Welcome note

Dear Members, Colleagues and Honoured Guests

The UKCPA extends a very warm welcome to you for the 2013 Autumn Symposium, as we return here to the historic and beautiful city of Chester.

If this is your first conference then a special welcome to you, please take advantage of the First Time attendees meeting to help you get the most out of the conference. If you're on your own and don't know anyone, please make yourself known to us and we'll do our best to look after you, however you will find that this is a friendly conference and there are many like-minded pharmacists to meet over the weekend. Those of you who have been before will notice that we have tried to shape the conference for two full days, rather than the traditional two and a half. We thought this timetabling was worth exploring, and so will be particularly interested in what you think about this from your feedback.

We are lucky indeed to have in our midst the new Faculty Board Chair, Professor Kopelman, who will speak at the opening of the conference to give his own perspectives of what the Faculty will mean for pharmacy.

We will also hear about some excellent work that will make clear the effect that clinical pharmacists have on the care of the critically ill, an exemplar project in that it demonstrates how networks of pharmacists can collect data to make plain their impact in a way that has not been done before.

We then break for posters and oral communications, followed by lunch and the exhibition. We are, as always, grateful for the attendance of our exhibitors from a range of pharmaceutical, information and technology industries, their involvement helps to ensure that delegates fees are amongst the lowest available for a residential pharmacy conference.

We then move on to a series of workshops, largely clinically orientated but with other broader based skills to learn from too, such as in leadership and education & training. A high turnout for the workshops is anticipated due to the excellent quality of presenters so please ensure you attend the work sessions you originally booked for. If you wish to change your choice please contact the Conference desk where every effort will be made to accommodate you. If you attend a session that you have not booked for it may mean that you take the place of someone who has, so we make a strong request that you only attend your allocated session.

In the early evening we hold fringe sessions. Particularly relevant this year is a session by Gill Hawksworth on the RPS Faculty.

On Friday night we have the conference dinner, a traditional social highlight in the UKCPA calendar; you will be networked and entertained until late, particularly since by popular demand we have asked Pleural Tap to lay on the music once again.

Saturday begins with keynote lectures in cardiology but in which the broader principles revealed are relevant to all. There is the AGM and UKCPA update, followed by time to visit the exhibition again. After this is another packed program of work sessions before lunch.

Saturday afternoon sees completion of the work sessions and a final opportunity to view the posters and the exhibition. An award winner’s presentation follows before the final keynote and the closing of the conference.

The UKCPA is your Association, please let us know what you thought of the event, what you’d like us to do better, and which topics you’d like to see in future. Thank you for supporting the symposium, we hope that you take the opportunity to learn, share, make new friends and contacts, and in addition, have some fun too.

I look forward to meeting you this weekend.

Mark Borthwick, UKCPA Chair

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**UKCPA Autumn Residential Symposium**  
**Progress in Practice: Leading in Excellence**  
**22 – 23 November 2013, Crowne Plaza, Chester**

### Friday 22<sup>nd</sup> November

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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>09.00</td>
<td>Registration desk opens</td>
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<tr>
<td>09.30</td>
<td>Convene in plenary suite for commencement of symposium</td>
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<td>09.40</td>
<td>Chair’s Introduction</td>
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<tr>
<td>09.55</td>
<td><strong>Symposium Opening</strong></td>
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<tr>
<td></td>
<td><em>Mark Borthwick, UKCPA Chair,</em> opens the symposium focusing on the</td>
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<td></td>
<td>biggest change to education, training and assessment of pharmacists</td>
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<td></td>
<td>the profession has seen and what the RPS Faculty means for</td>
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<td></td>
<td>pharmacy</td>
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<tr>
<td>10.15</td>
<td>**Keynote Lecture: Advancing the role of the Pharmacist - Royal</td>
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<tr>
<td></td>
<td>Pharmaceutical Society Faculty**</td>
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<td></td>
<td>Professor Peter Kopelm, RPS Faculty Board Chair</td>
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<tr>
<td>10.35</td>
<td><strong>UKCPA Critical Care Group Project Update:</strong></td>
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<td></td>
<td><strong>PROTECTED study</strong></td>
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<tr>
<td></td>
<td>*Dr Cathrine McKenzie PhD MRPharmS, Consultant Pharmacist,</td>
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<td></td>
<td>Perioperative Medicine and Critical Care, Guy’s and St. Thomas’</td>
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<td></td>
<td>NHS Foundation Trust**</td>
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<tr>
<td>11.00</td>
<td><strong>First Time Attendees Welcome Meeting/Refreshments</strong></td>
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<tr>
<td>11.30</td>
<td>Oral Communications</td>
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<td>12.45</td>
<td>Lunch and exhibitions</td>
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<tr>
<td>13.45</td>
<td>Work session 1 (concurrent sessions)</td>
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<tr>
<td>15.15</td>
<td>Exhibition and refreshments</td>
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<tr>
<td>15.45</td>
<td>Work session 2 (concurrent sessions)</td>
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<tr>
<td>17.15</td>
<td>Networking, exhibition and First Time Attendees Welcome Meeting</td>
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<td></td>
<td>(for those unable to attend the earlier meeting)</td>
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<tr>
<td>17.30</td>
<td>Fringe/Satellite Meetings:</td>
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<tr>
<td></td>
<td><em>- RPS Faculty Surgery – so you are thinking of joining the Faculty?</em></td>
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<tr>
<td></td>
<td>Dr Gill Hawksworth Senior Lecturer, University of Huddersfield.</td>
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<tr>
<td>19.30</td>
<td>Pre Dinner Drinks</td>
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<tr>
<td>20.00</td>
<td><strong>Symposium Dinner</strong></td>
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#### Saturday 23<sup>rd</sup> November

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<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>07.45</td>
<td>Breakfast Meetings</td>
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<tr>
<td>08.30</td>
<td>Registration desk opens/exhibition viewing</td>
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<tr>
<td>09.00</td>
<td><strong>Keynote Lectures:</strong></td>
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<tr>
<td></td>
<td>Can a cardiac pharmacist prescriber improve the discharge process?</td>
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<tr>
<td></td>
<td>*Michelle Cerrato, Lead Cardiac Pharmacist, University Hospitals</td>
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<tr>
<td></td>
<td>Southampton NHS Foundation Trust**</td>
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<td></td>
<td>Development of an in-patient prescribing role in cardiology – the</td>
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<tr>
<td></td>
<td>highs and lows!</td>
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<tr>
<td></td>
<td>*Joanne Bateman, Lead Cardiology Pharmacist, The Countess of</td>
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<tr>
<td></td>
<td>Chester Hospital NHS Foundation Trust**</td>
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<tr>
<td>09.45</td>
<td><strong>UKCPA AGM/Association Update</strong></td>
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<tr>
<td>10.15</td>
<td>Refreshments and exhibition</td>
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<td>10.45</td>
<td>Work session 3 (concurrent sessions)</td>
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<tr>
<td>12.15</td>
<td><strong>Medical Exhibition/Poster Viewing Session</strong></td>
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<td>Plus Lunch and Refreshments</td>
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<tr>
<td>12.30</td>
<td>Fringe/Satellite Meetings:</td>
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<tr>
<td>14.00</td>
<td>Work session 4 (concurrent sessions)</td>
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<tr>
<td>15.30</td>
<td>Refreshments, final poster and medical exhibition session</td>
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<tr>
<td>15.50</td>
<td>UKCPA 2013 Award Acknowledgements</td>
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<tr>
<td>16.00</td>
<td>UKCPA Education and Training Award 2013 – winner’s presentation</td>
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<tr>
<td>16.20</td>
<td>**Keynote Lecture: Rising to the Challenge: what professional</td>
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<td></td>
<td>recognition means to me</td>
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<tr>
<td></td>
<td>*Nicola Rudall, Senior Lead Clinical Pharmacist for Perioperative</td>
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<tr>
<td></td>
<td>and Critical Care, Newcastle Hospitals NHS Foundation Trust**</td>
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<tr>
<td>16.30</td>
<td>Chair’s Closing Remarks</td>
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<tr>
<td>17.00</td>
<td>Lunch and exhibitions</td>
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<tr>
<td>17.15</td>
<td>Symposium closes</td>
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### Meeting Rooms

- **Friday, 17.30** RPS Faculty Surgery – so you are thinking of joining the Faculty? will be delivered in the **Cornwall Suite**.
- **Saturday, 12.30** Pharmacogenetics and personalising opioid medicines will be delivered in the **Cornwall Suite**.
- All keynote lectures and addresses will be delivered in the main plenary suite: **Charles I**.
- All event rooms are located on the ground floor.
- The medical exhibition (including refreshments and lunch on Friday and Saturday) will take place in: **Edward I**.
- The poster exhibition will take place in the **Chester Suite**.
# Symposium work sessions

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Facilitators</th>
<th>Suite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday 13.45</td>
<td>Dealing with the anticoagulated in-patient</td>
<td>Katherine Stirling &amp; Rebecca Chanda</td>
<td>Roodee</td>
</tr>
<tr>
<td>Friday 15.45</td>
<td>Stroke Prevention in AF</td>
<td>Duncan McRobbie &amp; Nazish Khan</td>
<td>Cornwall</td>
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<tr>
<td>Saturday 10.45</td>
<td>Diabetes treatment individualisation: old and new therapies</td>
<td>Philip Newland-Jones</td>
<td>Cornwall</td>
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<tr>
<td>Saturday 14.00</td>
<td>Recent advances in pain management</td>
<td>Emma Wilson &amp; Roger Knaggs</td>
<td>Cornwall</td>
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This work session line will be delivered in the Roodee Suite

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<thead>
<tr>
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<tbody>
<tr>
<td>Friday 13.45</td>
<td>Surviving Sedation in Ventilation</td>
<td>Cathy McKenzie</td>
<td>Cornwall</td>
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<td></td>
<td>Infusion related adverse events – Can we do better?</td>
<td>Andreas Fischer</td>
<td>Cornwall</td>
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<td></td>
<td>Medications and Enteral Tubes – a practical guide</td>
<td>Jackie Eastwood &amp; Rebecca White</td>
<td>Cornwall</td>
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<td></td>
<td>Introduction to Liver disease – How to manage your patient with chronic liver disease</td>
<td>Sarah Cripps</td>
<td>Cornwall</td>
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This work session line will be delivered in the Cornwall Suite

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<tr>
<th>Time</th>
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<th>Facilitators</th>
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<tbody>
<tr>
<td>Friday 13.45</td>
<td>Leadership for Directorate Pharmacists</td>
<td>Chris Green &amp; Richard Cattell</td>
<td>Christleton</td>
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<td></td>
<td>Challenges in tutoring – is it you or is it me?</td>
<td>Jill McDonald, Elizabeth Mills &amp; Aamer Safdar</td>
<td>Christleton</td>
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<td></td>
<td>Aligning yourself in the organisation</td>
<td>Cathy Mooney &amp; Pippa Roberts</td>
<td>Christleton</td>
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<td></td>
<td>Working with others – managing performance to deliver priorities</td>
<td>John Quinn</td>
<td>Christleton</td>
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This work session line will be delivered in the Christleton Suite

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<th>Time</th>
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<th>Facilitators</th>
<th>Suite</th>
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<tbody>
<tr>
<td>Friday 13.45</td>
<td>Antibiotics - Back to Basics</td>
<td>Adel Sheikh &amp; David Sharpe</td>
<td>Rothesay</td>
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<tr>
<td></td>
<td>Antimicrobial stewardship for the non specialist</td>
<td>Laura Whitney &amp; Jacqueline Sneddon</td>
<td>Rothesay</td>
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<td></td>
<td>Bleep bleep 6pm to 8am – on-call emergencies</td>
<td>Jamie Cheong &amp; Tejal Vaghela</td>
<td>Rothesay</td>
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<td>Portfolio building in Medicines Safety</td>
<td>Jane Nicholls &amp; Surinder Ahuja</td>
<td>Rothesay</td>
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This work session line will be delivered in the Rothesay Suite

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<th>Time</th>
<th>Session</th>
<th>Facilitators</th>
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<tbody>
<tr>
<td>Friday 13.45</td>
<td>Qualitative research methods in pharmacy practice: an interactive session for hospital pharmacists</td>
<td>Antonella Tonna &amp; Ruth Edwards</td>
<td>Malpas</td>
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<td></td>
<td>Enhancing your audits: using quantitative data more effectively</td>
<td>Ian Bates</td>
<td>Malpas</td>
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<td></td>
<td>Information Governance</td>
<td>Jennifer Archer &amp; Gill Hawksworth</td>
<td>Malpas</td>
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<td></td>
<td>Changing Health Behaviour</td>
<td>Jennifer Archer &amp; Gill Hawksworth</td>
<td>Malpas</td>
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This work session line will be delivered in the Malpas Suite

All our symposia work sessions have specific learning outcomes which will enable you to see how your practice will benefit from your attendance. We have also mapped these learning outcomes to the GLF and Advanced Pharmacy Framework (APF) so that you can easily identify the level that the work session is aimed at, and the professional development benefits you can achieve. Attending these work sessions will give you the opportunity to apply the knowledge learnt in order to achieve the competencies outlined in the APF. Don’t forget that you can enter your attendance at work sessions into your CPD or Faculty portfolio.

**Key to delivery level for work sessions, based on the GLF and APF:**

- **F** = General Level, Foundation
- **I** = Advanced Stage I
- **II** = Advanced Stage II
- **M** = Advanced Stage Mastery
<table>
<thead>
<tr>
<th>TITLE AND DESCRIPTION</th>
<th>SPEAKERS</th>
<th>LEARNING OUTCOMES</th>
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</table>
| a) Dealing with the anticoagulated in-patient (F) | Katherine Stirling Consultant Pharmacist, Anticoagulation and Thrombosis, Leeds Teaching Hospital and Rebecca Chanda, Highly Specialist Pharmacist Anticoagulation, Guy's & St Thomas' NHS Foundation Trust | At the end of this session participants will be able to:  
- Describe how to manage the bleeding anticoagulated patient  
- Give guidance on adjusting warfarin doses  
- Discuss options for an anticoagulated patient presenting for emergency surgery  
- Discuss options for the treatment of ACS in the anticoagulated patient  
- Discuss monitoring and bridging of anticoagulation in in-patients (including tests affected by new agents) |
| b) Surviving Sedation in Ventilation (I) | Dr Cathrine McKenzie PhD MRPharmS, Consultant Pharmacist, Perioperative Medicine and Critical Care, Guy’s and St. Thomas’ NHS Foundation Trust | At the end of this session participants will be able to:  
- Name current sedative therapies during ventilation  
- Identify their place in practice  
- Discuss the assessment of the difficult patient |
| c) Leadership for Directorate Pharmacists (I) | Chris Green, Director of Pharmacy and Medicines Management, Countess of Chester NHS Foundation Trust and Richard Cattell, Director of Operations, Dudley Group NHS Foundation Trust | At the end of the session participants will be able to:  
- Identify areas in which they are a leader  
- Define different leadership styles  
- Explain how and when to modify leadership styles |
| d) Antibiotics - Back to Basics (F) | Adel Sheikh, Lead Pharmacist for Antimicrobials and Respiratory, Portsmouth Hospitals NHS Trust and David Sharpe, Antimicrobial Pharmacist, Alder Hey Children’s Foundation Trust | At the end of this session participants will be able to:  
- Describe the four principal groups of pathogenic bacteria  
- Identify the bacteria groups likely to be associated with different sites of infection  
- Define the spectrum of activity of the major antibiotic classes  
- Recommend appropriate antibiotic combinations to cover common infections |
| e) Qualitative research methods in pharmacy practice: an interactive session for hospital pharmacists (I) | Antonella Tonna, Lecturer in Clinical Pharmacy, School of Pharmacy and Life Sciences and Ruth Edwards, Senior Lecturer and MPharm Course Leader, School of Pharmacy and Life Sciences, Robert Gordon University | At the end of this session participants will be able to:  
- Describe the types of research questions that qualitative research can answer  
- Discuss how qualitative research methods can be used in healthcare research  
- Describe the qualitative research process, how to design and conduct a project using these methods and how to ensure the robustness of research conducted |
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<tr>
<th>TITLE AND DESCRIPTION</th>
<th>SPEAKERS</th>
<th>LEARNING OUTCOMES</th>
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</table>
| a) Stroke Prevention in AF (F) | Duncan McRobbie, Lead Cardiac Pharmacist, Guy’s and St. Thomas’ NHS Foundation Trust and Nazish Khan, Principal Pharmacist Cardiac Services, Royal Wolverhampton Hospital | At the end of this session participants will be able to:  
- Calculate a patient’s risk of stroke  
- Determine the balance of stroke and bleeding for individual patients  
- Select an appropriate anticoagulant for a patient with AF |
| b) Infusion related adverse events – can we do better? (II) | Andreas Fischer, Specialist Pharmacist – Critical Care, Royal Brompton & Harefield NHS Foundation Trust | At the end of this session participants will be able to:  
- Describe current initiatives to improve safety of injectable medicines in critical care and within the hospital  
- Appraise evidence behind different strategies to improve safety of injectables; including SMART infusion pumps and electronic prescribing and administration records |
| c) Challenges in tutoring – is it you or is it me? (F/I) | Jill McDonald, Pharmacy E&T Manager, Milton Keynes Hospital NHS Foundation Trust, Dr Elizabeth Mills, Postgraduate Academic Course Manager, University of Keele and Aamer Safdar, Lead Pharmacist for Education & Development, Guy’s and St Thomas’ NHS Foundation Trust | At the end of this session participants will be able to:  
- Describe the warning signs which may suggest trainees are experiencing difficulties  
- List some of the challenges that tutors can face supporting trainees in the workplace  
- Explore some of the challenges in tutoring from the perspective of the tutor and the trainee  
- Use the STAR model to identify approaches to resolving challenges in tutoring |
| d) Antimicrobial stewardship for the non specialist (F) | Laura Whitney, Antimicrobial Pharmacist, St. Georges Hospital, London and Jacqueline Sneddon, Project Lead for Scottish Antimicrobial Prescribing Group, Glasgow | At the end of this session participants will be able to:  
- Describe the key elements of an antimicrobial stewardship programme  
- Discuss why antimicrobial resistance and HAI are currently a priority within healthcare and why an effective antimicrobial stewardship programme is required  
- Describe the role of an antimicrobial pharmacist and how all pharmacists can contribute to antimicrobial stewardship within their own area of practice |
| e) Enhancing your audits: using quantitative data more effectively (F) | Professor Ian Bates, FRPharmS, FRSPH, FRSS, Head of Education Development, UCL School of Pharmacy, London | At the end of this session participants will be able to:  
- Map data types to their audit aims  
- Design better data capture spreadsheets  
- Generate better tables and displays for their audit data  
- Use measures of association to enhance their audit conclusions |
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<tr>
<th>TITLE AND DESCRIPTION</th>
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<th>LEARNING OUTCOMES</th>
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| a) Diabetes treatment individualisation: old and new therapies (F) | Philip Newland-Jones, Advanced Specialist Pharmacist for Diabetes and Endocrinology, Specialist Medicine, University Hospitals Southampton NHS Foundation Trust | At the end of this session participants will be able to:  
• Identify the lifestyle and economic factors that play a part in treatment choices for diabetes management  
• List the new therapies for diabetes and describe their action, common side effects, cautions and contraindications  
• Illustrate the pharmacy input necessary for delivery of a pharmaceutical service to diabetic patients in a hospital setting  
• Safely advise on initiation or adjustments of medication where appropriate in the inpatient setting  
• Describe the risks involved with insulin use in a hospital setting, including the use of concentrated insulins |
| b) Medications and Enteral Tubes – a practical guide (I) | Jackie Eastwood, Pharmacy Manager, St Mark’s Hospital, London and Rebecca White, Consultant Pharmacist: Nutrition & Intestinal Failure, Oxford University Hospitals NHS Trust | At the end of this session participants will be able to:  
• List the common types of tube and where in the GI tract they are placed  
• List the terminology around enteral tubes  
• Advise on how to care for an enteral tube that is used for medication  
• Discuss the practicalities and limitations of administering medication down enteral tubes  
• Advise on changes to medication and appropriate safe administration |
| c) Personal development for Directorate Pharmacists: Aligning yourself in the organisation (I/II) | Catherine Mooney, Director of Governance and Corporate Affairs, Chelsea & Westminster Hospital NHS Foundation Trust and Pippa Roberts, Director of Pharmacy and Medicines Management, Wirral University Teaching Hospital NHS Foundation Trust | At the end of the session participants will be able to:  
• Explain why knowing about corporate priorities is important  
• Define key corporate priorities  
• Identify what this means for pharmacy services |
| d) Bleep bleep 6pm to 8am – on call emergencies (F) | Jamie Cheong, Specialist Pharmacist, Antimicrobial, Royal Brompton & Harefield NHS Foundation Trust and Tejal Vaghela, Team leader Pharmacist-Antimicrobials, West Hertfordshire Hospitals NHS Trust | At the end of this session participants will be able to:  
• Identify signs and symptoms of severe infections  
• Discuss antimicrobial therapy for acutely ill patients  
• Recommend first line treatment for severe infections |
| e) Information Governance (F) | Jennifer Archer, Managing Director, Jennifer Archer Consulting Ltd and Dr Gill Hawksworth Senior Lecturer, University of Huddersfield | At the end of this session participants will be able to:  
• State the difference between information governance and clinical governance  
• Discuss the responsibility individuals have to ensure effective information governance  
• Identify the consequences of not fulfilling the requirements for information governance |
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<th>TITLE AND DESCRIPTION</th>
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<tr>
<td>a) Recent advances in pain management (I)</td>
<td>Emma Wilson, Surgical Lead Pharmacist, Aintree University Hospitals NHS</td>
<td>At the end of this session participants will be able to:</td>
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<td>The aim of this session is to review the treatment of neuropathic pain with particular</td>
<td>Foundation Trust and Roger Knaggs, Associate Professor in Clinical</td>
<td>• Describe the changes to the recommendations in the 2013 updated NICE guidelines in comparison to those published in 2010</td>
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<td>emphasis on the updated NICE guidance 2013</td>
<td>Pharmacy Practice, School of Pharmacy, University of Nottingham/Advanced</td>
<td>• Identify and then explain differences between local policies and practice and NICE guidance for the management of neuropathic pain</td>
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<td></td>
<td>Pharmacy Practitioner – Pain Management, Nottingham University Hospitals</td>
<td>• Discuss pharmacological and non pharmacological treatments for the management of neuropathic pain</td>
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<td>NHS Trust</td>
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<tr>
<td>b) Introduction to liver disease – How to manage your patient with chronic liver</td>
<td>Sarah Cripps, Gastroenterology Pharmacist, Oxford University Hospitals</td>
<td>At the end of this session participants will be able to:</td>
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<td>disease (F/I)</td>
<td>NHS Trust</td>
<td>• List causes of acute and chronic liver disease</td>
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<td></td>
<td>• Interpret the signs and symptoms of chronic liver disease</td>
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<td>• Discuss the use of drugs in liver disease</td>
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<td>• Discuss the pharmacokinetics and pharmacodynamics of drugs in liver disease</td>
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<td>• Describe current management strategies in a patient with liver disease</td>
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<td>• Construct a pharmaceutical care plan for a patient with liver disease</td>
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<tr>
<td>c) Personal development for Directorate Pharmacists: Working with others – managing</td>
<td>John Quinn, Chief Pharmacist, Buckinghamshire Hospitals NHS Trust</td>
<td>At the end of the session participants will be able to:</td>
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<td>performance to deliver priorities (I)</td>
<td></td>
<td>• List performance management requirements in the evolving NHS</td>
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<td>• Identify ways to empower others</td>
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<td>• Discuss how to hold others to account to deliver service priorities</td>
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<tr>
<td>d) Portfolio building in Medicines Safety (F/I)</td>
<td>Jane Nicholls, Deputy Director, Medicines Use and Safety Division, East</td>
<td>At the end of this session participants will be able to:</td>
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<td>&amp; South East England Specialist Pharmacy Service and Surinder Ahuja,</td>
<td>• Explain why portfolio building is desirable</td>
</tr>
<tr>
<td></td>
<td>Medicines Evaluation Pharmacist, The Rotherham NHS Foundation Trust</td>
<td>• Discuss what is required for the different clusters in the APF in relation to medication safety</td>
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<td>• Develop examples of the sort of evidence in medication safety that could contribute to Advanced Stage I Level of the APF</td>
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<tr>
<td>e) Changing Health Behaviour (F)</td>
<td>Jennifer Archer, Managing Director, Jennifer Archer Consulting Ltd and</td>
<td>At the end of the session participants will be able to:</td>
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<td></td>
<td>Dr Gill Hawksworth Senior Lecturer, University of Huddersfield</td>
<td>• State at least two different health behaviour change models</td>
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<td>• Demonstrate the use of ‘Making Every Contact Count’</td>
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<tr>
<td></td>
<td></td>
<td>• Explain how supporting people in their chosen health behaviour change impacts on health prevention</td>
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Speaker Biographies

