies concerned medication that was initiated in hospital which was not present on the patients GP records. Of the discrepancies, 22% were related to dose changes and 31% involved medication that was stopped in hospital but restarted in primary care.

Table 1: The types of discrepancies present on medication records at surgeries to which patients were discharged to from WGH.

<table>
<thead>
<tr>
<th>Type of discrepancy</th>
<th>Percentage (n=32)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing item</td>
<td>47%</td>
</tr>
<tr>
<td>Incorrect dose</td>
<td>22%</td>
</tr>
<tr>
<td>Item stopped in hospital and carried on in primary care</td>
<td>31%</td>
</tr>
</tbody>
</table>

A total of 665 TTHs were collected across Wales. Of these, 48% were printed. 98% of medication changes were noted on the TTHs. An average of 91% of TTHs across Wales arrived at the surgeries in a timely manner. 20% of prescribing systems were not updated within 14 days of the patient’s discharge. 61% of patients across Wales requested a repeat prescription within the 14 days of discharge, with an average of 81% of the noted medication changes being updated in primary care.

Discussion
There is a clear problem with the transfer of information at WGH and across Wales when a patient is discharged from hospital to primary care. Hospitals across Wales and the GP surgeries to which patients are discharged did not fulfil all of the audit standards which is putting patients at risk of medication related harm. The main audit standard that was not met by WGH was the TTHs being printed; however, the overall results were similar to the Hospitals in Wales that use only printed TTHs. Even when the GP surgeries did receive a copy of a printed TTH, discrepancies were present on their GP records, suggesting that improvements need to be made in primary care. TTHs needed to be endorsed with the long term changes for the purpose of the audit in order to see whether the changes were followed up in primary care, so it is unclear whether this is generally done in practice. The GP surgeries were informed that audit was being carried out so they may have altered their practice for this reason. There are a number of changes which could be made in both hospital and primary care order to improve the accurate transfer and action of information when patients are discharged.

References
Introduction

Intravenous (IV) infusions are regularly used in hospitals for administration of medicines and fluids that cannot be delivered via the enteral route. Reports of medication errors in paediatric patients showed that errors involving the IV route of prescribing were most common.\(^1\) One study showed that 56% of the errors reported in paediatric patients were related to IV administration, with 16.5% of these errors occurring with total parenteral nutrition (TPN) and IV fluids.\(^2\)

It is important that the prescribing of IV infusions is monitored so as to maintain a high level of clear and accurate prescriptions and improve patient safety amongst paediatric patients. It is also imperative that appropriate monitoring of these patients occurs so that any problems with fluid or electrolyte balance can be identified quickly. Trust guidance recommends that these prescriptions are written in line with the issued guidelines\(^2\) and that regular fluid balance monitoring occurs, along with daily electrolyte monitoring and weight recording\(^3\).

Objectives

The aim of this audit was to determine the quality of prescribing of intravenous fluids and consequent monitoring in paediatric patients.
- To determine whether paediatric prescriptions for intravenous fluids are completed in line with prescribing guidelines.
- To determine whether appropriate electrolyte, fluid balance and weight monitoring is taking place for all paediatric patients prescribed intravenous fluids.
- To review the design of existing intravenous fluid prescriptions and fluid balance charts for paediatric patients.

Standards

- 100% of paediatric prescriptions for intravenous fluids are completed in line with prescribing guidelines.
- 100% of fluid balance charts are completed appropriately for paediatric patients receiving intravenous fluid therapy.
- 100% of paediatric patients receiving intravenous fluid therapy have their electrolytes monitored appropriately.
- 100% of paediatric patients have their weight recorded at initiation of fluid therapy and daily throughout the duration of fluid therapy.

Method

Data collection tools were designed to collect the relevant prescribing information and the monitoring of patients receiving IV infusions. Two pilots were performed on 5 and 13 patients respectively to optimise the data collection tools. Data was collected for five consecutive days on the four paediatric inpatient wards using chart beds, bedside notes and the electronic patient records. Ethics approval was not required due to the nature of this project as an audit.

Results

Over the 5 day period, data was collected for a total of 80 patients, with 177 prescriptions for IV fluids and infusions. This exceeded the target value of 120 prescriptions; therefore the actual amount of data collected should be sufficient to make valid comparisons.

Table 1: A summary of adherence to the prescribing and monitoring standards across paediatric wards.