Plenary Lecturers (alphabetical)

**Jo Bateman** has been the Lead Cardiology Pharmacist for The Countess of Chester NHS Trust for over 8 years and has been a specialist non-medical prescriber in heart failure and cardiology since 2011. Jo is also the Chair of the Pharmacy Forum for the Cheshire and Merseyside Cardiac and Stroke Network (CMCSN) and has been involved in developing regional guidelines. She is a member of the CMCSN AF Task Group and wrote a comparison of warfarin with the new oral anticoagulants for GPs. Jo was a finalist for the RPS Clinical Pharmacist of the Year 2012 and was awarded the hameln pharmaceuticals Oral Communication Award 2012 at the Autumn UKCPA Conference for her presentation on her prescribing role in heart failure in-patients.

**Michelle Cerrato** is an experienced pharmacist currently working as the lead pharmacist for the cardiovascular and thoracic unit in Southampton. Previously she has worked as a specialist for cardiology and respiratory in Portsmouth and also spent time as an Education and Training pharmacist, leading on the development of Portsmouth’s postgraduate clinical diploma. Michelle is presenting how she developed a role for a pharmacist prescriber, after securing funding directly from the chief executive officer for University Hospitals Southampton. The presentation will also highlight how the success of the role was measured and fed back to senior clinicians within the Trust.

**Professor Peter Kopelman** MD FRCP FFPH is Principal of St George’s, University of London. Professor Kopelman studied medicine at St George’s before moving to the London Hospital Medical College in 1980 to become a Lecturer in Medicine. He was appointed senior lecturer and consultant physician in 1986. Professor Kopelman was Vice-Principal, Queen Mary, University of London and Deputy Warden of Barts & The London Medical and Dental School (2001-6) and Dean of the Faculty of Health, University of East Anglia (2006-8) before returning to St George’s in 2008. Professor Kopelman plays a prominent role in the National Health Service and higher education policy in the UK. He is a member of Medical Education England Board (MEE), the Governance Board of the Centre for Workforce Intelligence, deputy chair of University UK’s health education research policy group and a member of the Higher Education Funding Council for England Research and Innovation Strategy Committee. He is Chair of University and Colleges Employer Association Clinical Academic Staff Advisory Group, Chair of London Medicine Group and Deputy Chair of London Higher. He has been closely involved in undergraduate and postgraduate medical education and chaired the Clinical Examining Board of the Federation of Royal Colleges of Physicians (UK) and the NHIR Academic Careers Panel. He is a member of the Board of Trustees of the University of London. Professor Kopelman has a long-standing interest in diabetes care, nutrition and obesity with a major research interest in obesity. He was a member of the UK Department of Health and Food Standards Agency Scientific Advisory Committee on Nutrition (2001-10), DH Expert Panel on Obesity (2008-10) and was Science Advisor to the Office of Science and Innovations Foresight Obesity Project. He has chaired a number of Working Parties on obesity and nutrition for the Royal College of Physicians of London. He is past President of European Association for the Study of Obesity; additionally he is a member of national and international committees on nutrition and academic affairs.

**Dr Catherine McKenzie** is a consultant pharmacist in critical care and perioperative medicine at Guy’s and St. Thomas NHS Foundation Trust which is part of Kings Health Partners, one of five academic health science centres in the UK. She is an active member of the UKCPA Critical Care Group and has been chair in the past. She is first and foremost a clinical pharmacist and is regularly referred challenging therapeutic dilemma by her fellow medical consultants.

Cathrine’s research interests are focused round safe and effective drug use in critical illness. Cathrine has over 30 peer-reviewed abstracts and publications. She has been awarded over £100k in research grants over that last 12 months and is a regular reviewer for many of the leading critical care journals, including Critical Care Medicine and Critical Care Forum. She is an investigator on several studies including pharmacokinetics of simvastatin in intensive care. Cathrine has been the Lead Cardiology Pharmacist for The Countess of Chester from 2011. Jo is also the Chair of the Pharmacy Forum for the Cheshire and Merseyside Cardiac and Stroke Network (CMCSN) and has been involved in developing regional guidelines. She is a member of the CMCSN AF Task Group and wrote a comparison of warfarin with the new oral anticoagulants for GPs. Jo was a finalist for the RPS Clinical Pharmacist of the Year 2012 and was awarded the hameln pharmaceuticals Oral Communication Award 2012 at the Autumn UKCPA Conference for her presentation on her prescribing role in heart failure in-patients.

**Nicola Rudall** graduated from Bath in 1999, moving to Oxford for her pre-registration year. Following a three year residency in Derby she went travelling, which included working as a pharmacist in Kolkata. On her return she spent four years in a critical care post at Gateshead, during which time she joined the UKCPA Expert Practice Steering group. In 2008, she moved to Newcastle upon Tyne to cover Perioperative and Critical Care, additionally now including Cardiothoracic Services. Having been an Advanced Practitioner assesssee on the pilot day, she repeated the exercise on the first official day, to act as comparator, and has since been involved on the assessment side.

Work session speakers (alphabetical)

**Surinder Ahuja** is the formulary and governance pharmacist at The Rotherham NHS Foundation Trust. Originally trained as an analytical chemist, work in a hospital clinical chemistry laboratory introduced her to the world of medicines, patients and their management. Retraining as a pharmacist provided extensive experience of clinical pharmacy before taking up the current post. She is involved with quality improvement initiatives: audits on high risk medicines; monitoring prescribing and dispensing errors; developing clinical guidelines; timely feedback through safety briefings to Pharmacy and through study days and weekly meetings to doctors.

**Jennifer Archer** is Managing Director of Jennifer Archer Consulting Ltd., a bespoke consultancy with a learning, education and research focus providing services, including project management, to a broad client base including Universities, NHS and Public Health organisations (Local Authorities, LETBs and prisons) and other health related organisations and businesses including community and voluntary sectors, both nationally and internationally. Jennifer has expertise in the complete range of learning and development techniques as well as specialist skills in the areas of Continuing Professional Development, facilitation and accreditation, for which she has received several well recognised awards.
Ian Bates holds the Chair of Pharmacy Education at the UCL School of Pharmacy and is Head of Educational Development. He is seconded to the National Health Service (NHS) in London, as academic lead across the university teaching hospitals. Professor Bates is the Director of Education Development for the International Pharmaceutical Federation (FIP), leading an international team appointed by FIP working in partnership with WHO and UNESCO; additionally he is Editor-in-Chief of Pharmacy Education, an international peer review research journal hosted by FIP. He is a Fellow of the Royal Pharmaceutical Society, a Fellow of the Royal Statistical Society, a Fellow of the Royal Society for Public Health, and a Trustee for the European Pharmaceutical Students’ Association. He is a Programme Director for the Joint Programmes Board, providing foundation training and workplace education for practitioner development for NHS pharmacists; additionally, as a founder member of CoDEG, provides advice on workplace education for many domestic and international institutions and agencies. Professor Bates is the Coordinator for the FIP-UNESCO Global UNITWIN Network for Education, a transnational network spanning over 16 countries worldwide. He is the independent Expert Advisor for the Royal Pharmaceutical Society on educational policy and workforce development and the nominated representative for Health Education England (a statutory executive agency) and the associated Professional Advisory board. He was honoured to be made a Fellow of the International Pharmaceutical Federation (FIP) in 2013.

Richard Cattell, Director of Operations, Dudley Group NHS Foundation Trust.
Biography details unavailable at time of print.

Rebecca Chanda is a Highly Specialist Pharmacist Anticoagulation. Having completed a Masters in Clinical Pharmacy in 2008, whilst at the Oxford Radcliffe NHS Trust, Rebecca is now a Specialist Anticoagulation Pharmacist at Guy’s and St Thomas’ NHS Foundation Trust. In her current role, Rebecca works to identify strategies to prevent anticoagulant-related medication errors and to improve processes to enhance safety within this high-risk drug area. As a result of this work, she won the Bayer Schering Pharma Haemostasis, Anticoagulation and Thrombosis Award in 2010. Together with Professor Beverley Hunt, Professor of Thrombosis at Guy’s and St Thomas’ NHS Foundation Trust, Rebecca received second prize in the Thrombus Innovation Award in 2011 for the successful development of an iPhone app containing all GSTT VTE and anticoagulation guidelines, which is now freely downloadable via the iTunes store. In 2013, Rebecca was awarded the VTE ambassador award by the thrombosis charity, Lifeblood, for her work on thrombosis prevention at GSTT.

Jamie Cheong is the Specialist Pharmacist in Antimicrobials at the Royal Brompton & Harefield NHS Foundation Trust. He graduated from the University of Nottingham and then completed her Pre-registration year in community pharmacy. After working as a rotational hospital pharmacist at St Mary’s in London she gained further pharmacy experience in Australia before coming back to the UK to specialise in antimicrobials. In 2007 Jamie completed an MSc in Infection Management for Pharmacists. She has presented “Home delivery to cystic fibrosis patients” and Antifungal Stewardship for Antimicrobial Pharmacists – ‘Antifungal out-patient therapy’. Her other interests involve covering adult and paediatric critical care.

Sarah Cripps graduated from Bath University in 1994. She has worked at the Oxford University Hospitals NHS Trust since qualifying and has experience in a wide range of clinical specialties, pharmacy management and education and training. She has worked in Gastroenterology for the last 14 years and is now working as a consultant pharmacist in this specialty. Sarah is the author of the IBD chapter in Clinical Pharmacy & Therapeutics. Her MSc thesis examined Inflammatory Bowel Disease Patients’ beliefs about their illness & medication and implications for medicines adherence and patient education. Sarah has served on two NICE Guideline Development Groups (Cronh’s Disease and Ulcerative Colitis). She is also a committee member of the UKCPA Gastroenterology and Hepatology Group.

Dr Chris Green is Director of Pharmacy at the Countess of Chester Hospital with key interests in patient safety, automation, continuous improvement and practice research. His career has included spells as a Resident Pharmacist, Medicines Information Pharmacist, Teacher-Practitioner and Clinical Services Manager. He is a Fellow of the RPS, and a longstanding member of the UKCPA/GHP Leadership and Development Group and is a former Chair of the Association. He has written or contributed to fifty research or review articles, presented a number of times at national conferences and is a co-author of “Pharmaceutical Care Made Easy”. He is fortunate enough to enjoy family life, is hopelessly addicted to golf and is the bass guitarist for Pleural Tap.

Dr Ruth Edwards, Senior Lecturer and MPharm Course Leader, Robert Gordon University, School of Pharmacy and Life Sciences. Ruth registered a pharmacist in 1990 and practiced as a community pharmacist before joining RGU as an academic pharmacist in 1999. Since then she completed an MSc Clinical Pharmacy and has been involved in teaching and administration for both undergraduate and postgraduate pharmacy students. Ruth’s main research focus is on pharmacy education and she has just completed a Doctorate of Education exploring pharmacy students’ learning. Ruth has a specific interest and expertise in using qualitative methods in educational research, in researching teaching, learning and assessment and has published qualitative studies on reflective learning, communication and consultation skills.

Andreas Fischer is the Specialist Pharmacist for Adult Critical Care at the Royal Brompton & Harefield NHS Foundation Trust. His clinical interests relate to patients requiring critical care and in particular those with severe cardiac and respiratory failure and including those requiring extra-corporal support. Andreas has recently completed an MSc in Quality and Safety in Health Care. This is underpinned by his major interest in quality improvement and safety. He implemented an electronic prescribing system in critical care, which encompasses over 100 beds in the Trust. Other projects have included the introduction of SMART infusion pumps, automated dispensing cabinets, and an automated system to collect key quality indicators for renal replacement therapy and insulin therapy.

Jackie Eastwood has worked within the field of nutrition since 1997 in a number of hospitals throughout the UK. She is currently the Pharmacy Manager for St Mark’s Hospital, Harrow. She is also the Chair of the British Pharmaceutical Nutrition Group. Her particular interest is in home parenteral nutrition and intestinal failure as well as risk management strategies around the provision of parenteral nutrition, however she teaches on all aspects of nutrition nationally.

Ruth is the Director of Education Development at the UCL School of Pharmacy and is Head of Educational Development. He is seconded to the National Health Service (NHS) in London, as academic lead across the university teaching hospitals. Professor Bates is the Director of Education Development for the International Pharmaceutical Federation (FIP), leading an international team appointed by FIP working in partnership with WHO and UNESCO; additionally he is Editor-in-Chief of Pharmacy Education, an international peer review research journal hosted by FIP. He is a Fellow of the Royal Pharmaceutical Society, a Fellow of the Royal Statistical Society, a Fellow of the Royal Society for Public Health, and a Trustee for the European Pharmaceutical Students’ Association. He is a Programme Director for the Joint Programmes Board, providing foundation training and workplace education for practitioner development for NHS pharmacists; additionally, as a founder member of CoDEG, provides advice on workplace education for many domestic and international institutions and agencies. Professor Bates is the Coordinator for the FIP-UNESCO Global UNITWIN Network for Education, a transnational network spanning over 16 countries worldwide. He is the independent Expert Advisor for the Royal Pharmaceutical Society on educational policy and workforce development and the nominated representative for Health Education England (a statutory executive agency) and the associated Professional Advisory board. He was honoured to be made a Fellow of the International Pharmaceutical Federation (FIP) in 2013.

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Dr Gill Hawksworth MBE, is a past President of the Royal Pharmaceutical Society of Great Britain, a senior lecturer for the undergraduate MPharm degree at the University of Huddersfield and a Fellow of the Higher Education Academy. She is the UKCPA lifetime achievement award winner 2011 and currently chair of the UKCPA community pharmacy group. She has been a Centre for Pharmacy Postgraduate tutor (CPPE) for the last 20 years, a locum community pharmacist and previously an independent pharmacy proprietor for over 20 years. She is the RPS West Yorkshire Local practice forum lead and has had experience of working within public health for a PCT as a clinical lead. She is an appointed member of the Chemistry, pharmacy and standards expert advisory group of the MHRA as well as a member of the RPS pharmaceutical science expert advisory panel. She has published widely in this and other fields of pharmacy practice.

Nazish Khan is Principal Pharmacist for Cardiac Services at the Heart and Lung Centre, The Royal Wolverhampton Hospitals NHS Trust. Nazish, an independent pharmacist prescriber, has extensive experience in the management of cardiac patients. She is a member of the UKCPA Cardiac Committee and faculty member for the Society of Cardiothoracic Surgeons, as well as being responsible for the postgraduate cardiovascular and heart failure modules at Keele University and for the arrhythmias CPPE e-learning module. She has a keen interest in anti-platelet therapies and is currently undertaking research involving the antiplatelet therapies and drug handling particularly during the acute phase of an MI. Nazish has also contributed to work undertaken by NICE around the potential use of a novel therapeutic agent in the management of acute heart failure.

Roger Knaggs. After graduating Roger completed his pre-registration training in the pharmaceutical industry and hospital pharmacy. He originally came to Nottingham to study for a doctorate in opioid pharmacology where his interest in pain management began. For nearly ten years, his main role was to provide a clinical pharmacy service to the Anaesthetics Directorate and the Pain Management Service and also has Trust-wide responsibility for handling and administration of Controlled Drugs, including opioids. In September 2011, he was appointed to a new clinical academic position that provides teaching and research opportunities whilst maintaining regular clinical practice. Roger was instrumental in the development of PAIN (Pharmacist Anaesthesia Interest Network) and is chair of the United Kingdom Clinical Pharmacy Association Pain Management Group. He was co-opted to the Council of The British Pain Society for several years before becoming and elected Council Member in 2011.

Jill McDonald BSc(Hons) MSc MEd MRPharmS, Pharmacy Education & Training Manager, Milton Keynes Hospital NHS Foundation Trust and Pharmacy Training Lead, Health Education Thames Valley. Jill graduated from the University of Sunderland in 1993 and began her career within the NHS. Jill has worked in Milton Keynes since 1998 becoming Pharmacy Fellow of the Higher Education Academy and in 2008 is also a Lead Pharmacist for Anaesthetics and Critical Care. Since 2008 Jill has also held a joint role as Regional Pre-registration Pharmacy Training Lead and since August 2013 as Pharmacy Training Lead for Health Education Thames Valley. Jill’s main areas of interest include pre-registration & post-registration pharmacist training, workplace learning, development of workplace tutors and how to develop professionalism in the pharmacy workforce.

Dr Catherine McKenzie
Please refer to biography under Plenary Lecturers.

Duncan McBirnie registered as a pharmacist in 1984 and received his Masters in Clinical Pharmacy from Brighton University in 1993. He is a Fellow of the Royal Pharmaceutical Society. He is currently Associate Chief Pharmacist – Clinical Services at Guy’s and St Thomas’ NHS Foundation Trust in London. In his specialist area of practice as Lead Cardiovascular Pharmacist, Duncan works to ensure patients with cardiac disease receive optimal pharmacological care. Duncan teaches extensively on coronary heart disease to undergraduates and postgraduates from all professions, and is a reader at Kings College and a visiting professor at UCL School of Pharmacy. He is a past chair of the United Kingdom Clinical Pharmacy Association and immediate past chair of that organisation’s Cardio Pharmacist group. He has represented his profession on various national committees. His research interests include understanding how medicines can best be optimized for patients and designing and evaluating tools to test pharmacists’ competence to undertake current and future roles. He has published widely in this and other fields of pharmacy practice.

Dr Elizabeth Mills is the Postgraduate Team Leader at Keele University, responsible for the development of their Postgraduate Programmes as well as managing the Advanced Practice Programme including the Professional Doctorate. Lizzie’s background was initially in community pharmacy before branching out into education and development. She currently develops the General Level Competency Framework for primary care. Lizzie has experience of supporting students at different levels from undergraduate, to pre-registration and through to postgraduate studies.

Catherine Mooney, Director of Quality Assurance, Chelsea & Westminster Hospital NHS Foundation Trust, was the Chief Pharmacist at St. Mary’s NHS Trust for 15 years, then the Clinical Governance Manager at Hammersmith Hospitals Trust for two years. She was the Director of Governance and Corporate Affairs at Chelsea & Westminster Hospital for seven years, responsible for trust-wide governance, including patient safety, clinical effectiveness, clinical audit, and risk; corporate governance, legal affairs, the Trust’s Quality Account and quality governance. She is now the Director of Quality Assurance, allowing more of a focus on the quality, risk and safety parts of her previous role.

Philip Newland-Jones is an Advanced Specialist Pharmacist Practitioner in Diabetes and Endocrinology and has worked at University Hospitals Southampton NHS Foundation Trust since 2008. He is a current committee member of the UKCPA Diabetes and Endocrinology Group, is chair of the District Prescribing Committee Diabetes Subgroup and is a member of the Diabetes Parliamentarian Think Tank. He is a Director of Diabetes at the South West Region and has taken a lead role in the trust’s patient improvement framework for diabetes with numerous patient safety projects previously undertaken and ongoing. He has a key role with pharmaceutical input into the direction of inpatient diabetes care at University Hospital Southampton and works in a specialist practitioner prescriber role on a day to day basis reviewing in-patients with diabetes issues. His dedication to education ensures the rest of his time is taken up educating doctors, nurses, allied healthcare professionals and students within secondary care, primary care and university settings.
Jane Nicholls, MRPharmS, MSc has a passionate interest in the provision of safe and effective health services to patients. Following many years working in hospital pharmacy services, culminating in the role of chief pharmacist, she is now Deputy Director of a team working across East and South East England to support cross sector initiatives designed to improve medication safety and drive up the quality of services provided to patients by pharmacy teams.