<table>
<thead>
<tr>
<th>Fluid prescriptions: (n=177 except *) Adherence to standards (%)</th>
<th>Clear and legible</th>
<th>Written generically</th>
<th>No Abbreviations</th>
<th>Start date present</th>
<th>Route stated</th>
<th>Infusion volume</th>
<th>Infusion rate</th>
<th>Prescription rewritten if changed (n=8)*</th>
<th>Signature present</th>
<th>Prescriber name printed</th>
<th>Prescriber beep/contact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>173 (97.74)</td>
<td>141 (79.66)</td>
<td>167 (94.35)</td>
<td>172 (97.18)</td>
<td>158 (89.27)</td>
<td>175 (98.87)</td>
<td>143 (80.79)</td>
<td>1 (12.50)*</td>
<td>174 (98.31)</td>
<td>84 (47.46)</td>
<td>61 (34.46)</td>
</tr>
</tbody>
</table>

| Daily Monitoring: (n=78) Fluid balance Electrolytes Patient Weight | 35 (44.87) | 48 (61.54) | 55 (70.51) |

Discussion

Overall, the results of this audit show that generally the prescribing of IV infusions is of a good quality, but improvements can be made. It can be seen that most prescriptions were written legibly, generically and without abbreviations, with compliance to these standards at a minimum of 79.66%. However, 77.5% of changed prescriptions were not re-written, making it difficult to form a complete audit trail of the prescribing, and leading to potential errors. Documentation of the prescriber’s details also needs improving; almost all prescriptions were signed for, 98.31%, but very few prescriptions actually contained the prescriber’s printed name and contact details, 47.46% and 34.46% respectively. This can make it very difficult for nurses to follow up on any queries they may have with the prescription. However, the prescription charts do not currently prompt prescribers for their name and contact details which may contribute to these omissions. Another omission on current charts includes a lack of space to document the route of infusion on PICU fluid charts. This could lead to misunderstanding over the intended routes and therefore future chart designs must be amended. Patient monitoring should also be improved with only 44.87% of patients having their daily fluid balance monitored; a parameter which can provide a great deal of information on the patient’s current hydration status. The monitoring of weight and electrolytes were better at 70.51% and 61.54% respectively, but ideally these parameters should be monitored routinely for all patients. The limitations of this data are that it was collected over just one week which may not be representative of all times of the year.

Recommendations

- Issue a memo to paediatric staff reiterating the importance of careful prescribing of IV infusions and monitoring – reminding them to use the Trust’s paediatric IV fluid guideline.\(^1\)
- Review the future electronic fluid prescription designs to ensure they allow full compliance with the Trust’s prescribing guideline.\(^2\)
- Re-audit these standards in two years.

References

1. Ross LM, Wallace J, Paton JY; Medication errors in a paediatric teaching hospital in the UK: five years operational experience; Archive of Disease in Childhood; (2000) 83;492-497
3. Cambridge University Hospitals NHS Foundation Trust (May 2011) Intravenous (IV) fluids for previously well children aged one month to 16 years, version 2.
Introduction
The correct disposal of medicinal waste is of great importance to the pharmacy department and the Trust, as incorrect disposal has financial, environmental and health and safety implications. Examples include fines to the department and Trust, and disposal of landfill waste via more expensive routes if waste is inappropriately segregated. The Department of Health sets out the requirement for the segregation of medicinal waste for appropriate disposal.

The aim of this audit is to assess compliance with the Nottingham University Hospitals (NUH) NHS Trust ‘return and disposal of non-controlled medicines’ policy1 amongst wards, clinics, theatres and pharmacy areas at the City Hospital Campus.

Objectives
To audit against the following standards:
- One hundred per cent of staff involved in the supply of medication to patients should know about and be able to locate the NUH waste management policy for non-controlled drugs.
- One hundred per cent of clinical areas should have a visible copy of the NUH cytotoxic poster and NUH disposal of medicines poster.
- One hundred per cent of staff involved in the supply of medication to patients should know where to dispose of different types of medication and should have the correct bins for disposal of medicines available.

Method
Data were collected using a form designed to assess compliance against the above audit standards. Firstly the awareness and location of the NUH ‘return and disposal of non-controlled medicines’ policy, secondly responses to six scenarios regarding disposal of commonly used medication, thirdly the display of the NUH medicines poster and cytotoxic poster and finally the presence of appropriate waste disposal bins in the ward, clinic, theatre or pharmacy area were assessed. Data from 40 wards, 10 clinics and 10 staff in 2 pharmacy areas (6 inpatient dispensary staff and 4 outpatient dispensary staff) were collected between 4th and 7th November 2013. Theatre data were collected from 13 theatres during the period 5th to 28th November 2013 by a pharmacy theatre technician. Staff on wards, clinics and theatres were chosen at random and were involved with administering medication (e.g. band 5 nurses and above). As this was an audit, ethics approval was not required.

Results
Theatre data were excluded for staff knowledge of medicine disposal, as data collection was incorrectly performed by a third party. Results show 79% of staff questioned across all clinical areas were aware of the ‘return and disposal of non-controlled medicines’ policy and 96% of staff knew where to find the policy. The NUH disposal of medicines poster was present in only 26% of areas visited and the cytotoxic poster in 14% of clinical areas. Table 1 shows results for knowledge and availability of disposal routes in the areas visited.

Table 1 Route of disposal correctly chosen (excluding theatres) and available in areas visited

<table>
<thead>
<tr>
<th>Route of disposal</th>
<th>Staff member chose correct route for disposal (%) (n=60)</th>
<th>Areas in which route of disposal was present (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cytotoxic bin*</td>
<td>10</td>
<td>51 (n=53)</td>
</tr>
<tr>
<td>Pharmaceutical waste (liquid)*</td>
<td>20</td>
<td>44 (n=54)</td>
</tr>
<tr>
<td>Non-hand wash sink/tiger stripe bin bag</td>
<td>44</td>
<td>71 (n=48)*</td>
</tr>
<tr>
<td>Pharmaceutical waste (solid)*</td>
<td>51</td>
<td>53 (n=53)</td>
</tr>
<tr>
<td>Pharmacy return box*</td>
<td>84</td>
<td>81 (n=57)</td>
</tr>
<tr>
<td>Sharps bin*</td>
<td>92</td>
<td>95 (n=63)</td>
</tr>
</tbody>
</table>

Route of disposal (a-f above) was assumed correct if chosen for a) opened chloramphenicol eye drops, b) reconstituted amoxicillin solution – part used, c) saline bag, no additives – part used, d) expired inhaler, e) unused ibuprofen tablets dispensed during admission, f) a broken glass gentamicin vial.*data was not collected for presence of non-hand wash sink. For the final column: n=number of areas visited in which route should have been available (i.e. not applicable answers were excluded).

Discussion
Overall the audit standards were not met. An area of good practice was the awareness of sharps disposal, minimising the risk of needle stick injury. In addition, the return of unused medication dispensed during admission to pharmacy is cost-effective. However, many staff also chose to send expired medication to pharmacy via the returns box. This practice will lead to inefficient use of pharmacy staff time, as items will need to be segregated for return or disposal in the dispensary or stores. Only 10% of staff recognised chloramphenicol eye drops as cytotoxic for disposal purposes. The non-hand wash sink was incorrectly chosen to dispose of liquid medication, including chloramphenicol eye drops and antibiotics, which could lead to serious environmental implications. Many staff were unaware of the pharmaceutical waste (liquid) bin and presence of this bin in clinical areas was low (44%).

Limitations of the audit include the lack of theatre data and the design of the data collection form. On reflection, the disposal of medication scenarios were more applicable to wards than other areas. It is likely the data collector subjectively answered the ‘not applicable’ option for presence of bins, as there are no distinct guidelines for the areas visited. In the case of a re-audit, the data collection form could be adapted to improve data collection in these areas.

There is a need for staff education across all areas visited. Recommendations to improve awareness were presented to the NUH Waste Management Committee in April 2014. These included an interactive ‘Medicine Disposal’ learning session, the nomination of a ‘Waste Management Champion’ in clinical areas to provide training and updates. A non-handwash sink poster, designed to encourage proper disposal via this route, was also presented.

References
Introduction
The use of Intravenous (IV) antibiotics in the secondary healthcare setting has obvious benefits in patients who are seriously ill. However, in many patients the use and administration of IV antibiotics increase the risk to the patient of secondary complications such as infected phlebitic lines and hospital acquired bacteraemia\(^1\). Oral alternatives provide a way to reduce the harm of secondary infections and discomfort felt by the use of the IV route, as well as having the benefit of decreasing nursing time required per dose and the chance of the dose being missed/delayed. Oral antibiotics are also much cheaper than their IV counterparts \(^1\). A previous audit into appropriate switching of IV antibiotics to their oral alternatives highlighted areas that could improve adherence to the nursing policy employed by the Trust. We were interested to know if the recommendations would improve adherence.