John Quinn, Chief Pharmacist, Buckinghamshire Hospitals NHS Trust Biography details unavailable at time of print.

Pippa Roberts, Director of Pharmacy and Medicines Management Wirral University Teaching Hospital NHS Foundation Trust, has worked as the Director of Pharmacy and Medicines Management at Wirral since August 2005. As well as her pharmacy remit she is involved in a wide range of trust wide issues; business planning, workforce and communication and Trust wide governance. Previous responsibilities at Wirral outside the pharmacy arena include lead the risk management agenda in the Trust including NHSLA, Legal Services, Complaints and PALS. Prior to working at Wirral, Pippa worked as the Director of Governance and Corporate Affairs and the Chief Pharmacist at Chelsea and Westminster Hospital for 18 months and 6 years respectively.

Aamer Safdar, BPharm (Hons), MSC, PGCE(PCET), MA, FHEA, MRPharmS, is the Principal Pharmacist in Education & Development at Guy’s and St Thomas’. He is a Clinical Lecturer at Kings College London and an Honorary Teaching Fellow at the University College London School of Pharmacy as well as a Fellow of the Higher Education Academy.

Aamer’s areas of interest include pre-registration and postgraduate education & training. Aamer is a member of the UKCPA E&T Committee and chair of the Education & Training Committee. Aamer has completed a National Leadership Academy Clinical Leadership Fellowship; one of only three pharmacists to do so.

David Sharpe is the Antimicrobial Pharmacist at Alder Hey Children’s Hospital in Liverpool and has a special interest in Antimicrobial Stewardship and Paediatric Infectious Diseases. He is secretary of the North West Antibiotic Pharmacist Group (NWAPG), and this year joined the UKCPA Infection Management Group (IMG) Committee.

Adel Sheikh is the lead pharmacist for Antimicrobials and Respiratory at Portsmouth Hospitals NHS Trust. He qualified in 2000 after completing his pre-registration year at University Bristol Hospitals Trust. He then worked in Southampton General Hospital for 3 years as a rotational pharmacist before moving to become a Prescribing Support Pharmacist in Southampton PCT. In 2004 he moved to Portsmouth Hospitals into his current role. In 2007 he registered as an independent prescriber. He is also a pre-registration tutor. Adel is a committee member of the UKCPA Infection Management Group, and also supports BSAC as a facilitator during their annual educational workshops. He enjoys playing golf, tennis and watching all kinds of sports.

Dr Jacqueline Sneddon is Project Lead for the Scottish Antimicrobial Prescribing Group (SAPG), a clinical multi-disciplinary forum which leads and co-ordinates the national antimicrobial stewardship programme. Jacqueline holds a Pharmacy degree from Heriot-Watt University, a PhD in Medicinal Chemistry and MSc in Clinical Pharmacy both from the University of Strathclyde. She has worked as a hospital-based pharmacist since 1988 within Aseptic Dispensing and Clinical Pharmacy. In 2003 she became one of the first Antimicrobial Pharmacists in Scotland and after a brief spell in a Clinical Effectiveness role moved to her current post.

Katherine Stirling is a Consultant Pharmacist - anticoagulation and thrombosis at Leeds Teaching Hospitals. She has been in post for 2 years with responsibilities for the VTE CQUIN, implementation of the new oral anticoagulants and strategies around pharmacist prescribing in secondary care in hospitals in Scotland. Katherine’s pharmacy career started in 1995 in Wrexham where she completed her clinical diploma. She moved to Cambridge as a chief resident in 1997. In 1998 Katherine moved to the Wirral and stayed there for 10 years, latterly as their consultant pharmacist for antimicrobials. Katherine moved to Leeds in 2009 initially as a neonatal, obstetric and fertility pharmacist.

Dr Antonella Tonna is currently a Lecturer in Clinical Pharmacy, Robert Gordon University, School of Pharmacy and Life Sciences, Aberdeen, and is involved in teaching both undergraduate and postgraduate pharmacy students. She was previously a hospital pharmacist in Malta for around 10 years and was instrumental in setting up numerous services mainly the ward based clinical pharmacy service in 2002. She moved to the UK and was involved in primary care research in Edinburgh and then worked as a surgical pharmacist in Oxford. Antonella graduated with a BPharm (Hons) from the University of Malta in 1994. She went on to complete a PhD at Robert Gordon University following thesis submission in July 2011. Her main research interest is antimicrobials and strategies that may be employed by the pharmacist to help optimize antimicrobial use. She has conducted exploratory research around pharmacist prescribing in secondary care in hospitals in Scotland. Antonella has a special interest in use of qualitative methods as a way of exploring individual’s views and perceptions in areas where there is limited evidence.

Tejal Vaghela is the Pharmacy Team Leader - Antimicrobials at West Hertfordshire Hospitals NHS Trust, East of England. She is also the pre-registration pharmacist manager and Intravenous Immunoglobulin Lead pharmacist. Tejal manages and runs a RSV immunoprophylaxis pharmacy led Independent prescribing clinic. Tejal has worked in hospital pharmacy for 20 years and has held lead pharmacist position in various specialties including Paediatrics & Neonatal are and Critical Care. Post graduate education includes Diploma in Clinical Pharmacy and Independent Prescribing status. She is a visiting honorary lecturer at University of Hertfordshire. Tejal is a UKCPA Infection Management Group committee member leading on the education portfolio.
Rebecca White is currently consultant pharmacist in nutrition and intestinal failure at Oxford University Hospitals NHS Trust. Rebecca has worked in nutrition support for almost 20 years, with experience in both technical and clinical services. Rebecca has been a non-medical prescriber in nutrition since 2003 and involved with both the BPNG and BAPEN for over 10 years, she is co-editor of the BPNG 'Handbook of drug administration via enteral feeding tubes' and is currently undertaking a PhD evaluating aspects of drug administration via enteral feeding tubes.

Laura Whitney completed her undergraduate training at Nottingham University in 2002 and has since worked in hospital pharmacy in London. Following completion of an MSc in Infection Management for Pharmacists at Imperial College in 2008 she took up the post of Lead Pharmacist for antimicrobials at St Georges Healthcare NHS Trust. Her interests include antibiotic stewardship, clostridium difficile infection and invasive fungal disease.

Emma Wilson, Surgical Lead Pharmacist, University Hospital Aintree NHS Foundation Trust, has been surgical lead pharmacist at UHA since 2006. In this role she takes a particular interest in pain management and is an active member of the Trust in-patient pain team. This involves writing and implementing guidelines with the acute pain team and has recently started to independently prescribe to ensure patients receive effective and timely analgesia. Emma has also completed work for the CPPE, producing the open learning programme and learning at lunch module on pain management. Most recently she has joined the UKCPA Pain Management Group as a committee member. She is currently working on secondment as a medicines information pharmacist.

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Fringe/Satellite meeting speakers

Dr Gill Hawksworth MBE.
Please refer to biography under Work Session Speakers.

Dr Joy Ross, Consultant in Palliative Medicine, The Royal Marsden NHS Trust.
Biography details unavailable at time of print.

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## Oral Communications, Awards and Poster Presentations

### Oral Communications, Friday 22nd November 2013

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<td>The Impact of the Introduction of Electronic Prescribing on the Daily Activities of a Ward Pharmacist - Green CF</td>
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### UKCPA Awards (Poster) Section

The following papers won an award during 2013

| UKCPA/Novartis Antimicrobial Management Award 2013 | Development of an innovative interactive national training programme to improve antimicrobial stewardship knowledge of pre-registration pharmacists - Roberts S, Stewart L, McCormick S, Colligan C, Macartney G, Cockburn A, Gourlay Y, Brailey A, Sneddon J | 21 |

### UKCPA Clinical Research Grant (Poster) Section

The following paper successfully secured UKCPA research funding

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<td>Appropriateness of regular oral morphine or oxycodone prescribing for inpatients</td>
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that these are verified independently.

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BPSA Conference 2013 Winning Posters

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Regional Pre-Registration Pharmacists Winning Audits 2013

| A   | An Audit of Vancomycin Prescribing at Darent Valley Hospital |
| B   | An audit of the storage and availability of naloxone and flumazenil at Nottingham City Hospital (NCH) |
| C   | Missed and delayed doses of Parkinson’s medicines in hospital |
| D   | An audit of omitted or delayed medicines related to medicines supply |
| E   | An audit to determine the extent to which chemotherapy prescribing at the Royal Gwent Hospital complies with the All Wales Dose Banding recommendations |
| F   | Clinical Audit: Are staff at one-stop clozapine-clinics monitoring outpatients for clozapine-induced constipation? |
| G   | Audit of the Nature and Frequency of Prescribing Errors at Milton Keynes Hospital Foundation Trust |
| H   | An audit of the compliance of prescribing and review of biologic therapy for dermatology patients against NICE guidance |
| I   | An evaluation of the potential cost savings by reducing the use of liquid “special” preparations |
| J   | Medication Reviews conducted within GP Practices in Cambridgeshire |
| K   | An audit of Pharmacy-led Medicines Reconciliation (MR) completed throughout a Hospital Trust |
| L   | Adherence to the Antibiotic Policy for Piperacillin and Tazobactam Prescribing at Warwick Hospital |

Disclaimer

The abstracts contained in this handbook have been produced using author-supplied copy. The UKCPA does not accept responsibility for any claims, instructions, methods or drug doses contained in the abstracts. The UKCPA would recommend that these are verified independently.
Background and introduction.
Introducing electronic prescribing (EP) is a complex and challenging programme but it is expected that it will deliver improvements in safety and efficiency. Research has highlighted the changing role of the pharmacist in relation to the introduction of EP, for example, it has been reported that pharmacists spent more time on clinical duties with an EP system in place, compared to pharmacists without access to EP and it has also been suggested that the implementation of EP leaves clinical pharmacists with more time to concentrate on patient-focused care. This study extended a previous piece of work investigating the impact of electronic prescribing and subsequent reliance on computers on the daily activities of a ward pharmacist and in particular whether EP has affected the time that pharmacists spend with patients. The purpose of this was to ascertain whether these observed changes were sustained once EP has been in operation for a longer period of time.

Objectives.
The objectives of the study were to identify differences in time spent directly with patients, using computers and in key clinical pharmacy activities.

Method
Data were collected from adult inpatient medical and surgical wards at the Countess of Chester Hospital using work sampling techniques. 20 hours of data collection were carried out on both medical and surgical wards prior to the roll-out of EP, shortly after the roll out of EP and follow up one year later, giving a total of 120 hours of observations. The researchers carried a pre-programmed pager (Random Reminder, Divilbiss Electronics) that randomly ‘bleeped’ at a pre-set thirty two times an hour. At each bleep the researcher documented the activity of the pharmacist at that time. Ethics approval was sought but deemed unnecessary as this was an observational study.

Results.
The top four activities identified during the study are reported in Table 1, as is the proportion of time spent either primarily using a computer or, with a patient. Each bleep represents 1.88 minutes of activity. Following the introduction of EP, three separate contingency chi-square tests for ‘Surgical’, ‘Medical’ and ‘Overall’ for changes in time ‘Using a computer’ and ‘Spending time with patients’ are all statistically significant (p<0.001) and for all other categories, three separate contingency chi-square tests for ‘Surgical’, ‘Medical’ and ‘Overall’ demonstrate statistically significant changes in pharmacist activity (p<0.001). One year on, increases in time spent using computers and decreases in time spent with patients have been sustained.

Table 1: Breakdown of activities observed during the study reported as number of observations and percentage time.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Surgical Wards</th>
<th>Medical Wards</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinically Checking</td>
<td>126</td>
<td>82</td>
<td>94</td>
</tr>
<tr>
<td>Prescription</td>
<td>19.7%</td>
<td>12.8%</td>
<td>14.7%</td>
</tr>
<tr>
<td>Looking For Drug</td>
<td>48</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Chart / Computer</td>
<td>7.5%</td>
<td>0.2%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Writing Care Plans</td>
<td>77</td>
<td>83</td>
<td>63</td>
</tr>
<tr>
<td>Using Resources</td>
<td>19</td>
<td>35</td>
<td>15</td>
</tr>
<tr>
<td>Other</td>
<td>3.0%</td>
<td>5.5%</td>
<td>2.3%</td>
</tr>
<tr>
<td></td>
<td>57.8%</td>
<td>68.4%</td>
<td>73%</td>
</tr>
<tr>
<td>*Using A Computer</td>
<td>153</td>
<td>332</td>
<td>304</td>
</tr>
<tr>
<td>*Spending Time With Patients</td>
<td>146</td>
<td>84</td>
<td>106</td>
</tr>
<tr>
<td>*Other</td>
<td>22.8%</td>
<td>13.1%</td>
<td>16.6%</td>
</tr>
</tbody>
</table>

*These activities were measured independently of the other activities in the Table.

Discussion and conclusion.
During the baseline data collection phase, it was identified that pharmacists only spend a fifth of their time in contact with patients which fell even further following the introduction of EP and was sustained longer term. This unsurprisingly, corresponds with a sustained increase in the proportion of time pharmacists spend using computers although, of the 25 activities on the observation recording sheet, only 7 (28%) are patient based activities. That this finding contradicts that of previous studies may be because models of clinical pharmacy have changed since the studies were reported in the year 2000. The increases in time spent clinically checking prescriptions are probably due to the nature of the EP system and the need for pharmacists to scroll through a number of screens, particularly to review longer prescriptions on medical wards and look in other screens for example to find missed doses. Similarly, amending allergies in EP is straightforward but time consuming compared to manually endorsing a patient’s understanding of medicines is suboptimal is well described, and as a result compliance is similarly poor. Pharmacists have a key role in medicines optimisation, and we therefore need to ensure that we maximise the proportion of time pharmacists are available to spend with patients discussing and counselling them about their medicines. Once a strategy to address this has been agreed and implemented, this work needs to be repeated to ensure this strategy has been effective.

References.
Introduction

Hypoglycaemia is the most feared complication of insulin therapy, presenting an increasingly important problem for hospital services. One in six inpatients has diabetes and more than half of these are being treated with insulin or an oral agent that may cause hypoglycaemia. Approximately one in four people with diabetes suffers a hypoglycaemic episode during their hospital stay. This has serious consequences as inpatient hypoglycaemia not only increases length of stay but is associated with an increased mortality.

Following the publication of NHS Diabetes “The Hospital Management of Hypoglycaemia in Adults with Diabetes Mellitus” a Pharmacist-led multidisciplinary team developed a new algorithm for the management of hypoglycaemia in adults at Wirral Hospitals. The new guidelines were launched at the same time that hypoglycaemia boxes were introduced into all clinical areas in the Trust. The hypoglycaemia boxes contain oral hypoglycaemic treatments and a copy of the new guidelines fixed to the inside lid. The guidelines were also made available on the Trust intranet, as had the previous guidelines.

The aim of the study was to demonstrate the impact of the new guidelines on nurses’ knowledge of the management of hypoglycaemia over a period of time.

Objective

To assess nurses’ knowledge on treatment of hypoglycaemia before introduction of new guidelines and then at 6 months and 18 months post introduction of the guidelines.

Method:

Fifty nurses on a variety of adult wards were interviewed using a standard pre-piloted questionnaire on the treatment of hypoglycaemia. Ethics approval was not required. The questionnaire was completed prior to the launch of the guidelines (in 2011), then at 6 months (in 2012) and 18 months post launch (in 2013). The same nurses were not questioned during each time period, however the same wards were included.

Results

The response rate was 100%. Table 1 summarises the correct responses given by the 3 cohorts of nurses. 26% of nurses in 2011 incorrectly identified a “hypo” (hypoglycaemic event) as a blood glucose <3mmol/L; this increased to 28% in 2012 and reduced to 16% in 2013. Milk was incorrectly chosen as an option to treat hypoglycaemia by 54% of nurses in 2011, 32% of nurses in 2012 and 30% of nurses in 2013.

In an unconscious patient who was having a hypoglycaemic event 58% of nurses in 2011 correctly identified they would stop an insulin infusion immediately if it was running, this reduced to 42% of nurses in 2012 and then increased to 74% of nurses in 2013. For the same patient scenario 56% of nurses in 2011 stated they would put the patient in the recovery position. This increased to 64% of nurses in 2012 and 70% of nurses in 2013. 86% of nurses in 2011 would also fast bleep a doctor, this increased to 88% in 2012 and 96% in 2013.

Seventy-two percent of nurses identified they were aware of the Trust hypoglycaemia guidelines in 2011, this increased to 92% in 2012 and 94% in 2013. 92% of nurses in 2011 stated they would like more guidance, this reduced to 76% in 2012 and 72% in 2013.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoglycaemia is &lt;4mmol/L</td>
<td>48%</td>
<td>68%</td>
<td>74%</td>
</tr>
<tr>
<td>At least one correct “hypo” treatment and no incorrect treatments stated for use in conscious patient able to swallow</td>
<td>30%</td>
<td>48%</td>
<td>64%</td>
</tr>
<tr>
<td>To re-check blood glucose 10-15mins after “hypo” treatment</td>
<td>54%</td>
<td>70%</td>
<td>68%</td>
</tr>
<tr>
<td>Correctly stated to repeat oral treatment if conscious patient still having “hypo” after 10-15mins</td>
<td>44%</td>
<td>58%</td>
<td>72%</td>
</tr>
<tr>
<td>Identification of Glucogel as initial treatment of “hypo” in conscious patient who is disorientated &amp; refusing to swallow</td>
<td>46%</td>
<td>60%</td>
<td>66%</td>
</tr>
<tr>
<td>Identification of glucagon as initial treatment of “hypo” in conscious patient who is disorientated &amp; refusing to swallow</td>
<td>34%</td>
<td>30%</td>
<td>56%</td>
</tr>
<tr>
<td>Once “hypo” treated number of nurses who would contact diabetes nurse or doctor for patient review.</td>
<td>80%</td>
<td>54%</td>
<td>72%</td>
</tr>
</tbody>
</table>

Discussion

Overall nurses’ knowledge on hypoglycaemia improved following launch of the new guidelines and this improvement increased from 6 months to 18 months after the launch. Nurses’ awareness of the guidelines increased significantly after the launch. This increased awareness could be partly attributed to availability of the guidelines in the hypoglycaemia boxes. Previously guidelines were only available on the intranet and nurses had anecdotally suggested it was difficult to find guidance on the intranet.

Although knowledge improved it is still of concern that in 2013 only 74% of nurses correctly identified a “hypo” as a blood glucose < 4mmol/L. Also of concern is that in 2013 only 72% of nurses identified what treatment to give if the patient was still having a “hypo”.

The endocrinology pharmacist is now working closely with the specialist diabetes nurses on further education of nurses across the Trust. Nurses did state they would like more guidance on management of hypoglycaemia. Following this education programme the audit will be repeated.

There were a number of limitations to this study. Each year the cohort of nurses interviewed differed. Also the study did not take into consideration how long the nurses had worked in the Trust and this may have affected nurses’ familiarity with the guidelines. It was outside of the scope of this study to review if treatment of hypoglycaemic episodes was correctly managed by nursing staff in practice.

Reference

Background

Little published evidence of pharmacist-led prescribing workshops for medical students exists although it has been recommended in a major General Medical Council (GMC)-commissioned report that students spend time with pharmacists during practical placements to gain understanding of the complete prescribing process. A study from the University of Wisconsin has claimed some benefit from pharmacist-led prescribing workshops. The GMC has specified criteria for safe and effective prescribing of drugs by medical graduates. In assessing any prescribing workshop these criteria should therefore be considered.

Aim

To assess the impact of a pharmacist-led workshop on learning by medical students.

Objectives

- Evaluate student performance using a multiple choice questionnaire (MCQ)
- Map MCQ results to four GMC criteria for safe and effective prescribing

Method

A two-hour prescribing workshop was delivered to fifth year medical students on hospital-based placement during the autumns of 2011 and 2012 (four groups each year). Each session was tutored by one of two experienced, practice-based pharmacists who guided participants through three case studies. Participants undertook tasks relating to selection of appropriate therapeutic options (referring to local and national guidelines) and completion of prescribing documentation.

An MCQ comprising seven questions was developed to assess the impact of the workshop on learning; participants completed the same MCQ before and after the session.

The questions (Qs) were linked to four of the GMC prescribing outcomes:

1. Planning appropriate drug therapy – Q5
2. Providing a safe and legal prescription – Q2, Q4, Q6, Q7
3. Calculating appropriate drug doses – Q1
4. Accessing reliable information about medicines – Q3, Q4

Following a pilot with five students, paired responses to individual questions were analysed for all participants (50 in total). A generalised estimating equation (GEE) was applied to assess workshop impact. Q4 related to two outcomes, 2 and 4; this question was included in the overall analysis but not in those of the individual criteria as the components could not be untangled from the combined effect.

Ethical approval was not required as the study was essentially an evaluation of teaching outcomes.

Results

Analysis of pre- and post-MCQ results demonstrated a positive overall impact of the workshop on student learning ($p<0.0001$). This was also true for each outcome (all $p<0.02$). (See Table 1) The odds for a student to answer a question correctly was improved following the session eightfold overall and at least threefold for each outcome. No significance was attributable to the year of participation (OR 1.15; 95% CI 0.67 to 1.97; $p=0.62$).