Aim
The aim of this re-audit was to determine the adherence to the policy by prescribing clinicians at MKHFT after having made an intervention based on the last audit. This ties in with the Trust’s objectives to improve clinical effectiveness, patient care and patient experience.

Objectives
- Review original audit results and carry out an intervention
- Audit against the following standards: all IV antibiotics prescribed should be reviewed within 48 hours, clinical review dates for all IV antibiotics must be clearly documented in the patients medical notes, patients receiving IV antibiotics should be switched to an oral alternative within 48 hours where appropriate.
- Review audit results and suggest interventions to be carried out in future audits in this field.

Method
The audit was undertaken with the help of foundation year one and two doctors. A specially designed questionnaire was implemented to collect data on how adherence to the policy could be improved. Results from the questionnaire showed that junior doctors would be most receptive to an intervention in the form of a ward poster highlighting key resources available to them. Data was collected from 6 wards that had been identified in the previous audit and the highest users of IV antibiotics. Wards not identified as high usage from the previous audit were excluded.

Data collection took place in January 2014; two weeks after the intervention had been placed on each of the wards. A specially designed data collection tool, based on the tool used in the previous audit was used, with minor changes made in response to feedback received during the pilot stage.

Ethical approval was not required.

Results
See table 1. A total of 41 IV antibiotics in 36 individual patients, were prescribed across the 6 wards on the day of data collection. Documentation of review was poor, only 19.5% of antibiotics had been clearly documented as having been reviewed within 48 hours. Documentation of review dates on either the patients drug chart or in the medical notes was still poor, however, this increased following the intervention. 9.8% of the antibiotics had review dates in the patients’ medical notes only of which none were documented as having been reviewed within 48 hours. 26.8% of antibiotics had a review date clearly labelled on both the drug chart and in the medical notes – of these, 54.5% were stated as having been reviewed within 48 hours.

Appropriate switching of IV antibiotics to their oral alternatives within 48 hours was very poor and there was no improvement after the intervention. From the first audit, 6.9% of patients were switched within 48 hours, however, in the second audit no patients were switched although, 41.4% of the antibiotics were suitable to be switched.

Antibiotics were considered as being suitably continued if the antibiotic was being used for an indication of sepsis, or if the patient showed any 2 or more of the following \(^2\): Body temperature <36 or >38°C, Heart rate >90 beats per minute, Respiratory rate >20 breaths per minute, White Blood Cell Count (WBC) >12 or <4 x 10^9/L.

Table 1 Audit and re-audit results

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Initial audit</th>
<th>Second audit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switched from IV to oral therapy within 48 hours</td>
<td>6.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Documentation of review date in drug chart or notes</td>
<td>16.7%</td>
<td>36.6%</td>
</tr>
</tbody>
</table>

Discussion
The audit revealed that only 8 of the 41 antibiotics used were reviewed after 48 hours. There seemed to be a correlation between prompt review of IV antibiotic use and an increase in the amount of antibiotics stopped. IV antibiotics that had a clear review date written in the patient’s notes and drug chart were more likely to be reviewed within 48 hours. This highlights the correlation between clear documentation and prompt IV antibiotic reviews.

The junior doctors noted that the primary barriers to appropriate switching were conflicting clinical decisions made by their senior/supervising doctor and a lack of awareness of IV to oral antibiotic switching guidelines.

The audit had a number of limitations. Firstly the second audit had a smaller sample size, which aimed to only provide a snapshot of IV antibiotic use at the Trust. Secondly, the data was collected over one day only.

The accurate documentation of IV antibiotic reviews and the appropriate switching of them are already part of the adult antimicrobial policy employed by the Trust. However, more emphasis needs to be placed on the prompt review of these medications. This can be achieved through pharmacy taking a more active role in highlighting review dates, as well as improving awareness through education. The role of the pharmacist in IV to oral antibiotic switching and the possibility of pharmacist led reviewing of all IV antibiotics could also be considered.

References
1. Mertz D. Outcomes of early switching from intravenous to oral antibiotics on medical wards, Journal of Antimicrobial Chemotherapy, 2009, 64, p188-200
Introduction
The EQUIP study, a recent study which investigated the accuracy of the prescribing of medication in hospitals by junior doctors, showed that of the 124,260 medications ordered around 8.9% contained errors. [1] The NPSA also released an alert in 2007 which stated the need for pharmacists to be involved in medicines reconciliation as early as possible during the hospital admission and that policies should be in place for staff to follow regarding their well defined roles and responsibilities. [2] Medicines reconciliation is therefore an imperative part of a patient’s journey through a hospital visit and it is important that as many patients, as the workload allows, are seen by a member of the pharmacy team whilst they are staying in the hospital.

Aim
To undertake an audit to assess how medicines reconciliation is being completed and to provide recommendation on how to improve compliance with the Trust’s drug policy.

Objectives
• Audit against the Hull and East Yorkshire Hospitals NHS Trust’s medicines reconciliation policy by assessing patient’s drug cards and using Cayder board software.
• Review audit results and provide recommendations for improvement

Method
To collect data, the NICE medicines reconciliation audit tool [3] was adapted to include relevant criteria being assessed specific to the Trust. Trust wide data was collected from all sites; Hull Royal Infirmary, Castle Hill Hospital and Queens Centre for Oncology and Haematology. The data was collected from 11 wards throughout the Trust, with 10 drug cards chosen at random from each ward. Ethics approval was not required.

Results
Table 1. The data collected compared with the target for each criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Target</th>
<th>Average on pharmacy staffed wards</th>
<th>Average including a non pharmacy staffed ward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of patients reconciled</td>
<td>50%</td>
<td>89%</td>
<td>84%</td>
</tr>
<tr>
<td>Patients seen by a member of the pharmacy team within 24 hours</td>
<td>50% by the end of 2014</td>
<td>36%</td>
<td>34%</td>
</tr>
<tr>
<td>Medicines reconciliation that involved talking to the patient (documented)</td>
<td>100%</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td>‘P’, ‘A’ or ‘N’ circled for each medication*</td>
<td>100%</td>
<td>31%</td>
<td>33%</td>
</tr>
<tr>
<td>‘Medications prior to admission’ entries contained a reason for it not being prescribed or ‘please review’*</td>
<td>100%</td>
<td>54%</td>
<td>49%</td>
</tr>
</tbody>
</table>

NB: SCR – Summary care record * - Trust specific criteria

Discussion
The results regarding the number of patients reconciled on the random sample of drug cards chosen show that 89% of all drug cards seen were reconciled. This figure is above the 50% target for the Trust. A target of 50% of patients being seen by a member of the pharmacy team within 24 hours of admission by 2014 is also set out in the drug policy. The data shown in table 1 shows that 36% of the drug cards randomly selected had been seen by a member of the pharmacy team within 24 hours.

The results from this audit show that a mere 19% of drug cards documented that the patient had been spoken to regarding their medication. This data may not be completely accurate as the pharmacy staff may have spoke to the patient and not documented it. This data also brings to the light the ever-rising number of acute beds taken up by patients suffering from dementia, delirium or acute confusion (16%). As this figure increases, the more difficult medicines reconciliation will become if staff are not adequately trained to deal with patients with dementia appropriately.

Ward 1 often has limited pharmacy support, even though the ward houses acutely ill patients. The data taken from this ward was added to the audit to illustrate how the Trust is successfully achieving some targets on pharmacy staffed wards; however including a ward without pharmacy staff will alter the overall data. The data is included to stress the importance of the need for more pharmacists to cover the wards, which are not currently seeing any pharmacy involvement due to the consequences of not reconciling patients previously stated in this report.

The audit has a number of limitations including mainly completed on wards with regular pharmacy cover, staff leave was not taken into consideration when collecting data, and was also collated on weekdays. The data was not assessed on weekends or school holidays when staffing levels would almost certainly be at a low point.

The results show that as a Trust, the staff are meeting the trust targets of having 50% of patients being reconciled at one time however the data was taken from wards which have a regular pharmacy visit Monday to Friday. The staff may need further training on communicating with patients, especially those with dementia, in order to improve confidence. The Trust’s target of 50% of patients being seen by a member of the pharmacy team within 24 hours, is currently not being met and therefore requires action.