Table 1: Analysis of pre- to post- paired scores to assess impact of training (using GEE)

<table>
<thead>
<tr>
<th>GMC prescribing outcome</th>
<th>Odds Ratio (OR)</th>
<th>95% Confidence Intervals (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>11.36*</td>
<td>1.48-86.48</td>
</tr>
<tr>
<td>Q2</td>
<td>3.32*</td>
<td>1.70-6.42</td>
</tr>
<tr>
<td>Q3</td>
<td>16.94*</td>
<td>5.31-54.60</td>
</tr>
<tr>
<td>Q4</td>
<td>12.18*</td>
<td>3.94-38.47</td>
</tr>
<tr>
<td>Overall</td>
<td>8.00*</td>
<td>3.32-19.11</td>
</tr>
</tbody>
</table>

Discussion

Two issues should be noted when interpreting this study. Firstly, a degree of caution may be ascribed to the application of only one question to outcome in three instances but this should be offset against the significance of the results. Secondly, the study population was rather small, though it comprised the full student allocation over two sessions at one of 10 practice centres serving a large medical school; the other centres have independently developed their teaching delivery and would therefore be unable currently to fully replicate the study criteria.

The study has demonstrated the effectiveness of the workshop in its impact on learning with reference to specified GMC prescribing outcomes. Its value may have lain in its scenario basis and utilisation of both peer and tutor support. Unlike the Wisconsin study, which included some features of the present model, the presence of a physician as leader was not regarded as crucial to the credibility of the sessions during the study.

Ethical approval was not required as the study was essentially an evaluation of teaching outcomes.

References

Introduction
Administration of antisecretory drugs has been associated with potential adverse events such as contributing to the risk of falls, the development of Campylobacter enteritis, hospital-acquired pneumonia and Clostridium difficile infection. Suppression of gastric acid can increase host susceptibility to Clostridium difficile; therefore it is prudent to avoid proton pump inhibitors (PPIs) or at least minimise their duration. All electronic PPI prescriptions at the Trust include a mandatory indication choice via a drop down list on the Electronic Prescription and Medication Administration (EPMA) system. It is perceived that a substantial number of PPIs are prescribed on admission with the indication ‘PPI prescribed prior to admission with unknown indication’ or ‘Other…please free type indication’, without the indication or duration being clarified.

Objectives
1. To assess the appropriateness and documentation of electronic PPI prescriptions in adults in non critical care areas against the following standards:
   a.) 100% of PPI prescriptions have specific indications (i.e. no prescriptions with unknown indications).
   b.) 100% of PPI prescriptions have appropriate indications in line with Trust guidelines.

Method
The number of patients on each adult ward was collected including the number prescribed antisecretory drugs. Each PPI prescription was assessed for documentation of indication, inclusion in patient’s documented medication history, and whether it was in accordance with Trust guidelines. The review was retrospectively carried out for a total of six weeks on all 35 non critical care adult wards using the EPMA system between October and December 2012. Interpretation of the guidelines was discussed with two senior pharmacists including an author. As this study was deemed to be service evaluation, ethics approval was not needed, in accordance with our institution’s criteria.

Results
Of 675 patients reviewed, 372 (55.1%) had either a PPI or a H2 receptor antagonist (H2RA) prescribed (and five patients had both). There were 327 PPI prescriptions (of either omeprazole or lansoprazole) and 51 H2RA prescriptions (of ranitidine alone). From these prescriptions nine medication histories could not be confirmed and were excluded. One additional PPI prescription was excluded as the clinical notes were not available at the time of data collection to assess its appropriateness. 14 duplicated prescriptions (13 PPIs and one ranitidine EPMA order) were also excluded. Mandatory indication fields are not included on H2RA prescriptions on EPMA, therefore no further analysis was undertaken.

Table 1: The total number of PPI prescriptions and the number of PPIs prescribed in accordance with Trust guidelines.

<table>
<thead>
<tr>
<th>Indications of Proton Pump Inhibitors (as stipulated on EPMA system)</th>
<th>Number of PPI prescriptions</th>
<th>Number of PPI prescriptions prescribed according to Trust guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPI prescribed prior to admission with unknown indication</td>
<td>93 (28.4%)</td>
<td>27 (29.0%)</td>
</tr>
<tr>
<td>Reflux/Heartburn/Reflux oesophagitis</td>
<td>29 (8.9%)</td>
<td>0</td>
</tr>
<tr>
<td>H. Pylori eradication</td>
<td>1 (0.3%)</td>
<td>1 (100%)</td>
</tr>
<tr>
<td>Haematemesis/Melaena</td>
<td>10 (3.0%)</td>
<td>5 (50%)</td>
</tr>
<tr>
<td>Confirmed ulcer (Duodenal/Gastric)</td>
<td>5 (1.5%)</td>
<td>2 (40%)</td>
</tr>
<tr>
<td>Prophylaxis against drug-induced gastroduodenal damage</td>
<td>120 (36.7%)</td>
<td>43 (35.8%)</td>
</tr>
<tr>
<td>Stress-ulcer prophylaxis</td>
<td>41 (12.5%)</td>
<td>5 (12.2%)</td>
</tr>
<tr>
<td>Other...please free type indication</td>
<td>15 (4.6%)</td>
<td>0</td>
</tr>
<tr>
<td>Unknown</td>
<td>13 (4.0%)</td>
<td>4 (30.8%)</td>
</tr>
</tbody>
</table>

| TOTAL | 327 | 87 (26.6%) |

Discussion
Since indications are not mandatory fields on EPMA for H2RA prescriptions, ascertaining their indication and adherence to Trust guidelines were beyond the scope of this review. Introducing a similar list for all H2RAs would support this. The low rate (26.6%) of PPI prescriptions deemed ‘appropriate’ (i.e. their indications were in accordance with Trust guidelines) reflects the perceived general lack of use of the guidelines. Many pharmacists and doctors questioned were unaware of the guidelines or how to locate them. Additionally the guidelines were complicated and not always easily interpreted, which reflects the lack of standardised national recommendations on the use of antisecretory agents in secondary care. Encouraging prescribers to document their rationale for initiating PPIs and H2RAs in clinical notes will allow their use to be evaluated readily. Providing education to prescribers, nurses and pharmacists will facilitate the use of relevant guidelines. Moreover, it was difficult to ascertain the indication or duration of a PPI commenced in the community, which made it difficult to assess their appropriateness on admission.

Collaboration with Clinical Commissioning Groups (CCGs) is needed to ensure clear documentation of their indications and durations, and promote the appropriate use and review of antisecretory agents.

References
Introduction
In June 2010 the National Patient Safety Agency (NPSA) published an alert to address potentially harmful errors in insulin administration. Advice included using insulin syringes for measuring and administering bolus insulin doses, and using the word ‘units’, without abbreviation, to describe doses. Subsequently the Department of Health listed death or severe harm from maladministration of insulin as a ‘Never Event’. In our Trust insulin is prescribed electronically or on condition-specific insulin prescriptions where the word ‘units’ is pre-printed in full. Trust prescription writing standards for handwritten prescriptions specify that the word ‘units’ must not be abbreviated. Insulin syringes are routinely used for measuring individual insulin doses and for preparing insulin infusions. Compliance with NPSA guidance was declared.

In December 2011 an adverse incident report described the inadvertent administration of 60 units of soluble insulin instead of 6 units. The prescription was on a paper drug chart. The word ‘units’ was not abbreviated, but the letter ‘U’ had been read as ‘0’. The 60 unit dose was queried by the nurse preparing the dose but confirmed as correct by a colleague. The patient was not harmed. The incident was investigated as a ‘near-miss Never Event’.

We sought additional barriers to this potentially catastrophic error. An Australian study described the successful implementation of a rule to identify and confirm unusually high insulin doses. This study describes the development and implementation of a similar rule to promote safe use of insulin adapted to our inpatient diabetic population.

Objectives
To determine the range and magnitude of insulin doses prescribed for inpatients
To propose a rule to help practitioners identify incorrect, high insulin doses
To incorporate the rule into clinical practice

Method
All electronic inpatient prescriptions (EPMA) were screened for insulin orders on a single day (3rd February 2012). Prescriptions for regular, once-only and supplementary insulin doses were identified. The insulin name, dose prescribed and time of administration were recorded, collated and analysed by insulin type and dose size. Audit methodology was used. Ethics approval was not required.

Results
Two hundred and twenty-nine prescriptions for 81 patients were identified. One variable dose prescription was excluded. Of the 228 prescriptions analysed 126 were for short-acting insulins, 35 were for pre-mix insulins and 67 were for intermediate or long-acting insulins.

No prescriptions for short-acting insulin were greater than 40 units. Ten prescriptions for 4 patients were for doses greater than 25 units. For pre-mix insulins 5 prescriptions for 3 patients were for doses greater than 40 units, and 3 prescriptions for 2 patients were for doses greater than 50 units. For intermediate and long-acting insulins 3 prescriptions for 3 patients were for doses greater than 40 units and one prescription was for a dose greater than 50 units. (Table 1)

On the basis of these results two rules were proposed: a ‘20/40’ rule and a ‘25/50’ rule to confirm doses of fast-acting insulin greater than 20 or 25 units, and pre-mix and long acting insulins greater than 40 or 50 units. Discussions with medication safety and diabetes teams led to the adoption of a ‘25/50 rule’ for additional confirmation of doses of fast-acting and pre-mix insulins greater than 25 units, and long-acting insulin doses greater than 50 units. Based on the audit population re-confirmation of doses would be required for 9% (21/228) of prescriptions and 15% of patients prescribed insulin (12/81).

Table 1. Insulin doses prescribed by insulin type

<table>
<thead>
<tr>
<th>Dose (units)</th>
<th>Short-acting</th>
<th>Pre-mix</th>
<th>Intermediate/Long-acting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Doses (Patients)</td>
<td>Doses (Patients)</td>
<td>Doses (Patients)</td>
</tr>
<tr>
<td>&lt;= 20</td>
<td>115 (70)</td>
<td>24 (13)</td>
<td>37 (28)</td>
</tr>
<tr>
<td>=&gt; 21</td>
<td>11 (4)</td>
<td>11 (6)</td>
<td>30 (21)</td>
</tr>
<tr>
<td>=&gt; 26</td>
<td>10 (4)*</td>
<td>10 (7)*</td>
<td>16 (14)</td>
</tr>
<tr>
<td>=&gt; 41</td>
<td>0 (0)</td>
<td>5 (3)</td>
<td>3 (3)</td>
</tr>
<tr>
<td>=&gt; 51</td>
<td>0 (0)</td>
<td>3 (2)</td>
<td>1 (1)*</td>
</tr>
</tbody>
</table>

*reconfirmation of doses required under the 25/50 rule

Discussion
Lack of knowledge is a human factor which contributes to medication errors. Although organisational processes to minimise the risk of error were in place, error-producing conditions and a knowledge-based mistake resulted in a potentially fatal error. Active failures are difficult to prevent. Implementation of a rule to alert clinicians to unusually high insulin doses, and incorporation of the rule into EPMA, introduces a barrier to human error. This barrier may be better than knowledge alone but it is still weak as it relies on human action to respond to the alert. Although NPSA guidance specifies the use of insulin syringes for measuring doses there is no guidance regarding insulin syringe size. Having determined that insulin doses greater than 50 units are unusual we challenged the widespread use of 100 unit syringes, which contributed to lack of recognition of a wrong dose error. Audit of insulin syringe sizes identified that 28 of 44 wards stocked only 100 unit syringes. Working with Procurement we standardised insulin syringe sizes across the trust to 50 units introducing a physical barrier to administration of erroneously high doses of insulin. This has been implemented and on-going audit and reinforcement has almost entirely eliminated 100 unit syringes from the trust. Reaudit in January 2013 found 100 unit (1mL) insulin syringes in only one clinical area. Rules for confirming high doses of insulin and restricting insulin syringe sizes were disseminated throughout the trust using alerts and presentations at teaching sessions.

Conclusions
Review of a single no-harm insulin incident, multi-disciplinary working and learning from medication safety initiatives in other countries has enabled us to introduce additional barriers to error beyond the recommendations of the NPSA to further reduce the risk of patient harm from insulin overdose.

References
The need to ensure safe and effective prescribing has been highlighted by several studies including EQUIP, which found a 9% error rate in 125,000 prescriptions written by foundation trainees. Similar results have been reported in general practice. The British Pharmacological Society is currently developing a national Prescribing Skills Assessment for final year medical students. Whilst this is a significant step forward in ensuring that new foundation doctor trainees have the knowledge and skills to safely prescribe, it will not cover the full breadth of competences outlined in the Single Competency Framework for all Prescribers.

In January 2011 a regional survey showed that there were marked differences in both the prescribing training provided and the assessment processes used for Foundation doctors between trusts. As a result, the Foundation School and Chief Pharmacists agreed that a regional assessment should be developed which would be available for use by all trusts. The potential benefits of using the assessment would be:

- A consensus in the expectation of prescribing standards
- Combined expertise of a group of doctors and pharmacists to develop the assessment
- More efficient use of educational supervisor and pharmacist time

### Objectives

- To develop a valid and reliable diagnostic assessment tool
- Identify weak prescribers and target their specific prescribing training needs locally

### Method

A multidisciplinary group was formed in June 2011 to develop a diagnostic assessment tool. Following a pilot on 95 new doctors, the assessment was modified and rolled out in July 2012. A standardisation exercise was undertaken to increase the likelihood of consistency of marking between trusts and an implementation guide was produced. Trusts were asked to plan and feedback on how to support doctors who performed poorly in the assessment. The assessment comprised five scenarios with most questions being answered by completing local drug charts. Candidates were supplied with guidelines where applicable, and had access to the BNF and a calculator. The objectives were to identify prescribers’ ability to:

- Prescribe high risk drugs
- Follow Trust guidelines eg antimicrobial and VTE
- Take into account allergies when prescribing
- Calculate and prescribe intravenous medicines
- Complete drug charts accurately, legibly and safely

Retrospectively the assessment was mapped to dimensions 1 (knowledge) and 4 (safety) of the Single Competency Framework for all Prescribers. As the assessment is for formative purposes a pass mark was not set, however experience from the pilots suggested that a mark of 19/32 (59%) or less would require further targeted prescribing support. For each question it was also noted whether an error was made that could have caused serious harm or death.

Ethics approval was not required as this was considered a service improvement initiative.

### Results

422 F1 doctors from 10 Trusts undertook the assessment. A mark of at least 19/32 was achieved by 74% of candidates, the mean score being 21.1 (range 5-31). The mean score for each trust was between 19 and 23. At least one serious error was made by 38% of candidates. The most common prescribing errors identified are shown in Table 1.

Feedback was obtained from both candidates and Trust prescribing leads. Both groups viewed the assessment positively. The main issue raised by the candidates was insufficient time to complete the assessment (one hour). Several did not complete the opioid question, which explains at least in part, its low score. The problem was compounded for several candidates who revealed that they were dyslexic so should have been allowed more time.

Table 1 – Frequency of prescribing errors in the diagnostic assessment

<table>
<thead>
<tr>
<th>Error</th>
<th>Number of trainees making this error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opioid dosage calculation</td>
<td>42</td>
</tr>
<tr>
<td>Prescribing insulin</td>
<td>27</td>
</tr>
<tr>
<td>VTE assessment and prescribing low molecular weight heparin</td>
<td>18</td>
</tr>
<tr>
<td>Calculating an intravenous dose based on mg/kg</td>
<td>14</td>
</tr>
<tr>
<td>Prescribing for patients with allergies</td>
<td>9</td>
</tr>
</tbody>
</table>

There were differences between trusts in actions were taken to support weaker prescribers. One trust reassessed these trainees following a teaching session, others stratified prescribers to receive increasing levels of individual support.

### Discussion/ Conclusion

The implementation of the prescribing assessment has helped to provide a consistent approach to identify F1 doctors who may require additional prescribing support and therefore reduce risks to patients. The assessment was generally well received by both the trainees and prescribing leads. Of real concern was that over a third of doctors (38%) made at least one error that was judged to have the potential to cause serious harm or death. Additionally the mean score of 21.1 indicates gaps in knowledge or its application in a number of aspects of prescribing. Performance was worst in opioid prescribing. However it must be noted that this was the last question in the assessment and some trainees reported that they had insufficient time to complete the assessment. To address this the order of questions will be changed in future and the time for the assessment extended. This will identify whether the opioid issue is a true one or a weakness of the assessment design. There were some notable differences between results by trust. This may have been due to variation in marking, despite a standardisation exercise being undertaken to reduce this.

It is hoped that the introduction of the Prescribing Skills Assessment (PSA) in the final undergraduate year will improve performance. However, the PSA is an on-line assessment and therefore, unlike the regional assessment, it will be unable to assess some basic skills such as the ability to complete safely a drug chart or write up correctly a patient’s pre-admission medicines. For these reasons the regional assessment is likely to be required to continue, although a redesign may be required for trusts with electronic prescribing.

The assessment has enabled Trusts to make best use of limited resources which can now be targeted to prescribers most in need. Future work will focus on further validation of the assessment tool and evaluating alternative means of providing prescribing remediation and support.

### References


National Prescribing Centre. A single competency framework for all prescribers. May 2012
Introduction
The Association of Scottish Antimicrobial Pharmacists (ASAP) is a national group of pharmacists whose predominant role is antimicrobial stewardship. An education subgroup was set up to formalise peer support and develop educational resources for all Pharmacy staff. Members had been involved in previous education initiatives including a NHS Education Scotland (NES) core course on prudent antimicrobial use in 2009 and local NHS board programmes for a variety of NHS staff. NES approached the group to develop and provide training on antimicrobial stewardship for pre-registration trainees to ensure optimal quality and equitable provision for all 177 students in Scotland. A blended learning approach using a variety of formats was recommended by NES team. Ethical approval was not required.

Objectives
Identify learning objectives, content, format and delivery methods
Develop content through consultation
Deliver training
Evaluate feedback to inform future programme

Methods
Discussion with ASAP members and Education sub-group meeting with NES.
Review of existing resources and adaptation for pre-reg level and group composition (75% community-based). Agreed through consultation with ASAP members.
Regional teams established to deliver sessions to all community and hospital pre-regs.
Scene setting introductory session via interactive live webinar. Session recorded to allow viewing by those unable to join live session.
Use of technology (interactive quiz) and small group teaching using case studies to illustrate key pharmaceutical care issues in management of respiratory tract (RTI) and urinary tract infections (UTI).
Details of evaluation method used by NES. Discussion of pre-reg and trainers feedback at national meeting.

Results
Programme developed to utilise variety of delivery methods accessible to all pre-reg pharmacists in Scotland.
Portfolio of resources developed.
Programme delivery:
• A live webinar session was delivered one week prior to the first regional study day. This provided background information about the threat of antimicrobial resistance, HAI and the antimicrobial stewardship programme in Scotland. The role of the pharmacist in the management of common infections in hospital and primary care was emphasised. The live session was joined by 25 pre-reg pharmacists from across the country and 5 antimicrobial pharmacists affording an opportunity to ‘ask the experts’ about the content of the webinar and any other antibiotic or infection related questions.
• An interactive quiz was constructed covering a broad range of topics including questions from previous exam papers. ASAP members ranked proposed questions in order of importance, categorising each as essential, desirable and optional. The quiz was delivered using audience participation software which allowed the student to choose from four possible answers to each question and “vote” using a key pad. The spread of votes was relayed on screen and the correct answer explained by the presenter. This is similar in format to a popular television quiz familiar to the students.
• The treatment of community-acquired pneumonia was described by two case studies of patients presenting to the community pharmacy and to an Accident & Emergency unit. Details on signs and symptoms, severity assessments, likely pathogens and treatment options were included. The impact of recent travel, penicillin allergy and interacting drugs were covered. Physiological changes resulting in systemic symptoms were used to highlight the response to infection and explain the use of severity assessments.
• The three UTI case studies highlighted the general pharmacokinetic and microbiologic qualities required of an antibiotic to treat UTI, the management of catheter associated UTI complicated by reduced renal function and the treatment of UTI in pregnancy with an additional scenario illustrating the development of multi-drug resistant UTI. A supplementary slide presentation signposted the key reference sources; SIGN, NICE, HPA, and covered UTI treatment in other patient groups (e.g. children and men), along with a discussion on the evidence base and options for prophylaxis.
Evaluation was carried out by NES against the agreed learning objectives with participants asked to score each of the four elements out of 5 for quality, relevance and meeting the stated learning objectives. The collated results from all three areas rated the quality at 91%, the relevance at 94% and meeting the objectives at 92%. Comments on the webinar included “Webinar was useful, microbial sessions were good”, on the quiz “Good fun, bit different, very helpful to learn about different antibiotics” and “Excellent session, really enjoyed that it was interactive and had the chance to test my knowledge.”, on the respiratory cases “Good scenarios, the speakers were really good at sharing information” and on UTI cases “Good for information we don’t always consider in community.”
Active student participation during the small group discussions was variable and required encouragement.
For future sessions, ASAP agreed to review the content and delivery method of each element using the feed back from students and trainers.

Conclusion
Development of this innovative education programme for pre-reg pharmacists has highlighted the benefits of national collaboration and utilisation of technology to deliver high quality interactive training. The portfolio of resources will be refined and utilised in future years. This will ensure that all new pharmacists in Scotland are aware of antimicrobial resistance and HAI, how common infections are managed and most importantly the role that all pharmacists can play in antimicrobial stewardship.

Acknowledgements: Stephen Peddie, Lead Pharmacist Educational Development (NES) for his substantial contribution and work and pharmacist facilitators delivering the sessions.

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. Preparation errors detected and reported after the medication has been released for use, can cause serious patient harm and death. In contrast, near-misses are mistakes detected during the preparation process before the medicine has been released for patient use. Little is known about nature and causes of injectable preparation errors and near-misses occurring within the pharmacy environment.

Objectives
This study aimed to determine risk critical activities in the process of preparing injectable medicines within the pharmacy environment using the proactive risk management technique of Failure Modes and Effects Analysis (FMEA). The objectives of the FMEA were to map the process of preparing injectable medicines; identify risk critical stages, failure modes in the preparation of injectable medicines and strategies for minimising the risk of these failure modes.

Method
A focus group was conducted with pharmacists, pharmacy technicians and pharmaceutical scientists involved in the preparation of injectable medicines within and/or quality assurance. A FMEA was undertaken by the focus group participants to explore the process and risks associated with the preparation of injectable medicines. The focus group recordings were transcribed verbatim and analysed using thematic analysis.

Results
Figure 1 illustrates the process of preparing an injectable preparation within the pharmacy environment as described by the focus group participants. Risk 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. Failure modes identified included: incorrect dosage calculation, selection of the incorrect drug, strength, diluent and final container for the preparation; incorrect final volume; and labelling medication with incorrect patient details, drug details, dosage and administration instructions, warnings, expiry date and storage information. Causes of failure modes were identified as distractions, lack of training, high workload and inadequate staffing. Strategies for minimising the risk of preparation errors included better design of the environment with a quiet workspace for the preparation of worksheets and labels, careful design of pharmacy computer systems to minimise worksheet and labelling errors, ensuring adequate number of staff that are trained and accredited for their roles; and clinical, worksheet, assembly, in-process and product approval checks undertaken by different members of staff.

Figure 1: Process of preparing injectable medicines in the pharmacy environment

<table>
<thead>
<tr>
<th>Receipt of prescription</th>
<th>Technical &amp; clinical check</th>
<th>Preparation of worksheet</th>
<th>Label generation</th>
<th>Accuracy check of worksheet &amp; label</th>
<th>Assembly of medicines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer out of isolator</td>
<td>In-process checks</td>
<td>Preparation of medication</td>
<td>Transfer of materials to isolator</td>
<td>Transfer of materials to clean room</td>
<td>Accuracy check of assembled medicines</td>
</tr>
<tr>
<td>Transfer out of clean room</td>
<td>Product labelling</td>
<td>Product approval</td>
<td>Package</td>
<td>Product release</td>
<td>Delivery to ward/clinic</td>
</tr>
</tbody>
</table>

Discussion
This study adopted a FMEA to systematically identify problems in the process of preparing injectable medicines. Similar to previous research, this study identified that label generation, worksheet preparation, calculation of dosages and selection and use of the incorrect drug and diluent were common errors occurring during the preparation of injectable medicines. The study findings also support previous research that reported staff error, interruptions, workload, staffing levels and process design contributed to the occurrence of preparation errors. However, FMEA does not involve analysis of actual errors that have occurred. Further work is needed to investigate the incidence, types and causes of injectable preparation errors. The research should involve an objective measurement of the incidence of injectable preparation errors within the pharmacy environment and a detailed exploration of the causes of these errors. It is vital that experiences of injectable preparation errors are widely shared and articulated within the profession such that deficiencies in the manufacturing process are identified and risk reduction strategies implemented.

References
Background
Warfarin is classed as a high risk medicine.\textsuperscript{(1)} The National Patient Safety Agency (NPSA) identified the risks associated with anticoagulation and issued a patient safety alert in 2007 highlighting action points to manage these risks and reduce the likelihood of patient harm.\textsuperscript{(2)} This includes annual audit of anticoagulation services to enable local action to improve the safety of anticoagulant use and reduce the risk of patient harm and hospitalisation.

Objectives
- Identify the number of warfarin patients suffering major bleeds.
- Identify the incidence of patients suffering a major bleed within a month of starting warfarin treatment.
- Determine compliance with trust guidelines on reversal of warfarin in patients with major bleeds.

Method
The population was all warfarin patients suffering a major bleed requiring administration of Octaplex over a three month period (01/06/2012 - 31/08/2012). Patients were identified retrospectively using bloodbank’s database of Octaplex issues. Warfarin patients within this sample were identified using medical notes. The data was also collected using patient notes, gaps in the data that could not be found in the notes were completed using the anticoagulation system. Patients requiring warfarin reversal for emergency surgery were excluded. No ethical approval was required for this audit project.

Results
During the period studied there were 741 patients in their first month of treatment and 8664 patients in the service overall. After exclusions there were 24 patients who received Octaplex. (see Table 1).

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Population size</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incidence: Major bleed within first month of therapy</td>
<td>741</td>
<td>1 (0.1%)</td>
</tr>
<tr>
<td>Incidence: Major bleed within first month of therapy with INR above therapeutic range</td>
<td>741</td>
<td>1 (0.1%)</td>
</tr>
<tr>
<td>Total number of major bleeds requiring Octaplex</td>
<td>8664</td>
<td>24 (0.28%)</td>
</tr>
<tr>
<td>Octaplex doses correct relative to patient weight</td>
<td>20*</td>
<td>20 (70%)</td>
</tr>
<tr>
<td>Intravenous Vitamin K 5 - 10mg given with Octaplex</td>
<td>24</td>
<td>18 (72%)</td>
</tr>
</tbody>
</table>

Table 1 Major bleeds requiring Octaplex during study period
* Four patients were excluded as their weight was not documented

Of the 24 patients with a bleed, 11 (46%) had an INR over 5. Six patients were administered non-guideline Octaplex doses, 100% of these were given a dose below the range in the guidelines. Of the six patients given an incorrect dose of Vitamin K, one was given a 20mg dose, four were given a 2mg dose and one patient was given no Vitamin K. This patient required a second administration of Octaplex due to continued bleeding.

Discussion
70% of Octaplex doses were correct relative to the patient's weight. Poor documentation of weight was a common problem. In an acute situation it may not be possible to weigh patients but documentation of the weight estimation used for dosing would be advisable. In one case no vitamin K was given and the patient required a repeat administration of Octaplex. Correction of warfarin-induced anticoagulation with Octaplex only persists for 6-8 hours due to the short half life of clotting factors \textsuperscript{(3)} and there will always be a rebound of the INR if vitamin K is administered in an insufficient dose.\textsuperscript{(4)} It is likely the lack of vitamin K was a significant factor in the need for additional Octaplex in this patient.

Four patients were given 2mg Vitamin K, this may be due to their bleeding being assessed as significant rather than major. For significant bleeding the guidelines recommend reversal with 2mg IV Vitamin K and to only consider Octaplex. It was not possible to judge retrospectively whether the bleeding was considered major or significant. In some patients the individual circumstances and risk factors may require deviation from the guidelines. It may have been decided to intentionally give a reduced Vitamin K or Octaplex dose due to the high risk of fully reversing anticoagulation. However there was no documentation of reasons for dosing outside the guidelines.

One patient suffered a major bleed within the first month of treatment, a good result for the NPSA safety indicator. Although a low percentage of total warfarin patients suffered a major bleed, a large percentage of these were associated with an INR over 5. Unfortunately identification of the cause of high INRs is outside the scope of this audit.

There are several limitations to the findings of this audit including those associated with retrospective data collection due to the reliance on documentation at the time of the event. Patients were identified through Octaplex issues therefore any patients with a major bleed not managed with Octaplex were not included. Additionally the audit only includes patients admitted to Leeds Teaching Hospitals and therefore does not include any patients managed by the Leeds anticoagulant service that had a major bleed whilst out of the area.

Recommendations are to consider development of a specific chart for Octaplex administration or warfarin reversal. Due to the importance of giving vitamin K with Octaplex, the addition of a sticker or other method of notification on Octaplex issues that vitamin K should be given should be considered. When discussing Octaplex usage with the authorising haematologist, prescribers should be reminded to prescribe an appropriate dose of vitamin K and to document reasons for using non-guideline doses. Guideline compliance should be re-audited after implementation of these recommendations. Further audit into the cause behind raised INR’s and into bleeds during the first month of treatment covering a longer time frame are also recommended. These may produce a larger sample size and more data that would enable recommendations to be made to further reduce the incidence of these events.

References
Introduction
Antimicrobial stewardship is part of a multidisciplinary, multifactorial approach to reducing healthcare associated infections (HCAI), notably Clostridium difficile infection (CDI) and in fighting against rising antimicrobial resistance. Year on year, the Department of Health requires Trusts further reduce cases of hospital acquired CDI. In addition, local, national and global concerns are mounting as the numbers of resistant bacteria increase. Following the success of the ‘Saving Lives’ High Impact Intervention care bundle tools used in improving clinical practice, for example in peripheral intravenous cannula care, an antimicrobial version of the tool was introduced to improve antimicrobial prescribing. Parameters of the antimicrobial care bundle were based on audit recommendations in the Department of Health’s guidance, ‘Start Smart then Focus’. Four elements were selected to address prescribing parameters identified as requiring improvements from local point prevalence audits and root cause analysis performed following each case of CDI. Ethics approval was not required for introduction of a care bundle tool.

Objective
To improve antimicrobial stewardship using a care bundle approach self-completed by prescribers at the point of care.

Aims
To improve antimicrobial stewardship as measured by increased compliance with four care bundle parameters:

A) Increasing the percentage of inpatient prescriptions for antimicrobials with:
   1) Documented indication
   2) Documented duration
   3) Appropriate specimen(s) sent for microbiology culture and sensitivity (C&S)
   4) Documented review of therapy at 48-72 hours

B) Increasing the percentage of inpatient prescriptions compliant with all four elements.

Method
The antimicrobial care bundle was launched in September 2012 alongside a campaign to raise awareness of the role of antimicrobial stewardship in avoiding both HCAI and antimicrobial resistance. Clinical Directors were requested to ensure that each ward within their specialty completed the antimicrobial care bundle. During the first week of each month, up to ten prescriptions were assessed on each ward (preferably during a senior clinician ward round). A score was given for each of the four elements and a further score given if all elements were complied with. In accordance with the care bundle methodology, clinical data was not required and compliance was achieved if a data field was not applicable. Data forms were collected and analysed by Infection Prevention audit educators.

Bi-annually pharmacists already complete a Trust wide point prevalence audit of all inpatient antimicrobial prescriptions. The point prevalence audit determines compliance with the antimicrobial formulary, documentation of indication and course length or review date. Results of the point prevalence audit were used to compare with the antimicrobial care bundle. Results were given to each directorate as part of the monthly Infection Prevention Performance Review meetings which are chaired by the Director of Infection Prevention and Control and also by lead clinical pharmacists at their local directorate meetings.

Results
Table 1 Antimicrobial care bundle Review results

<table>
<thead>
<tr>
<th>Month/Year</th>
<th>Percentage compliance (expressed as Trust Average)</th>
<th>Number of wards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indication</td>
<td>Course length</td>
</tr>
<tr>
<td>September 12</td>
<td>80%</td>
<td>65%</td>
</tr>
<tr>
<td>October 12</td>
<td>88%</td>
<td>61%</td>
</tr>
<tr>
<td>November 12</td>
<td>80%</td>
<td>62%</td>
</tr>
<tr>
<td>December 12</td>
<td>77%</td>
<td>70%</td>
</tr>
<tr>
<td>January 13</td>
<td>92%</td>
<td>75%</td>
</tr>
<tr>
<td>February 13</td>
<td>88%</td>
<td>76%</td>
</tr>
<tr>
<td>March 13</td>
<td>88%</td>
<td>83%</td>
</tr>
</tbody>
</table>

Discussion
Implementation of the care bundle has improved antimicrobial stewardship. The percentage of prescriptions compliant will all elements in the care bundle increased from 44% to 66% over the first seven months (table 1). Graph 1 shows improvements in the Trust wide point prevalence audit over the same time period with similar results recorded for documentation of duration of therapy. Documentation of indication improved to a lesser extent, though the baseline level of compliance was higher with almost 80% recorded in February 2012. At the launch of the antimicrobial care bundle the Trust was over trajectory for the number of allowed cases of hospital acquired CDI with poor antimicrobial prescribing, in particular prolonged course length frequently cited as an avoidable cause. At the end of the financial year, the Trust reported fewer cases of CDI than the trajectory and poor antibiotic prescribing was less likely to be cited as an avoidable cause. The number of wards that submitted antimicrobial care bundle results grew initially from 18 to 27 out of a possible 36 but then declined. Sustaining completion of the antimicrobial care bundle is a priority for 2013/14.

Conclusion
The antimicrobial care bundle has shown improvements in antimicrobial stewardship. Further improvements are required as part of the Trusts continuing commitment to reducing HCAI and antimicrobial resistance. Raising awareness of the importance of appropriate use of antimicrobials and ensuring that this translates to improved practice remains a challenge.

References
Background
Prescribing errors are amongst the most commonly reported patient safety incidents nationally and locally. It is recognised that undergraduate medical education on prescribing is at best variable and change is necessary to better equip newly qualified doctors to bridge the gap between university and foundation duties. A lack of any formal training programme for foundation year 1 or 2 doctors (FY1 or FY2) at Heatherwood and Wexham Park Hospitals (HWPH) prompted this study to be undertaken, with the overall aim of creating a standardised tool to promote a safe prescribing culture among foundation doctors, and to reduce prescribing errors. In addition to addressing training needs, the research focused on understanding junior doctors’ attitudes towards prescribing errors.

Objectives
- To assess the impact of newly developed safe prescribing session on knowledge and attitude towards prescribing errors
- To interview junior doctors to understand their perceptions about undergraduate education, their experiences with prescribing errors at HWPH and their training needs following graduation
- To evaluate the impact of the programme on the overall prevalence of prescribing errors within the Trust

Methods
Participants attended a safe prescribing teaching session run by the investigator. The impact of the session was evaluated in terms of its effect on participants’ attitude towards safe prescribing and behaviours that can prevent errors using a questionnaire adapted from Garbutt et al. Error awareness was assessed using a prescription screening assessment. Three groups were enrolled into this study – FY1 doctors from Aug 11 intake, FY2 doctors from Aug 11 intake and FY1 doctors from Aug 12 intake. Data was collected a week prior to the session, immediately after the session and four weeks after the session.

Responses were summed and pre and post scores were compared within and between the groups. Cronbach’s alpha coefficient was calculated to determine the reliability of the summed scales. Throughout the study, prescribing errors were monitored and the impact of the session was assessed by comparing error rates before and after the session.

Participants from a convenience sample were recruited to attend an interview to discuss their undergraduate medical education, preparedness for the foundation program in terms of prescribing, their experience with prescribing errors and their views about the level of support that should be provided by the Trust. Transcripts were coded and analysed using Reason’s model of error causation, the same model used in the EQUIP study.

Ethical approval was not required as this project was considered as service evaluation.

Results
A total of 55 doctors, with various levels of post graduate experience, were recruited. Eighteen FY1 doctors for the initial pilot session in April, 14 FY2 doctors for the training session in May and 23 newly qualified FY1 doctors for the final session in September.

Participants identified common themes for contributors to prescribing errors, with 51 respondents (92%) citing ‘being in a hurry’, 48 (87%) ‘excessive workload’, 45 (82%) ‘being interrupted’, and 35 (63%) ‘fatigue’. Most of the participants believed that they had adequate training as an undergraduate student; however, only 50% of the participants indicated that they have written their first prescription as a foundation doctor.

Cronbach’s alpha coefficient was 0.5 for the 11 items attitude scale and 0.7 for 16 items behaviour scale for all groups combined (n=55). There was a statistically significant improvement in attitudes and behaviour scores for FY1 group (attitude median pre= 40, post = 42, z= -2.16 p=0.03 “exact two tailed”, behaviours median pre= 66, post = 69 z= -2.47 p=0.01 “exact two tailed”). Improvements were not significant for the more experienced groups FY1 pilot and FY2. Similarly, error awareness assessment scores were most significantly improved in FY1 group. There was no apparent impact on the number of prescribing errors as a result of the training sessions.

Six doctors were recruited for the interview, all had experience of at least one prescribing error since joining the Trust and felt that workload is a contributory factor in making mistakes. Knowledge based mistakes were considered the most common active failures, with slips being acknowledged for errors in routine tasks such as re-writing drug charts.

Discussion and Conclusion
The study demonstrated improvement in attitudes, error preventing behaviours and error awareness following the safe prescribing session. These improvements were maintained when measured four weeks post session. The improvements were most significant in less experienced doctors suggesting that the session was best suited for newly qualified foundation doctors. Error rates remained high despite the training session; however, a more robust data collection tool is required in order to identify individual prescribing trends.

Foundation doctors were generally satisfied with their undergraduate teaching in contrast to suggestions in the current literature. The safe prescribing session was deemed useful but they would have liked the session to be delivered earlier during the first week of commencing the foundation program. Errors were commonly reported as a result of poor work environment. In addition, knowledge based mistakes continues to be commonly reported as a cause of prescribing errors despite improvements in the undergraduate curriculum.

A number of recommendations were made in the paper, most importantly the inclusion of safe prescribing training sessions within the foundation doctors’ induction program.

References
3. WALL D, BOISHAW A, and CAROLAN J. From undergraduate medical education to pre-registration house officer year: how prepared are students? Medical teacher 2006; 28: 435-439
Introduction
In the current economic climate the NHS is facing financial challenges and thus needs to make huge savings. In December 2012 the DH published a report about their recommendations on ‘Improving the use of medicines for better outcomes and reduce waste’. One of the recommendations was to re-cycle medicines within the hospital environment. This report was developed as a result of findings from the York (2010) report, which estimated a value of £300 million a year in England in 2009 in medicines waste. In community pharmacy strategies such as Medicines optimisation (MO), the New Medicines Service (NMS) and Medicines Use Reviews (MUR’s) all claim that through increased compliance and adherence to medicines, they can theoretically achieve a reduction in medicine wastage. Therefore it makes sense to look further into these methods and discover what impact if any they have in terms of reducing medicines wastage. Other methods such as the possibility of recycling medicines within the NHS were explored and the opinions of both Community and Hospital Pharmacist’s were taken into consideration.

Aims & Objectives
The aims of this project were to gather the views of Community Pharmacists in Calderdale & Kirklees about medicine wastage, including options for re-cycling medicines, the success so far of the NMS and targeted MUR services in relation to increasing patient compliance and adherence and on whether they think the NMS or MO may have an effect on reducing medicines wastage in the future. A further aim was to compare the views of some hospital pharmacists and technicians about medicines waste.

Method
University Ethics Committee approval was gained and the opinions of Community Pharmacists from the Calderdale & Kirklees area were gathered by using a convenience sampling method in the form of a questionnaire. 120 were distributed. A shorter questionnaire was used to seek the views of 9 West Yorkshire Hospital Pharmacist’s on the issue of medicine wastage and 20 hospital and community pharmacy technicians were also surveyed who attended the University of Huddersfield. These results were then analysed and interpreted statistically. Due to the sensitive nature of the subject all questionnaires were kept anonymous.

Results
Regarding Community Pharmacists, of the 54 questionnaires returned, 55% of participants had received no information on Medicine Optimisation, and this was identified as having a significant statistical association between how much information a participant had and whether they thought it had the potential in reducing waste or not \( P = 0.05 \text{ P}=0.006 \). 88% of community pharmacists agreed that after NMS and MUR’s interventions, patient’s compliance and adherence to medicines increased thus leading to a reduction in medicine waste as the patient had a better understanding of their medicines and were more inclined to take them. When community pharmacists were asked to rank the order in which they thought the following methods reduced medicines wastage, (i) 28 days prescribing, (ii) MUR’s, (iii) Repeat dispensing and (iv) Advertising awareness campaigns on medicines waste, it was found that the 28 days prescribing strategy was the most popular (51%). The Advantages and disadvantages of recycling medicines in hospital are shown in (Table 1).

Table 1 Shows the advantages and disadvantages of recycling medicines in Hospitals’.

<table>
<thead>
<tr>
<th>Hospital Responses (Number of participants)</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacists (9)</td>
<td>cost savings reducing waste.</td>
<td>increased unremunerated workload, time consuming to implement, no guarantee of storage conditions</td>
</tr>
<tr>
<td>Technicians (13)</td>
<td>cost effectiveness, same medicines brand for PODs, product availability, less waste for incineration, less swizzles, less expired stock, less split packs on shelves, more rotation of stock so reduces re-ordering</td>
<td>Safety/integrity of product, time consuming, dedicated staff time, loss of batch numbers &amp; expiry dates, errors with similar packaging lack of storage space.</td>
</tr>
</tbody>
</table>

Conclusions
More awareness is needed regarding the effectiveness of Medicines Optimisation for pharmacists as the majority of pharmacists surveyed were unsure of its goal in reducing waste and there was confusion over the definition. MUR’s were identified as being a good tool to increase patient adherence to medication and were commented on as an excellent way of identifying any potential “stockpiling” or potential problems that may compromise patient adherence and thus create waste. The NMS was also agreed to increase patient compliance and adherence. Restricting to 28 days’ supply was identified as the scheme that pharmacists believed to have the most impact on reducing medicines waste and the importance of public awareness campaigns was also identified by both hospital and community pharmacists as a possible tool to reducing medicine wastage. The GPhC’s Code of Ethics currently prohibits community pharmacists from recycling patient’s medicines in line with recent legislation. However the impact on reducing medicines waste following recommendations of the DH to actively re-cycle medicines within the hospital needs further investigation, as it should show improvement if implemented following the results of the hospital pharmacists and technicians surveys in our study.

References:
1) Department of health, ‘Improving the use of medicines for better outcomes and reduced medicines waste—an action plan’, Department of Health (DH) commissioned report published December 2012.
4) WHO SFFC medicines. Available online at http://www.who.int/en [assessed 19th April 2013]
Introduction
The National Patient Safety Agency (NPSA) issued a rapid response report in 2010 on reducing harm to patients in hospital from missed and delayed doses of medication. A baseline audit of omitted doses undertaken in 2010 highlighted that doses are often omitted and nursing staff do not routinely record reasons for omitted doses on the Trust’s electronic prescribing system (EPS). The trust medicines policy states that the administration of all medication should be accounted for and if omitted, there should be a recorded reason. As for critical medicines, they should not be omitted or delayed (administration should be within 2 hours). In 2010 a total of 9257 doses were reviewed, of which, 76% were documented as “given”, 15% as “not given” and 9% were unaccounted for. Following the audit a new approach to the medicine administration round was adopted which promoted the administration of intravenous medicines and controlled drugs for patients at the beginning of the round to improve the timeliness of these medicines. The audit also identified limitations with the current EPS. However, the implementation of a new system has been delayed until 2015; therefore, a repeat of this audit was deemed necessary.