References
I. An audit to show the effectiveness of stage 1: medicines reconciliation at The Royal Wolverhampton NHS Trust.
Ishfaq, S and Askew, J, The Royal Wolverhampton NHS Trust, Wolverhampton

Introduction
In a healthcare environment, it is important to ensure that patients are receiving optimal care. Every time a patient is transferred from one setting to another, it is crucial that reliable information about the patient’s medication is also transferred at the same time. A process called “medications reconciliation” was acknowledged: to help ensure all information about the patient’s medications is being handed over in a correct manner. National patient safety agency reported figures from November 2003 and March 2007 demonstrated the numbers of incidents of medication errors on admission and discharge were 7070 this included 2 fatalities and 30 resulted in severe harm. To have a correct and up-to-date medication history for a patient has several benefits to the patient and the NHS. Medicines reconciliation has shown a reduction in medication errors and adverse drug event from getting the correct patient’s medication information. The Royal Wolverhampton NHS Trust, have a medication reconciliation policy in place. The policy expresses how medicines reconciliation should be undertaken and has been categorised into three individual stages. Stage 1 ‘collecting’, stage 2 ‘checking’ and stage 3 ‘communicating’. All three stages have equal value; however this audit concentrated on stage 1 of medicines reconciliation.

Aim
The aim of this audit was to find out how accurate and reliable stage 1 of the medicines reconciliation process was documented in the acute medical unit (AMU) and the surgical assessment unit (SAU).

Objectives
- The audit was designed against following standards from ‘The medicines reconciliation policy’ at The Royal Wolverhampton NHS Trust;
  - 100% of patients have been clerked within the policies time-frame (24hours)
  - 100% of drug histories have stated the drug names
  - 100% of drug histories have stated a drug dose
  - 100% of drug histories have stated a drug frequency
  - 100% of the drug histories have stated the reference source used
- Review the results of the audit and discuss potential changes.
- Implement the changes discussed and undertake a re-audit.

Method
40 patients were identified in this audit; 20 patients who had been admitted on AMU and 20 patients who had been admitted on SAU. The data collection process took place over two days (7th January-8th January 2014). The data was obtained using the appropriate sections on the admission clerking sheets and was noted down on the collection tool. AMU and SAU both had different admission clerking forums, however the concept of collecting the data was the same.

Results
Table 1 shows the standard sets, percentages achieved by both wards and the P values.

<table>
<thead>
<tr>
<th>Standards</th>
<th>Acute Medical Unit (%)</th>
<th>Surgical Unit (%)</th>
<th>Assessment</th>
<th>P Values*</th>
</tr>
</thead>
<tbody>
<tr>
<td>The admitting doctor or advanced nurse complete the admission sheet within 24 hours(weekday)</td>
<td>100% (n=20)</td>
<td>100% (n=20)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>The patient’s drug names stated</td>
<td>100% (n=20)</td>
<td>90% (n=18)</td>
<td>0.154</td>
<td></td>
</tr>
<tr>
<td>The patient’s drug dose stated</td>
<td>80% (n=16)</td>
<td>55% (n=11)</td>
<td>0.194</td>
<td></td>
</tr>
<tr>
<td>The drug frequency of drugs stated</td>
<td>60% (n=12)</td>
<td>50% (n=10)</td>
<td>0.537</td>
<td></td>
</tr>
<tr>
<td>The source used to identify the patient’s drugs identified and noted</td>
<td>20% (n=4)</td>
<td>0% (n=0)</td>
<td>0.036</td>
<td></td>
</tr>
<tr>
<td>The admitting doctor or advanced nurse signed the drug history</td>
<td>95% (n=19)</td>
<td>100% (n=20)</td>
<td>0.324</td>
<td></td>
</tr>
<tr>
<td>The admitting doctor or advanced nurse dated the medication history?</td>
<td>5% (n=1)</td>
<td>40% (n=8)</td>
<td>0.007</td>
<td></td>
</tr>
</tbody>
</table>

Discussion/ Conclusion
After analysing the results, it can be seen that an equal number of subject charts were collected from both units; this was to make the audit fair and reliable. When comparing the two wards data statistical differences were found in certain areas. This showed the practice for both wards were carried out in a similar manner.

Areas of improvement were identified and new strategies were acknowledged to help improve practice at The Royal Wolverhampton NHS Trust. Improvement areas included; educating doctors the importance of medicines reconciliation and their role within the medication reconciliation process. This could be taught via mandatory training sessions, presentations, posters and emphasised through the ward pharmacists. Other areas of improvement were the redesigning of clerking in sheets by using opinions of healthcare professionals. All aspects in this audits; aims, objectives, standards need to be reviewed and re-audited at a further date, after recommendations have been shared and implemented.