Objectives
• Determine the percentage of doses due to be administered which were either “not given” (i.e. where the nurse indicated a reason why the dose was not administered) or unaccounted for (i.e. where no reason was provided for non-administration).
• Determine the most common reasons provided for “not given” doses
• Determine the percentage of “not given” doses which are critical medicines
• Determine the number and category of critical medicines that were unaccounted for

Method
The audit was conducted over a two week period in January 2013. Five patients were randomly selected from randomly selected wards in each division and the number of doses given, not given and unaccounted for, over the previous 7 days was calculated. “When required” doses were not included because it is not possible to know if they were requested by the patient or not. Continuous infusions on paper charts were also not included as staff routinely only document the initiation of a continuous infusion.

During the data collection period, all doses recorded as “given” or “not given” on the EPS were collected by Wirral Health Informatics Service and emailed to the auditors in the form of an Excel spread-sheet. This provided the auditors with reasons why doses were omitted for the “not given” medicines. Ethical approval was not required for this audit.

Results
During the audit period, 9201 doses were due to be administered. A Trust wide and divisional analysis of the results is shown in Table 1, with an additional breakdown of those medicines classed as critical medicines.

Overall, the most common reasons for non-administration were “patient refused”, “patient didn’t require dose” and “no ward supply”.

Table 1: Summary of doses given, not given and unaccounted for (n = 9201)

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Surgery</th>
<th>Women &amp; Children’s</th>
<th>Acute Care</th>
<th>Trust wide</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of doses given</td>
<td>74</td>
<td>67</td>
<td>88</td>
<td>76</td>
</tr>
<tr>
<td>% of doses not given</td>
<td>17</td>
<td>19</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>% of doses unaccounted for</td>
<td>9</td>
<td>14</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>% of doses of a critical medicine given</td>
<td>76</td>
<td>66</td>
<td>85</td>
<td>77</td>
</tr>
<tr>
<td>% of doses of a critical medicine not given</td>
<td>12</td>
<td>16</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>% of doses of a critical medicine unaccounted for</td>
<td>12</td>
<td>18</td>
<td>13</td>
<td>14</td>
</tr>
</tbody>
</table>

Discussion/Conclusion
The 2010 audit included 9257 doses due to be administered. Of these, 76% were recorded as given, compared with 72% in the current audit. The percentage of doses “not given” and unaccounted for in the 2010 audit was 15% and 9% respectively compared with 17% and 11% in the current audit. Overall, the results of the current audit have not shown any improvement, however, this audit did include stat doses which were previously excluded and may account for the marginal increases observed. It is not possible to compare results between the divisions due to the different numbers of doses audited per division. However divisional and individual ward data is provided in the full report

A divisional breakdown of the reasons recorded for non-administration is shown in the trust report with further analysis of critical and non-critical medicines. Those critical medicines not administered with “not required” and “no ward supply” recorded as a reason will be analysed and reported to Lead Divisional Pharmacists to enable them to review ward stock lists. It was outside the remit of this audit to further investigate the reasons behind “no ward supply” and where no reason was recorded on EPS. However, action points have been identified and further work will be undertaken including a review of minimum stock levels and availability of critical medicines. Nebulised bronchodilators and analgesics were the most common classes of critical medicines with doses unaccounted for.

The results in each division highlight the importance of further education to nursing and medical staff regarding identification and supply of critical medicines, and this forms an action point from this audit. Staff within the pharmacy department will also receive further education regarding the prompt supply of critical medicines as appropriate. The EPS does not alert staff when doses are due to be given or to record that the dose has been administered, therefore signing for the administration of medicines by nursing staff is not routinely done in “real time” and so delayed doses were not included in this audit. Suggestions will be made to incorporate a prompt into the new EPS.

References
1. Missed Doses Audit, Calvert, P (Medical Student), Pharmacy Department, Wirral University Teaching Hospital NHS Foundation Trust, August 2010.
2. WUTH Medicines Management Policy (General) Version 18, Young, T, approved 15th November 2012.
Introduction

Within the past 12 months, the Trust has updated the drug chart with regards to antimicrobial use. The antimicrobial page on the drug chart contains sections to specify the duration and re-signature to confirm continuation of antimicrobial administration after 5 and 10 days. In 2011 the Department of Health (DoH) released a document regarding Antimicrobial Stewardship which states that either a duration or date of review should be specified on the drug chart for antimicrobial prescriptions. This is to ensure that antimicrobials are prescribed with the right drug, dose, time and duration for every patient, thereby limiting the risk factors of healthcare associated infections such as Clostridium difficile and MRSA. The aim of the audit was to evaluate the unintentional continuation of administration of antimicrobial courses in Buckinghamshire Healthcare Trust.

Objectives

- To determine the percentage of antimicrobial prescriptions that specify a start date on the drug chart – (Standard 1 - 100%).
- To determine the percentage of antimicrobial prescriptions that specify the indication or suspected indication on the drug chart – (Standard 2 – 100%).
- To determine the percentage of antimicrobial prescriptions that specify a duration or date of review on the drug chart – (Standard 3 – 100%).
- To determine the percentage of antimicrobial prescriptions where additional administration occurs beyond the duration specified on the drug chart - (Standard 4 - 0%).
- To determine the percentage of antimicrobial prescriptions where the doctor has reviewed or the decision to continue has been documented in the notes in instances where antimicrobial administration is continued - (Standard 5 - 100%)
- To evaluate staff perceptions of the antimicrobial page of the inpatient medicine chart with respect to start date, duration and re-signature at 5 and 10 days.

Method

A specially designed audit data collection form was used to collect data on antimicrobial prescriptions. The audit was undertaken during the week of 5th-9th November 2012. All inpatient drug charts were reviewed and antimicrobial prescriptions assessed on the main Trust acute hospital sites. Data was collected by the pre-registration pharmacist.

A questionnaire was designed surveying a random sample of doctors, nurses, microbiologists and pharmacists across the two acute sites. The questionnaires collected demographic data and included questions regarding perceptions of the re-signature and duration sections on the antimicrobial chart. Ethics approval was not required as this was an audit project.

Results

286 antimicrobial prescriptions were reviewed. Table 1 shows that none of the standards were met.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Criteria</th>
<th>Target</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Start date specified (n=286)</td>
<td>100%</td>
<td>88%</td>
</tr>
<tr>
<td>2</td>
<td>Indication specified (n=286)</td>
<td>100%</td>
<td>68%</td>
</tr>
<tr>
<td>3</td>
<td>Duration specified (n=286)</td>
<td>100%</td>
<td>44%</td>
</tr>
<tr>
<td>4</td>
<td>Extra doses administered beyond duration (n=126)</td>
<td>0%</td>
<td>14%</td>
</tr>
<tr>
<td>5</td>
<td>Where extra doses administered, review documented in notes (n=17)</td>
<td>100%</td>
<td>39%</td>
</tr>
</tbody>
</table>

60 staff members completed the perception questionnaire of the 96 questionnaires issued. The variation in responses highlighted ambiguity with regards to understanding the sections of the drug chart and demonstrated potential for variation in prescribing between doctors and administration of doses by nurses. For example, 43% of questionnaires demonstrated that the “sign to confirm continuation” section should not be signed if the duration was specified on the drug chart compared to the 55% that did not express this opinion.

Discussion

The audit revealed that less than 45% of antimicrobial prescriptions specified a duration on the drug chart. Therefore the standard outlined by the Department of Health was not met within the Trust. 14% of antimicrobial prescriptions identified continued administration beyond the duration specified. Of the antimicrobial prescriptions that did not specify duration on the chart 23% were administered beyond the 5 day “sign to confirm continuation” section. Only one of these prescriptions contained a signature on the chart to confirm continuation of the antimicrobial.

The data demonstrates that the length of antimicrobial courses prescribed is non-compliant with the standards outlined by the Department of Health. This is to ensure that antimicrobials are prescribed with the right drug, dose, time and duration for every patient, thereby limiting the risk factors of healthcare associated infections such as Clostridium difficile and MRSA. Additional cost analysis was performed, estimating an unnecessary financial cost of at least £10,000 annually to the Trust based. This was based upon drug expenditure within the Trust per additional dose administered beyond the duration specified on the drug chart. Data from the questionnaire highlighted a variety of opinions with regards to correct use of the antimicrobial drug chart. A potential unnecessary cost of up to £170,000 per year may have incurred when accounting for antimicrobial courses which did not specify a duration if continuation was inappropriate. Furthermore the questionnaire highlighted ambiguity concerning the roles and responsibilities of the healthcare professionals involved in discontinuing antimicrobial courses. For example, only 42% of staff indicated that no more antimicrobial doses should be administered once the duration specified was reached.

The audit had a number of limitations. Where additional doses were administered beyond the 5 day duration section without a signature, the notes were not always reviewed. This meant that not all of the antimicrobial courses were administered unintentionally, although the intention to continue the courses was not evident from the drug chart. The sample size of the questionnaire was small due to time limitations and some of the questions were limited in the interpretation whereby one question could justifiably be answered one of two responses.

The results were presented to the Trust Antimicrobial Review Group in July 2013. It is recommended that the Group further analyse staff perceptions of the antimicrobial page on the drug chart. A chart update should be considered to improve prescribing practice. Trust guidelines should be clarified with regards to duration and signature to confirm continuation sections. In addition the pharmacist endorsing policy should be clarified with regards to the role of the pharmacist annotating the discontinuation of antimicrobials beyond the duration prescribed. A cost analysis should be undertaken by the Antimicrobial Review Group, further to the cost analysis performed by the pre-registration pharmacist. Any changes should be re-audited 6 months following the time of implementation.

References

1. Department of Health. Antimicrobial stewardship: Start smart - then focus. 2011
7. Medicines reconciliation at the interface: A pilot randomised controlled trial to determine the costs and effects of pharmacy provided services

Hammad Ea, Cadman Bb, Bale Ab, Barton Ga, Desborough Ja, Holland Ra, Howe Hb, Nunney Ia, Wright Da.
a School of Pharmacy, University of East Anglia, b Pharmacy Department, Cambridge University Hospitals

Background
Medicines reconciliation (MR) is the process of ensuring that 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. Based on a single randomised controlled trial reporting medication errors rate as the primary outcome, the National Institute of Health and Clinical Excellence/National Patient Safety Agency (NICE/NPSA) guidance recommends pharmacists to be involved in MR within 24 hours for all hospital admissions. This target is currently being met for only 50% of admissions across the Eastern region. The cost and effect of expanding the pharmacy service to all admissions is currently unknown. This pilot study is designed to determine the best approach to perform a full scale trial on an expanded pharmacist led MR service. The pilot MR RCT was approved by the Essex Ethics Committee.

Objective:
To estimate the costs and effects of pharmacist led MR within 24 hours of admission by interim analysis of the first 60 patients. The full pilot study was designed to recruit 200 patients.

Methods
Patients were recruited from five medical wards and randomised to either receive medicines reconciliation within 24 hours and at discharge or usual care. All unintentional discrepancies (medication errors) in both groups (both resolved and unresolved) were identified at each transfer of care.

Costs related to potential adverse drug events (ADEs) due to errors occurring upon patient care transfer were estimated by calculating the cost of increased burden on hospital bed occupancy see Table 1. The proportion of errors leading to ADEs and the number of extra bed days were estimated based on assumptions informed by previous published studies. It is reported that 4.8% 95%CI [3.7-6.1] of discrepancies upon patient transfer of hospital lead to ADEs. A prospective analysis of 18820 patients admitted to hospitals in the UK assessed the prevalence of admissions due to ADEs. It was estimated that patients admitted with an ADE had a median stay (IQ) of 8 [4,18].

The average cost of a bed day is £264 as valued by the Department of Health reference cost 2011-2012 for the financial year 2011/2012. Therefore, £2,112 (8*264 on average) was calculated as the cost per adverse event.

Results:
A total of 145 medication errors were identified. Inter-rater agreement kappa score of discrepancy identification was 0.51, indicating good agreement. Variances in discrepancy identification were discussed with the study Principal Investigator and the process was standardised.

In the control group 72 errors were identified affecting 24 patients (80.0%), each patient had at least one error; a median (IQ) of 2 [1, 3]. Most errors occurred on admission (n=60) and the majority were due to omission of pre-admission medicines and these were carried on until discharge. 10 errors in the control group were resolved before discharge by ward staff.

In the intervention group 73 medication errors were identified, occurring in 22 (73%) patients; 72 errors were intercepted by the MR pharmacist.

Table 1 Summary of medication errors and costs in both groups

<table>
<thead>
<tr>
<th></th>
<th>Intervention No. of Patients=22</th>
<th>Control No. of Patients =24</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Number of errors</td>
<td>73</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>B Number of adverse drug events</td>
<td>3.5 (2.7 – 4.4)</td>
<td>3.46 (2.7 – 4.4)</td>
<td>A<em>0.048 (A</em>0.037-A*0.061)</td>
</tr>
<tr>
<td>C Excess bed days</td>
<td>28 (21.6 – 35.6)</td>
<td>27.6 (21.6 – 35.1)</td>
<td>B<em>8 (B</em>- B*18)</td>
</tr>
<tr>
<td>D Cost of errors</td>
<td>£7392 (5702 – 9398)</td>
<td>£7286 (5702 – 9266)</td>
<td>C*£264 (C Lower b) *£264 C (Upper b)£264)</td>
</tr>
<tr>
<td>E Cost avoidance of 10 errors intercepted by routine care</td>
<td>-</td>
<td>£1013</td>
<td>10*0.048£2,112</td>
</tr>
<tr>
<td>F Cost avoidance of 72 errors intercepted by MR pharmacist†</td>
<td>£7286 (5702 – 9266)</td>
<td>-</td>
<td>72*0.048£2,112</td>
</tr>
<tr>
<td>G Overall cost of errors</td>
<td>£106 (0-132)</td>
<td>£6273 (4920 – 7978)</td>
<td>Σ D-E-F</td>
</tr>
</tbody>
</table>

† One error was not intercepted by the MR pharmacist

Discussion and Conclusion
The interim analysis suggests that the pharmacist led MR intervention can obviate the burden of adverse drug events on bed occupancy and contribute to considerable cost savings for the NHS. These estimated costs however should be considered with caution. The proportion of unintentional errors at care transition that might lead to ADEs was based on a USA study. Differences in the reporting system could influence transferability to the UK context. Consequences of ADEs were assumed to impose costs only on the hospital. The assumptions were justifiable by the lack of UK figures.

This study collected a wide scope of cost and consequence data relating to pharmacist led MR both during hospital stay and up to 3 months post discharge. This included MR pharmacist and doctor time, NHS services, social care services and informal care. This will be reported in the full pilot analysis and modelled to estimate the true cost-effectiveness of the service.

References
Introduction
Smoking is the single greatest cause of preventable illness and premature death in the UK. It is associated with many health problems, prolonged hospital stay and repeated hospital admission.¹

The need to improve and develop services for inpatients wishing to stop smoking across this large teaching hospital Trust was highlighted and a multidisciplinary group identified a pathway for hospital staff. It included: guidance for brief advice based on the “Ask, Advise and Act” approach, a brief NRT prescribing guide, a list of local community clinics and a referral form. In October 2008 a pilot study on one cardiology ward showed by implementing the pathway there was an increased number of quitters (43% of smokers admitted to the ward during the pilot) who had still quit at four weeks post discharge from hospital.² The challenge we faced was to introduce the service to all wards across the Trust (1800 beds) to consistently support and refer motivated inpatient smokers to community stop smoking clinics to increase hospital patient quit rates. There is very little literature describing successful implementation of a secondary care stop smoking service.

Aims and objectives
• Increase the number of hospital staff trained in brief stop smoking advice.
• Increase the use of NRT across the Trust

Ethics approval was not required.

Method
In September 2009 five additional clinical teams were identified; the coronary intervention ward, the cancer centre, elderly care, a vascular surgical ward and pharmacy. Using the principles of change management³ and building on previous work, the enthusiastic project team shared their vision by leading communication briefings with members of staff in each area via clinical governance meetings, which included consultants, junior doctors, nurses, healthcare assistants and the pharmacy team. The pathway was described, along with the referral system and who to contact if help was needed. Emphasis was placed on benefits to both patients and staff by providing NRT and support to those wishing to quit in terms of recognising and managing nicotine withdrawal on the ward.

To support staff and to raise awareness across the Trust, a Trust intranet page for smoking cessation was created with details of the pathway, referral form, details of the community clinics and prescribing guide. Additionally to support the clinical teams an e-learning package was designed that was available via the Trust Intranet. This was advertised to all Trust staff. The local Centre for Pharmacy Postgraduate Education(CPPE) trainers had organised a stop smoking training event for pharmacists and pharmacy technicians. The hospital pharmacy team were encouraged to go. Following the event the attendees were encouraged to complete the online National Centre for Smoking Cessation and Training (NCSCT) training package to gain a nationally recognised certificate in stop smoking counselling.

NRT products were added to all ward stock lists

Results:

Table 1: Use of NRT and Trust training package over 5 years

<table>
<thead>
<tr>
<th>Financial Year</th>
<th>Total cost of NRT used in the Trust (£)</th>
<th>Number of wards using NRT in the Trust</th>
<th>Number of staff who completed Trust online learning package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr 2008-Mar 2009</td>
<td>29,555</td>
<td>59</td>
<td>0</td>
</tr>
<tr>
<td>Apr 2009-Mar 2010</td>
<td>42,343</td>
<td>75</td>
<td>0</td>
</tr>
<tr>
<td>Apr 2010-Mar 2011</td>
<td>53,744</td>
<td>80</td>
<td>2860</td>
</tr>
<tr>
<td>Apr 2011-Mar 2012</td>
<td>60,988</td>
<td>93</td>
<td>2304</td>
</tr>
<tr>
<td>Apr 2012-Mar 2013</td>
<td>62,833</td>
<td>84</td>
<td>335</td>
</tr>
</tbody>
</table>

From table 1 use of NRT products has increased by 113% across the Trust over five years. The number of clinical areas using NRT has increased by 42%. The e-learning package was introduced in June 2010. The total number of Trust staff who have completed the e-learning training package is 5499. There are approximately 13,000 staff employed. Six Trust pharmacy staff attended the CPPE event and completed the NCSCT online course.

Discussion
Since June 2010 the total number of staff who have completed the e-learning training package has increased. The amount of NRT used has increased across the Trust, shown by an increase in cost and an increased number of ward areas using NRT. Implementing a change of practice across many clinical areas is difficult. Clear communication and the ability to motivate staff from different disciplines is key to success. A limitation of the study was the system we used to collect data on smoking status after discharge. It was not possible to collect this data for a larger number of clinical areas using the same method as the pilot study and thus we would require extra resources to collect this data or another method of data collection. We are currently developing an electronic smoking cessation form to aid referral tracking and audit across the Trust.

This study is widely applicable because the inclusion criteria was broad, it was a large teaching hospital and there was a specific pathway to aid dissemination of training. A team-based approach is important. Every member of the clinical team who has contact with patients has an opportunity to support them in stopping smoking, however brief. Pharmacists are ideally placed to support Trust wide smoking cessation services due to their coverage of several wards, and focus on medication counselling and discharge information. Clinical areas with greatest use of NRT have designated stop smoking champions. More champions need to be identified. Smoking cessation is now part of the undergraduate dental hospital curriculum and sessions are provided to F1 trainees. Smoking cessation is part of the Trust preceptorship programme for all new staff (mixed groups).

Next steps
We will continue to raise awareness through producing information leaflets for patients, to help them assess where they are in the quit cycle and encourage them to be involved in the choice of NRT therapy. There will be a Trust wide staff bulletin to keep staff up to date with smoking issues and training opportunities.

References
Introduction.
The generally poor quality of discharge prescription (TTO) writing is a well-recognised and described phenomenon. TTO errors may result in patient safety issues if the errors escape detection, they may generate of waste in terms of staff time and dispensed items that require correction and because prescriptions require intervention or alteration, this contributes to poor flow of work through the dispensing process.

In 2009 at the Countess of Chester Hospital NHS FT (COCH), TTOs were electronically prepared via manual entry of individual drugs into an e-discharge prescription whereas in 2013, electronic TTOs are generated via the E-prescribing system using ‘flags’ against medicines already entered into the system.

Objectives.
The aim of the audit was to evaluate the impact of the introduction of an e-prescribing system on TTO error rates. The objectives were to measure error rates, error types and compare the two systems accordingly.

Method.
All TTOs received by the pharmacy dispensary during a 5-day week in 2009 and 2013 were screened by a clinical pharmacist and errors were recorded on a pre-formatted and pre-piloted data collection form. Data were collated using Microsoft Excel. Ethics approval was not required as this was an audit of standard working practices.

Results.
In 2009, 350 TTOs were screened, of which 138 (39.4%) were amended although full data were only collected for 116 (84.1%). In 2013, 288 TTOs were screened of which 113 (39.3%) were amended and all had data collected. In 2009, 270 (77.1%) TTOs were generated via the e-discharge process whereas in 2013, 252 (87.5%) were generated via the e-prescribing module. In 2009, the total number of items on amended prescriptions was 935 (average 8.06) of which 301 were errors giving an error rate of 2.6 per amended TTO. In 2013, the total number of items on amended prescriptions was 967 (average 8.58) of which 195 were errors giving an error rate of 1.73 per amended TTO.

Of the amended TTOs, in 2009, 65 (56.0%) were written by FY1 doctors, 10 (8.6%) by FY2s, 34 (29.3%) by staff grades; 3 were written by consultants (2.6%). 1 by a pharmacist (0.9%) while 3 (2.6%) were unknown. Of the amended TTOs, in 2013, 57 (50.4%) were written by FY1 doctors, 19 (16.8%) by FY2s, 33 (29.2%) by staff grades; 3 were written by consultants (2.7%) and 1 by a pharmacist (0.9%). In 2009, 45 (38.8%) TTOs were amended in less than 5 minutes, 33 (28.4%) in less than 10 minutes, 17 (14.6%) in less than 15 minutes and 15 (13.0%) took 15 minutes or longer; 1 was “unknown”. By comparison, in 2013, 22 (19.4%) TTOs were amended in less than 5 minutes, 26 (23.0%) in less than 10 minutes, 23 (20.4%) in less than 15 minutes and 20 (17.7%) took 15 minutes or longer; 22 were “unknown”. The prescriber was contacted for 58 (50%) forms in 2009 compared to 54 (47.8%) forms in 2013 and of these, 49 (47.6%) were EP TTOs. Further results are shown in Table 1.

Table 1: Breakdown of errors identified during the audits.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of errors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrong dose</td>
<td>31</td>
<td>190</td>
<td>181</td>
<td>14</td>
</tr>
<tr>
<td>Frequency</td>
<td>29</td>
<td>19 (10.0%)</td>
<td>17 (9.4%)</td>
<td>2 (14.3%)</td>
</tr>
<tr>
<td>Course length</td>
<td>16</td>
<td>7 (3.7%)</td>
<td>7 (3.9%)</td>
<td>0</td>
</tr>
<tr>
<td>Incorrect dose form</td>
<td>19</td>
<td>7 (3.7%)</td>
<td>5 (2.8%)</td>
<td>2 (14.3%)</td>
</tr>
<tr>
<td>Timing</td>
<td>13</td>
<td>7 (3.7%)</td>
<td>5 (2.8%)</td>
<td>2 (14.3%)</td>
</tr>
<tr>
<td>Spelling</td>
<td>25</td>
<td>1 (0.5%)</td>
<td>0</td>
<td>1 (7.1%)</td>
</tr>
<tr>
<td>Items not required</td>
<td>14</td>
<td>12 (6.3%)</td>
<td>11 (6.1%)</td>
<td>4 (28.6%)</td>
</tr>
<tr>
<td>Additions required</td>
<td>46</td>
<td>65 (34.2%)</td>
<td>65 (36.0%)</td>
<td>0</td>
</tr>
<tr>
<td>CD regulations</td>
<td>11</td>
<td>9 (4.7%)</td>
<td>9 (5.0%)</td>
<td>0</td>
</tr>
<tr>
<td>Dose instructions</td>
<td>0</td>
<td>13 (6.8%)</td>
<td>13 (7.2%)</td>
<td>0</td>
</tr>
<tr>
<td>Wrong drug</td>
<td>9</td>
<td>6 (3.2%)</td>
<td>4 (2.2%)</td>
<td>2 (14.3%)</td>
</tr>
<tr>
<td>Incorrect device</td>
<td>7</td>
<td>4 (2.1%)</td>
<td>4 (2.2%)</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>33</td>
<td>13 (6.8%)</td>
<td>13 (7.2%)</td>
<td>0</td>
</tr>
</tbody>
</table>

NB: In 2009 data were not collected regarding the format of prescriptions as electronic discharge prescriptions or handwritten TTOs and it is not possible to separate e-discharge TTOs from handwritten forms.

Discussion and conclusion.
This study has identified issues arising from the implementation of e-prescribing. Firstly, the overall error rate on the number of TTOs requiring amendment has not changed which is disappointing given the investment in EP and use of technology with the intention to reduce errors and improve patient safety. Secondly, despite the failure to improve the proportion of prescription forms requiring amendment, EP does appear to have reduced the number of errors per form. Thirdly, the results indicate that EP has extended the time required to amend TTOs in that 67% of TTOs requiring amendment in 2009 took less than ten minutes to complete whereas in 2013, just over 40% could be amended in this time. However, it should be noted the higher number of “unknowns” in 2013 skews the data somewhat and if the figures are adjusted for this by excluding “unknowns”, 52.8% were amended in less than ten minutes. Finally, in terms of error types, the majority of error types maintain a largely similar distribution. However, post-EP, there were notable reductions in errors relating to the wrong dose (12.6% to 5.8%) and spelling errors (8.3% to 0.5%). Conversely, EP also resulted in notable increases in errors relating to dose instructions (0% to 6.8%) and a significant increase in the number of instances where additions were required to the TTO as a result of missing drugs (15.3% to 34.2%) possibly due to the layout of the screen used to generate TTOs. In conclusion, EP has reduced the overall number of errors on TTOs, but a corresponding fall in the number of TTOs requiring amendment has not been seen. The reason behind the high percentage of drug omissions needs further exploration and resolution.
Introduction
The issue of discharge prescription (TTO) turnaround times and delays at discharge are long standing issues for many Trusts. While some Trusts have instituted lean processes with significant success, for many Trusts, this remains a problem. At the Countess of Chester Hospital NHS Foundation Trust, the number of TTOs being turned around with in the Key Performance Indicator Target has significantly improved following the introduction of basic lean concepts, but it remains a thorny issue. Patient feedback to the Trust suggested that their inpatient stay was on the whole, a positive experience but, the Trust failed to continue that through to the day of discharge because they had to wait for medicines.

Objectives
The objectives of the study were to process map the TTO journey from the point at which the patient is told they can go home, to the point at which the TTO has been dispensed and to calculate the proportion of time a TTO spends between each point on the process map.

Methods
All TTOs issued during a 5 day working week were followed up and data were collected for each point in the journey. COCH is currently using electronic prescribing and the process which was defined as:
1. Patient informed they can go home
2. Last prescription item flagged for TTO
3. Prescription is printed
4. Prescription arrives in Pharmacy
5. Prescription is completed and ready to return to the ward.

Data were entered into and analysed using Microsoft Excel. Ethics approval was not required as this was an audit of current practice.

Results
Of the 253 TTOs dispensed over the 5 day period, full data were collected for 172 (70%) patients who were told that they were ready for discharge. 10 (4.0%) patients were asleep, 33 (13.0%) patients had not been told they were ready for discharge even though their TTO had been written and sent to Pharmacy, and 38 (15.0%) patients were unavailable. Due to the number of ‘outliers’, results are presented as the range, inter-quartile range and median in Table 1. The results for the overall journey time are calculated from individual TTO journey times and are not a summation of the other data presented in the Table. Of the total TTO journey time, the results show that 13.0% of the TTO journey was spent in Pharmacy.

Discussion / conclusion
In terms of limitations, due to the complexity and logistics of data collection, the data set is not complete for each stage of the journey, particularly around when the patient was told they could go home for the reasons described above. However, a large data set, representing 70% of TTOs processed during that week, should give a reasonably robust indication of the issues raised by the TTO process.

Looking at the whole TTO journey, the time associated with the need to print prescriptions and send them to pharmacy is a process issue which arises from having a separate e-prescribing system and pharmacy stock control and dispensing system. It is also exacerbated by the approach pharmacy takes to screening prescriptions on wards to ensure that they are correct before sending them to the pharmacy department. The Trust’s main electronic hospital management system is due for replacement in the next few years, and integration between the e-prescribing and pharmacy system will be high on the agenda and allowing prescriptions to be sent electronically to pharmacy for dispensing once they have been approved by a pharmacist will smooth the flow of work.

The fact that 13% of the total TTO journey time for all of the TTOs scrutinised is spent in pharmacy is influenced somewhat by the outliers seen in the three stages preceding arrival in pharmacy. Taking the results solely for the inter-quartile range, time spent in pharmacy accounts for 36.8% of the TTO journey. However, it is most likely the outliers that generate patient dissatisfaction.

In conclusion, it is clear that once a patient has been told that they can go home, their expectations of an imminent discharge from hospital are raised and it is important to understand the whole TTO journey and how, added together, this can contribute to patients having a somewhat negative experience of their last day in the hospital. This audit has highlighted that discharge delays relating to availability of medicines at discharge result from a combination of events, not solely within pharmacy.

1. Some patients were told that they could go home after their prescription had been entered onto the system, thus the range begins at -142 minutes.
2. Some prescriptions did not require any items to be dispensed or were completed on the ward.

Discussion / conclusion
In terms of limitations, due to the complexity and logistics of data collection, the data set is not complete for each stage of the journey, particularly around when the patient was told they could go home for the reasons described above. However, a large data set, representing 70% of TTOs processed during that week, should give a reasonably robust indication of the issues raised by the TTO process.

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10. The TTO Journey: how much of it is actually in Pharmacy?
Green CF, Hunter L, Jones L, Morris K, Pharmacy Department, Countess of Chester Hospital NHS FT

<table>
<thead>
<tr>
<th>Process</th>
<th>Range</th>
<th>Inter-quartile range</th>
<th>Median</th>
<th>Total time (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start: patient is informed that they can go home</td>
<td>-142² to 1409</td>
<td>10 to 173</td>
<td>64</td>
<td>31311</td>
</tr>
<tr>
<td>End: last TTO item is entered</td>
<td>0² to 1431</td>
<td>1 to 42</td>
<td>5</td>
<td>31171</td>
</tr>
<tr>
<td>Start: TTO is printed</td>
<td>2 to 1426</td>
<td>12 to 42</td>
<td>22</td>
<td>17327</td>
</tr>
<tr>
<td>End: TTO arrives in Pharmacy</td>
<td>0² to 216</td>
<td>38 to 100</td>
<td>60</td>
<td>11943</td>
</tr>
<tr>
<td>End: TTO is completed</td>
<td>-4 to 2020</td>
<td>95 to 260</td>
<td>170</td>
<td>91752</td>
</tr>
</tbody>
</table>

1. Some patients were told that they could go home after their prescription had been entered onto the system, thus the range begins at -142 minutes.
2. Some prescriptions did not require any items to be dispensed or were completed on the ward.
Introduction

The introduction of electronic prescribing (EP) is seen by many as a solution to the problems associated with paper based prescribing systems in the United Kingdom. These problems include illegibility, prescriptions with missing information, failure to follow policy and missing prescription charts. Although it is assumed that EP ‘fixes’ all these problems, and that there is an expectation that EP is an improvement on paper-based systems, this may not be the case and there is relatively little in the way of evidence to contribute to that argument. There is also an expectation that EP allows more efficient workflow, again, despite there being little evidence that this is the case.

Objectives

The objectives of the study were to ascertain the views of EP users on their experiences of their EP systems, with regard to user experience, patient safety and working practices.

Methods

Hospital pharmacies known to be users of EP were contacted and asked if they would participate in a paper-based questionnaire study. Ethics approval was obtained via the Liverpool John Moores University Research Ethics Committee. Pre-piloted questionnaires were posted to the participating hospitals for distribution to all the pharmacists within their departments, with a reminder via email to encourage non-responders.

Results

111 responses were received from 300 questionnaires, resulting in a response rate of 37%. 18 (16.4%) indicated that EP was either currently being rolled out or had been in place for less than two years, 57 (51.8%) indicated EP had been in place for 2-4 years and 32 (29.1%) more than 4 years. A summary of the results is presented in Table 1.

Discussion / conclusion

In terms of limitations of this study, firstly, although the response rate was 37%, given the sample size and population, it represents a reasonable return. Secondly, there are limitations on what can be ascertained from a postal questionnaire and some issues would benefit from further research in a qualitative setting.

In terms of user experience, pharmacists had very positive experiences of accessibility of information, data entry, software operating speed but not necessarily to identifying changes to existing prescriptions. In terms of working practices, the consensus suggests that EP allows pharmacists to use their time more efficiently, the majority would not wish to return to paper and the vast majority felt competent to use the system after training. However, there was an equivocal view as to EP’s contribution to communication between healthcare professionals and making working practices less stressful. In terms of patient safety and apart from notifying users of patient’s allergies, it appears that pharmacists feel that as yet, the benefits realisation of EP has not delivered, particularly with regard to highlighting errors, but also dealing with drug interactions and supporting dosing decisions. A slight majority of pharmacists disagreed that it was easier to view the patient’s whole prescription with EP and also felt that EP appears to have virtually no impact on helping prescribers around the side effects of medicines. Of particular interest was that pharmacists using EP appeared equivocal as to whether there were less errors with EP compared to paper systems. Overall, the study suggests that EP offers pharmacists a largely positive experience but in terms of really influencing patient safety, it appears to be a work in progress.

Table 1: Pharmacists views on three aspects of e-prescribing.

<table>
<thead>
<tr>
<th>User experience</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The information presented on the EP screens is easy to read</td>
<td>20</td>
<td>57</td>
<td>12</td>
<td>21</td>
<td>1</td>
</tr>
<tr>
<td>The EP software system runs at an appropriate speed</td>
<td>13</td>
<td>48</td>
<td>22</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>It is easy to see changes to an existing EP prescription</td>
<td>14</td>
<td>39</td>
<td>18</td>
<td>33</td>
<td>6</td>
</tr>
<tr>
<td>It is easy to find information</td>
<td>14</td>
<td>40</td>
<td>21</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>It's easy to enter data into the system</td>
<td>13</td>
<td>73</td>
<td>10</td>
<td>15</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Working practices</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-prescribing allows me to use my time more efficiently</td>
<td>22</td>
<td>43</td>
<td>27</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>EP improves communication between healthcare professionals</td>
<td>12</td>
<td>28</td>
<td>38</td>
<td>29</td>
<td>3</td>
</tr>
<tr>
<td>EP makes working practices as a clinical pharmacist less stressful</td>
<td>10</td>
<td>30</td>
<td>45</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Having used EP pharmacists would not want to return to paper</td>
<td>29</td>
<td>40</td>
<td>25</td>
<td>15</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient safety</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP highlights prescribing mistakes effectively</td>
<td>4</td>
<td>24</td>
<td>31</td>
<td>45</td>
<td>7</td>
</tr>
<tr>
<td>EP notifies the user of drug interactions effectively</td>
<td>4</td>
<td>20</td>
<td>18</td>
<td>37</td>
<td>30</td>
</tr>
<tr>
<td>EP notifies the user of side effects effectively</td>
<td>0</td>
<td>4</td>
<td>18</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>EP notifies the user of patient allergies effectively</td>
<td>11</td>
<td>49</td>
<td>18</td>
<td>24</td>
<td>8</td>
</tr>
<tr>
<td>EP provides advice on dosing effectively</td>
<td>3</td>
<td>41</td>
<td>22</td>
<td>28</td>
<td>16</td>
</tr>
<tr>
<td>It is easier to view the patients whole prescription compared to paper based systems</td>
<td>12</td>
<td>28</td>
<td>18</td>
<td>36</td>
<td>17</td>
</tr>
<tr>
<td>There are less errors with EP than paper based systems</td>
<td>11</td>
<td>35</td>
<td>33</td>
<td>28</td>
<td>4</td>
</tr>
<tr>
<td>EP informs decision making</td>
<td>5</td>
<td>30</td>
<td>39</td>
<td>25</td>
<td>10</td>
</tr>
</tbody>
</table>
Background

In October 2011 NICE released Technology Appraisal (TA) 236 stating that ticagrelor can be used for the treatment of acute coronary syndromes (ACS) with low dose aspirin for up to 12 months. The Royal Liverpool and Broadgreen University Hospital Trust approved the use of ticagrelor for ACS in September 2012; this led to changes in integrated care pathways including that for non-ST elevation acute coronary syndrome (NSTEACS).

There are four main aspects to the NSTEACS pathway: immediate medication, risk assessment, treatment, and secondary prevention. An established risk scoring system that predicts 6-month mortality such as the Global Registry of Acute Cardiac Events (GRACE) scoring system should be utilised for risk assessment.

Once a GRACE score is calculated the patients should be classified in to groups; lowest risk (GRACE ≤1.5%), low risk (>1.5% but ≤3.0%), intermediate and high risk (>3.0% but ≤9.0%) and highest risk (>9%), which then determine treatment. Ticagrelor is recommended for non-ST elevation myocardial infarction (NSTEMI) patients who have a GRACE score greater than 1.5%, and patients with unstable angina (UA) who meet specific criteria outlined in NICE TA236.

Before discharge patients should also be offered cardiac rehabilitation and drug therapy for secondary prevention in line with ‘MI: secondary prevention’ and ‘Lipid modification’ guidelines.

This audit was completed to determine whether the NSTEACS pathway was being followed.

Objectives

- Identify a sample of patients with NSTEACS
- Determine whether a dose of aspirin 300mg was given immediately
- Ascertain the number of patients who had a GRACE score recorded and whether subsequent treatment was appropriate
- Discover whether secondary prevention measures were provided before discharge

Method

Data collection took place at the Royal Liverpool University Hospital (RLUH) from the 12th to 22nd November 2012. Patients newly diagnosed with NSTEACS were identified by the chest pain nurses, and by ward pharmacists. An audit tool was produced to collect the following information: diagnosis, GRACE risk score and medication prescribed. This audit did not require ethics committee approval.

Results

Twenty two patients were identified with NSTEACS during the study period. According to the pathway all patients should be offered aspirin 300mg immediately unless it’s contraindicated. All of the suitable patients (n=18) were prescribed this dose.

Subsequently patients should undergo risk assessment, however less than half of the patients (8/22) had a documented GRACE score in their medical notes.

The next step is treatment with a combination of antiplatelets and antithrombotics. Irrespective of GRACE score patients should be prescribed aspirin 75mg daily. A total of 19/22 patients were prescribed this dose and aspirin was contraindicated in the remaining 3 patients.

The trust algorithm indicates that the preferred antithrombotic agents for use in NSTEACS are fondaparinux or enoxaparin and are indicated for all patients unless contraindicated. 18/22 patients followed the trust algorithm, in 3 patients antithrombotic agents were contraindicated and 1 patient was prescribed dalteparin for ACS and a pulmonary embolism which is a suitable alternative but not part of the pathway.

According to the recommendations only 15 patients were suitable for treatment with ticagrelor, 10 of which were prescribed the loading dose of 180mg. Only 1 patient received a loading dose of an alternative antiplatelet. Subsequently 13/15 patients were prescribed the maintenance dose of ticagrelor, 90mg twice a day, with both of the remaining 2 patients being prescribed an alternative antiplatelet.

Table 1: Prescribing of secondary prevention medication for 22 NSTEACS patients

<table>
<thead>
<tr>
<th>Prescribed on discharge</th>
<th>ACE inhibitor</th>
<th>Beta-blocker</th>
<th>High dose statin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>18</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Contraindicated</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

From table 1, the prescribing of secondary prevention medications looks to be adequate however only 55% (n=12) of patients were prescribed all of the 3 stated secondary prevention medications. Only 9 of 21 patients were referred to the cardiac rehabilitation team on the Integrated Clinical Environment (ICE) system, as required.

Discussion and Conclusions

A good awareness of the pathway was demonstrated throughout the hospital. The hospital was 100% compliant with guidelines for immediate medication, however there was little evidence of risk assessment and without clear documentation it is not possible to identify whether the appropriate intensity of treatment is being prescribed. Despite this it seems that the majority of patients, 68% (n=13), received appropriate treatment according to the NSTEACS pathway.

In contrast, approximately half of the patients were not prescribed all of the secondary prevention medication, with no documented reason for this in the medical notes, and less than half were referred to cardiac rehab.

At the time of this audit the NSTEACS pathway was only available as a hard copy on the acute admission wards which may have some bearing on the results. Since this audit was completed the NSTEACS pathway was subsequently made available on the hospital intranet, it informs the prescribers exactly how to access the tools for risk stratification therefore documentation of this may improve.

This audit has highlighted to the Cardiology team the need for increased recording of GRACE scores, increased delivery of secondary prevention measures and most importantly improved documentation to identify to all staff the rationale behind a patient’s treatment.

Management of NSTEACS should be re-audited in 1 year time.

References

Introduction
The goals of prophylactic administration of antibiotics to surgical patient are to:
- Reduce the incidence of surgical site infection
- Use antibiotics in a manner that is supported by evidence of effectiveness
- Minimise the effect of antibiotics on a patient’s normal bacterial flora
- Minimise adverse effects
- Cause minimal changes to the patient’s host defences.

SIGN guidelines state that the use of prophylactic antibiotics is highly recommended in colorectal surgery. Antibiotic choice should be guided by local policy and chosen to reflect the most likely causative pathogens. Evidence suggests that one single dose of antibiotic should be given preoperatively with very little evidence to support the use of continued prophylactic antibiotics postoperatively. This is supported by local guidelines within the OUH trust. It was decided to audit against these standards on the lower gastrointestinal ward as it was noted that prophylactic antibiotics were often being continued for up to five days postoperatively in elective surgical patients. Ethics approval was not required as this was a clinical audit. The audit was added to the trust audit register.

Aim
To identify current patterns in prophylactic antibiotic usage during and following lower gastrointestinal surgery and to review the findings with the infectious diseases team to bring about potential change in practice.

Objectives
To audit against the following standards:
- All patients receive pre operative antibiotic prophylaxis as per local guidelines
- No patients receive continued prophylactic antibiotics post operatively without clear indication (e.g. spilled faecal contents during procedure) as per local guidelines

Method
This audit was undertaken without the knowledge of the surgical staff. A specially designed data collection form was used to collect data on all new patients admitted to the lower gastrointestinal surgical ward at the Churchill Hospital over a two month period (February and March 2013.) The data collection form was not piloted as it was not felt this was necessary. (The data collection form was very basic and the only two pharmacists using the form were those who designed it.) All antibiotics prescribed and administered in the perioperative period were recorded, along with surgical procedure, operating surgeon and complications e.g. faecal spillage, contamination. This information was obtained from the medical notes, the operation note, the anaesthetic chart and the drug chart.

The results were presented to the OUH Infectious Diseases team. In due course the audit will be presented to the surgical team and current guidelines discussed to ensure their continued appropriateness. Following any necessary guideline review, the audit will be repeated to demonstrate local practice is evidence based and supported by guidelines.

Results
Data were collected for 34 patients.