References
Introduction
Venous thromboembolism (VTE) leads to approximately 25,000 preventable deaths in English hospitals each year. In 2013, approximately 160,000 total hip (THR) and knee replacement (TKR) surgeries were performed in England and Wales. As recommended by NICE, Rivaroxaban and Enoxaparin are two of the pharmacological options for the prevention of VTE in adults having elective THR or TKR surgery. They are also respectively the first and second line of choice in Plymouth Hospital NHS Trust Guidelines. Ethics approval was not required as this is an audit project.

Aim
To assess prescribing of the pharmacological prevention of VTE after THR or TKR surgery in Derriford Hospital, Plymouth Hospitals NHS Trust in order to improve current practice and therefore improve patient safety.

Objectives
• To measure the current prescribing against the local guidance
• To analyse the degree to which standards are being met
• To identify the changes needed to be made

Method
Patients were identified based on the following inclusion criteria:
1. Patient has been admitted for solely elective THR or TKR surgery
2. Patient has not been using any anticoagulants
3. Patient is more than 18 years old

Patients who were using any anticoagulants were excluded as their VTE prophylaxis management would be different from the audit criteria. Patients who were younger than 18 years old were excluded as the current guidelines had been established for adults.

A pilot was conducted to assess the data collection template. Then data was collected by reviewing new inpatients medical notes and drug charts on three orthopaedic wards and one private ward on a daily basis for a month.

Results
A total of 70 patients were included and reviewed in this audit. Table 1 on next page shows the compliance percentage of each audit criterion.THR and TKR patients were all prescribed post-operative VTE prophylaxis with appropriate dose and frequency. The non-compliance in Criterion 1 was due to prescribers’ extra cautiousness towards patients’ renal function. In Criterion 2 the majority of non-compliance happened when the surgeries had finished in the afternoon before 6 p.m. however the first doses were given in the morning on the following day. Furthermore, early dosing was also identified in seven TKR cases where the first doses were given within 6 hours post-operatively.

Treatment duration in the THR patients group was the only criterion where 100% standard was achieved. On the other hand, inappropriate duration of treatment was identified in the TKR patients group. The vast majority of those were insufficient durations prescribed for patients who would need extended prophylaxis due to certain risk factors especially obesity.

Table 1 Key Findings

<table>
<thead>
<tr>
<th>Criteria</th>
<th>THR</th>
<th>TKR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criterion 1</td>
<td>For all adults who have had THR or TKR, Rivaroxaban 10mg once daily should be prescribed for the primary prevention of VTE.</td>
<td>92.6%</td>
</tr>
<tr>
<td></td>
<td>Use Enoxaparin 20mg once daily if eGFR &lt; 30 mL/min.</td>
<td></td>
</tr>
<tr>
<td>Criterion 2</td>
<td>All VTE prophylaxis should be started 6-10 hours (Rivaroxaban) or 6-12 hours (Enoxaparin) after surgery.</td>
<td>29.6%</td>
</tr>
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<td></td>
<td>First evening dose to be omitted if surgery finishes after 6 p.m.</td>
<td></td>
</tr>
<tr>
<td>Criterion 3</td>
<td>For all THR patients, VTE prophylaxis should continue for 35 days.</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>For all TKR patients, VTE prophylaxis should continue for 14 days, or continue for 35 days if the patient has the following risk factors:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Previous or family history of VTE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Active cancer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Obesity (BMI &gt; 30kg/m²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Thrombophilia</td>
<td></td>
</tr>
</tbody>
</table>

Discussion
Lack of awareness of the local guidance is the most likely reason for those issues. Additionally, the ambiguous statements of timing in the guidance may also contribute to the high percentage of delayed doses. Therefore, the context of the guidance should be rewritten accordingly in a more concise and straightforward fashion and be evaluated for its practicalities before being published. The associated education programme should be reinforced to raise the awareness among doctors and pharmacists, especially the timing and the certain risk factors that affect treatment duration. Moreover, since it is a general guidance and cannot account for all clinical situations, prescribers should also be encouraged to document their reasons for not following the local guidelines, which will improve the efficiency of communication between various healthcare professionals as well as the value of future audit.

The practice should be re-audited after the changes are implanted for an agreed period in order to assess the influence and identify further improvements needed.

Overlooking information is potentially the main limitation of this audit. The data used in this audit was mostly collected by the author alone, thus the possibility of human error should be considered.

References