Table 1 Audit results

<table>
<thead>
<tr>
<th>Table 1 Audit results</th>
<th>Number of patients</th>
<th>% of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre operative antibiotic prophylaxis given</td>
<td>28</td>
<td>82.4</td>
</tr>
<tr>
<td>No pre operative antibiotic prophylaxis given</td>
<td>6</td>
<td>17.6</td>
</tr>
<tr>
<td>Prophylactic antibiotics given as per OUH policy</td>
<td>24</td>
<td>70.6</td>
</tr>
<tr>
<td>Post operative antibiotics given</td>
<td>19</td>
<td>55.9</td>
</tr>
<tr>
<td>No post operative antibiotics given</td>
<td>15</td>
<td>44.1</td>
</tr>
<tr>
<td>No clear indication* for post op. antibiotics</td>
<td>14</td>
<td>41.1</td>
</tr>
</tbody>
</table>

* Documented in inpatient notes as ‘post operative antibiotics’ without documentation of contamination during procedure.

In total 37 antibiotic agents were used to treat 19 patients postoperatively. 43.2% of these agents were co-amoxiclav and 48.6% were metronidazole. Of note, the bioavailability of oral and intravenous metronidazole is equivalent, however 94.6% of all post operatively antibiotics given were administered intravenously. The patterns in prescribing were split quite evenly between the six different surgical consultants. There was wide variation in surgical procedure performed.

Discussion/Conclusion
The audit clearly demonstrates that local policy on prophylactic antibiotic use is not being adhered to, both through use of antibiotics preoperatively and their continued use postoperatively. This clearly deviates from the principles of pre operative antibiotic prophylaxis as set out both locally and nationally. Antibiotics are not currently being used in an effective manner which is based on evidence. The inappropriate use of prophylactic antibiotics postoperatively leaves the patient at increased risk of experiencing adverse effects. Unnecessary antibiotic use can lead to interruption of a patient’s natural bacterial flora and host defences, leaving them at risk of developing opportunistic infections such as Clostridium difficile.

This study had some limitations; wide variation in surgical procedure and operating surgeon does not allow firm conclusion to be drawn. The small sample size was also insufficient to draw firm conclusion.

The audit also raises question over the appropriateness of route of administration of antibiotics. The OUH trust has recently implemented a policy allowing pharmacist based substitution of intravenous to oral metronidazole, however lower gastrointestinal surgeons have expressed concern over the absorption of oral metronidazole following surgery to the lower gastrointestinal tract. This needs to be explored further to take postoperative complications (e.g. ileus, vomiting) into account.

Although firm conclusion cannot be drawn, a clear need for policy review is demonstrated. A multi disciplinary approach, including surgeons, infectious disease doctors and pharmacists is needed to ensure policy and local practice reflects each other and have a firm evidence base.

References
Introduction
This audit follows on from a previous audit of pharmacist interventions on discharge prescriptions (TTOs), completed in November 2010. This was carried out before the introduction of an Electronic Prescribing and Medicines Administration (EPMA) system at the Royal Liverpool University Hospital (RLUH).

Objectives
To assess the number and clinical significance of pharmacist interventions on TTOs, and to compare the results with previous findings before the introduction of EPMA.

Method
The study was carried out on 36 wards (21 medical and 15 surgical wards) at the RLUH. Electronic TTOs received within a five day period, 12-16 November 2012, were available to audit. Doctors generated an “unauthorised” TTO by selecting medication for discharge and this was compared to the final pharmacist-verified TTO. Data collected included the ward, number of items, type of pharmacist verifying the TTOs (e.g. independent prescriber), and if it was authorised at ward level or in the dispensary. Changes that had been made to the “unauthorised” prescription by a doctor or a pharmacist were recorded and coded by type and assessed for severity. The severity score was based on an existing model for assessing prescribing error severity.

Score 1: Minor significance; no effect on patient outcome (e.g. adding “if required” to analgesia, changing dosage form from liquid to tablets).
Score 2: Moderate significance; potentially undesirable for patient outcome (e.g. endorsing the correct insulin device or inhaler device).
Score 3: Major significance; potentially detrimental for patient outcome (e.g. inappropriate inclusions and important omissions of drugs, dosage correction including failure to taper steroids, inappropriate antibiotic choice/ course lengths).

Results
A total of 295 out of 438 TTOs were audited (67.4%). 32.6% of TTOs were not included because the “unauthorised” prescription was not available to the investigator.

Pharmacists made an intervention on over half (52.9%) of all TTOs received, affecting 331 (13.9%) of 2381 prescribed items. This gave an average of 1.12 pharmacist interventions per TTO, with an average severity score of 2.58. This compares to 56.1% of prescriptions requiring a pharmacist intervention at discharge pre-EPMA, equating to 1.30 pharmacist interventions per TTO, with an average severity score of 1.92.

About a third (32.9%) of prescriptions had an intervention in the ‘major’ category, those potentially detrimental to patient outcomes. The nature of the interventions are summarised in table 1.

Pharmacist independent prescribers made more interventions (1.58 per prescription) compared to non-prescribing pharmacists (0.96 per prescription). However, there was no significant difference in the severity of the interventions between the two groups. Similar results were seen when non-rotational pharmacists and rotational pharmacists were compared.

TTOs verified by a pharmacist on the ward had a higher intervention rate compared to the dispensary, 1.21 interventions per TTO compared to 0.67, respectively. However, there was no significant difference in the severity of the interventions.

Table 1 Nature and severity of pharmacist interventions on 295 TTOs at RLUH

<table>
<thead>
<tr>
<th>Category of intervention</th>
<th>Minor</th>
<th>Moderate</th>
<th>Major</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose amended</td>
<td>0</td>
<td>18</td>
<td>31</td>
<td>49</td>
</tr>
<tr>
<td>Dose interval amended</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Dose formulation amended</td>
<td>15</td>
<td>9</td>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>Route amended</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Instructions amended</td>
<td>31</td>
<td>8</td>
<td>9</td>
<td>48</td>
</tr>
<tr>
<td>Drug added</td>
<td>33</td>
<td>87</td>
<td>121</td>
<td></td>
</tr>
<tr>
<td>Drug removed</td>
<td>5</td>
<td>17</td>
<td>21</td>
<td>43</td>
</tr>
<tr>
<td>Notes added</td>
<td>6</td>
<td>10</td>
<td>13</td>
<td>29</td>
</tr>
<tr>
<td>Notes removed</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total amendments</td>
<td>66</td>
<td>99</td>
<td>166</td>
<td>331</td>
</tr>
<tr>
<td>Prescriptions affected</td>
<td>42 (14.2%)</td>
<td>70 (23.7%)</td>
<td>97 (32.9%)</td>
<td>156 (52.9%)</td>
</tr>
</tbody>
</table>

Discussion
Ethics committee approval was not required for this audit because no changes to regular practice were necessary.

When compared to the previous audit carried out in 2010, slightly fewer (3.2%) prescriptions required a pharmacist intervention at discharge. However, the severity of the interventions has shifted with the number of major interventions increasing by 12.2%. When comparing the type of pharmacist interventions between the two audits, the findings show that the number of interventions in the “drug added” category has significantly increased post-EPMA; however the audit was not powered to determine the reason for this.

Pharmacist intervention rates nearly doubled when TTOs were authorised at ward level as opposed to in the dispensary. This is likely to be because the ward pharmacist has access to the patient, their notes and the doctors involved with the patients care thus will identify more issues about the patient’s needs and condition. Hence, every effort should be made to ensure systems are put in place to allow pharmacists to verify discharge prescriptions at ward level.

It was not within the scope of this audit to determine each patient’s medical history which may have affected the severity score of any given intervention. Also, it was beyond the scope of this audit to identify whether the interventions made were appropriate, or if the pharmacist had noticed all the required interventions.

This audit confirms that pharmacists remain essential to the safe and cost-effective discharge of patients from hospital after the introduction of EPMA.

References
Background.
The Specialist Care Event Monitoring (SCM) registry study design is a new methodology developed parallel with the new legislative requirement for pharmaceutical companies to undertake a Risk Management Plan as part of post-authorisation safety monitoring. (1) These observational pharmacoepidemiological post-marketing studies are designed to monitor the use and safety of a new drug prescribed to a patient population under the care of specialists, including those who may be more complex in terms of underlying disease, co-morbidities and concomitant medications than in the general disease population. Thus in contrast to primary care based studies, risk estimates are likely to be less subject to the influence of selection bias based on concurrent health status/disease severity by capturing first ever prescriptions from specialists.

The principle approach of pharmacovigilance that pharmacists are aware of and involved in is spontaneous adverse drug reaction (ADR) reporting. Pharmacists play important roles in influencing drug policy, use and outcomes through collaboration with other health care professionals (HCPs). Pharmacists’ involvement in developing treatment guidelines, pharmaceutical care practices, health screening and monitoring (e.g. for issues related to treatment concordance) they are well placed to provide a positive contribution in pharmacoepidemiological research. Clinical pharmacists could improve the success of SCM studies by contributing to: methodological aspects at the design stage; implementation of signalling processes to alert study investigators of eligible patients (referral of patients to study investigators); and monitoring and reporting adverse events.

Sycrest® (asenapine) is a novel atypical antipsychotic agent launched January 2012 in the UK used in the treatment of moderate to severe manic episodes associated with bipolar I disorder and schizophrenia in adults. (2) OBSERVA is being conducted as part of the Risk Management Plan to proactively monitor the short-term (up to 12 weeks) safety and drug utilisation of asenapine prescribed to patients by psychiatrists in a mental health care setting in England and Wales. The study design is summarised in Figure 1.

Figure 1. OBSERVA SCM registry study outline

**Asenapine approved, DSRU decides to monitor drug**

- Prescribers in secondary care enrolled to study, consent obtained from patients started treatment in secondary care and simple baseline questionnaire completed
- 12 week questionnaires completed by prescribers irrespective of patient stopped. Questionnaires returned, data entered. If discharged to primary care, GPs contacted to capture relevant outcome and exposure data
- Data reviewed by Research Fellow
- Events of interest followed up
- Confidentiality & security carefully maintained

Objectives
To describe the rationale, challenges and study design choices of OBSERVA and to discuss opportunities for clinical pharmacists to expand their professional roles.

Methods.
A single exposure observational cohort design to collect exposure and outcome data on a cohort of evaluable patients prescribed asenapine over 2 years. Patients will be identified via specialist networks and data obtained from existing medical records on prognostic/risk factors, exposure and specific outcomes. There are no specific exclusion criteria. Important considerations include facilitating recruitment of patients with mental health conditions who may have difficulty in providing consent/participation in research, whether a counterfactual comparator cohort can be identified and external factors influencing drug availability. Primary foci will quantify the incidence of selected identified risks which are not currently well-characterized; secondary foci will describe potential risks, off-label /precautions use, and outcomes often subject to misascertainment (adherence, reported misuse/diversion).

Results.
A positive ethics opinion was received July 2011. Since November 2012, 12 investigative sites have engaged with full Research & development approval

**Methodological considerations.** The desire is to study asenapine use in a more heterogeneous population that those observed in clinical trials. However, a potential weakness of this (and any observational study) is selection bias arising because of certain patient characteristics which influence the probability of being treated. Bias may also be introduced by external factors such as clinical setting, the physicians’ natural caution for adopting new medicines and influences on prescribing (e.g. expert committee guidelines).

OBSERVA has been adopted by the Mental Health Research Network in England and Wales, who collaborate in multi-site enrolment of investigative sites and patient recruitment (initially where the product has been adopted on the prescribing formulary), plus maintain engagement. Thus potential obstacles affecting recruitment such as lack of engagement of psychiatrists are likely to be minimised.

Since the design does not include an internal comparator, for estimating strength of association between exposure to asenapine and acute transient events associated with administration in such a diverse study population, the self controlled case series method will be employed. (3) This method is increasingly being used in pharmacoepidemiology because as a case only design it is: efficient relative to a standard cohort design, self-controlled in terms of fixed (time invariant) confounders (known and unknown) which are controlled for implicitly, with the emphasis on comparing time windows periods associated with high risk (i.e. after starting treatment) with low risk periods (when acute events are unlikely to occur).

Conclusions.
Well designed observational studies registries are an important and valuable approach to monitoring the post-marketing safety of new treatments. Identifying appropriate strategies during study design may help overcome recruitment challenges. This is anticipated to be of particular value given increasing legal demands for post-authorisation Pharmacovigilance, offering pharmacists new collaborative research opportunities in intensive monitoring programmes and to expand on their professional roles.

References
Introduction
Medication problems and non-adherence contribute to between 5 and 20% of all hospital admissions and readmissions, with almost half of these being foreseeable and therefore avoidable. Counselling of patients prior to discharge has been shown to improve drug knowledge and adherence, emphasising that patients can play a vital role in preventing errors when they have been appropriately educated about their medicines.1

There has been increasing interest regarding the role of patient satisfaction as a mediator between providing adequate information about medicines and levels of adherence.2 Limited studies have been conducted investigating the effects of discharge counselling on patient satisfaction and studies on its effects on adherence and readmission rates have shown variable results. These studies have been criticised for not including details of the counselling sessions undertaken and have also not used a targeted approach. The PREVENT tool was designed as an aid to identify patients at high risk of medicine related readmissions3 and aims to provide pharmacist with a way to target ‘high-risk’ patients.

Aim
To assess the effects of an enhanced discharge counselling service provided to ‘high risk’ patients has on patient satisfaction with information about medicines and hospital readmission rates.

Method
The local NHS Research and Ethics Committee granted approval for this study prior to the start of the data collection period.

All patients admitted to three general medical wards in the Bristol Royal Infirmary (BRI) between 1/9/12 and 30/9/12 were assessed using the PREVENT tool4 to establish whether they were at high risk of medicine related readmissions, and therefore eligible for inclusion in the study. Convenience sampling allocated patients in to either the control or intervention groups. The intervention group (n = 41) received a consultation with a pharmacist about their medicines, based on ‘the four E’s’ model5, prior to discharge and were given a medicine reminder card. The control group (n = 56) received the standard discharge service, with the nurse in charge providing the medication information. Level of satisfaction was assessed in both the control and intervention group by postage of a validated questionnaire6. After two weeks, any non-responders received a follow up letter, questionnaire and free-post return envelope. If no response was received after a further two weeks, they were classified as a non-responder. Data were inputted, cleaned and analysed using Statistical Package for the Social Sciences.

The patients were followed up one month post discharge to ascertain whether they had been readmitted to hospital. Case reports of all readmissions were prepared by the researcher. These were then reviewed by a team of healthcare professionals (2 doctors, 2 nurses and 2 pharmacists) to identify whether they were preventable medicine related readmissions7. Inter-rater reliability was assessed using Fleiss’ Kappa.

Results
The overall satisfaction with information about medicines score for the intervention group had a median of 12 (out of a maximum of 17) compared to 5 in the control group; this was a significantly higher result (U = 73.0, z = -4.45, p <0.001, r = -0.64). When each question was analysed individually, all but one (‘whether the medicines will affect your sex life’) achieved statistical significance. Additional comments were received on 17% of the returned questionnaires; a distinct difference between comments from the control and intervention groups was noted, with those from the intervention group being far more positive.

Sixteen readmissions were identified; 13 in the control group and 3 in the intervention group. This was not a significant result. One readmission was classed as being a preventable medicine related readmission, and although this was in the control group, it was too small a number for statistical significance. Fleiss’ Kappa inter-rater reliability analysis showed a high level of agreement between assessors.

Discussion/Conclusion
The benefits a medicine consultation has on patient satisfaction was proven through the significant increase in patient satisfaction with information provided in the intervention group. The positive additional comments received from the intervention group were also extremely encouraging.

Unfortunately the study group was too small to identify a significant reduction in preventable medicine related readmissions. However, the one readmission that was classified as a preventable medicine related readmission was in the control group, and could have been prevented if a consultation about medicines prior to discharge had occurred. Although not statistically significant, this result is promising.

In conclusion, providing a medication consultation to patients prior to discharge significantly increases patient satisfaction with information about medicines. By using the PREVENT tool the service can be targeted to those who will benefit the most. Future work is required including a larger sample so as to assess the impact on preventable medicine related readmissions.

References
Introduction
In practice it is well known that although large numbers of hospitals use medication reminder cards, compliance aids and large print labels, few trusts have a formal way of identifying and targeting patients who may benefit from such interventions. This may result in under use of these patient aids as well as wasting resources by providing them to patients who don’t require the additional help.

Professionals at North West London Hospitals Trust and Kings College London, have approached this problem by developing a tool to assess and identify patients who are considered to be at a high risk of medicine related readmissions (the PREVENT tool). The authors used other published tools, evidence from literature, action research and expert opinion to develop the tool, refining it through reflective practice, root cause analysis, and patient feedback. The aim of the tool is to help pharmacists identify patients and prioritise those at high risk.

Although being used successfully in North West London Hospitals Trust, the PREVENT tool has yet to be used in other trusts in the United Kingdom, and its usability and utility on a day-to-day basis in other NHS trusts needs to be established.

Aim
To investigate the usability and utility of the PREVENT tool in University Hospital Bristol NHS Foundation Trust (UHBristol).

Method
The local NHS Research and Ethics Committee granted approval for this study prior to the start of the data collection period. Permission to use the PREVENT tool in this research project was gained from one of the authors.

All pharmacists working in the Bristol Royal Infirmary who regularly cover a ward were placed on a list. Purposive sampling was conducted to select 8 pharmacists ensuring representation across agenda for change bands 6-8. This is a common method used in qualitative research to ensure inclusion of people with various experiences. The selected pharmacists were provided with a summary of the PREVENT tool and details of what their involvement in the study would entail. The pharmacists were instructed to use the tool when reviewing all patients on their wards during the first two weeks of September 2012. The approximate time taken to assess each patient was recorded.

Semi-structured interviews were conducted by the researcher to gain feedback from the pharmacists. The interviews were audio recorded and consent was obtained from participants on tape prior to starting each interview. Notes were taken by the researcher to supplement the recording. The recordings were replayed with key comments being noted.

Thematic analysis was undertaken by the researcher firstly by separating comments in to three main categories: those relating to ease of use of the tool, those relating to its usefulness, and those relating to time. Further qualitative analysis was carried out to identify if any common themes were connected to the grade of pharmacist or the type of ward. The average time taken to assess each patient using the tool was calculated for each participant to again identify any relationship to the grade of pharmacist or type of ward.

Results
There were no differing opinions about the ‘ease of use’ of the PREVENT tool between pharmacists of varying grades or experience. All participants were of the opinion that the tool was initially cumbersome but, with experience, became reasonably straightforward and easy to use in practice. None of the participants offered any ideas for improvement and agreed the tool provided a clear proforma to follow when assessing patients.

All participants could see the potential benefits of using the tool to target resources to those at high risk of medicine related readmissions, however there were differing opinions highlighted regarding the extent of the tools usefulness. These opinions were partly dependent on the type of ward/patient group covered by the pharmacist and partly dependent on the grade/experience of the pharmacist.

Time taken to assess each patient varied between 2 and 10 minutes; no association was seen between grade of pharmacist and time taken, but instead participants felt it was dependent on the complexity of the patient and access to the patient and their notes. All participants commented that the tool got quicker to use as they became more familiar with it.

When asked if they would use the tool on their wards on a daily basis, all pharmacists interviewed were unanimous in their positive reply.

Discussion/Conclusion
The PREVENT tool has favourable usability amongst UHBristol pharmacists and was accepted as a useful tool to enable efficient targeting of resources.

As the time taken to use the tool was dependent on two unpredictable variables (the complexity of the patient and ease of access to medical notes), it makes it difficult to deduce the impact using the tool would have on day-to-day practice. The time pharmacists have dedicated to clinical work at ward level varies greatly between and within trusts in the UK, reducing the generalisability of the results. The pharmacists at UHBristol are often pressed for time on their wards, especially those at band 6 level; therefore, although all pharmacists agreed using the tool would get faster as they became more familiar with it, in practice, it is reasonable to hypothesise, that when pushed for time other services would take priority.

The benefits of using the tool on specific wards or in specific patient groups was questioned, and which wards/specialties would be the most effective to target resources is an area that needs further investigation.

The interviewer was known to the participants as a colleague; this has the possibility of introducing response bias. As not all the comments were positive, this does not appear to have had a major effect in this study, but does however remain a potential limitation.

In summary, all pharmacists interviewed could see the benefits of using the PREVENT tool to identify patients at risk of medicine related readmissions, although questions remain on exactly which wards/specialties would be the most effective to target resources.

References
Introduction
Pharmacists’ presence on wards has developed to include activities such as medicines reconciliation, clinical screening of prescriptions and advising on medicines use to optimise patient care in line with NHS initiatives. Whilst there is an abundance of published work on pharmacists’ interventions in response to prescribing errors, there is little published work on quantification of ward-based activity which could then be used to suggest ways of improving the quality and productivity of ward-based pharmacy services. This audit aims to replicate a previous audit of ward-based pharmacy activity conducted at a London NHS Trust.

Objectives
The objectives of the audit were:
1. To quantify pharmacist ward based activity and determine the most frequent activities.
2. To determine trends in activity throughout the week.
3. To determine number of ‘waste activities’, e.g. duplication of work.
4. To determine the proportion of prescription reviews which identify problems

Method
The study ran for one week (Monday to Friday) in January 2013. Data were collected by ward based pharmacists each day using a tally system to record number of activities on a data collection form with pre-set fields for activities. Activities were split into three sections: when a new patient is admitted, activities continued throughout the hospital stay and activities on discharge. Ethics approval was not required for this study as no staff or patient data was utilised.

Results
Forty-two wards were covered each day during the study resulting in a total of 210 data collection forms, of which 11 forms were not returned. Nineteen different types of activity were recorded which accounted for a total of 9626 activities. The most frequent types of activity, which accounted for 58% of the total, were:
1. Review of prescribed medication (29% of total activity).
2. Communication of problems with prescriber (10%).
3. Order non-stock medicines (7%).
4. Check / verify medicines histories (6%).
5. Clinical checking of discharge prescriptions (TTHs) (6%).

The remaining 42% of activities involved amending prescriptions in line with trust policy (4%), therapeutic drug monitoring (TDM) follow-up and advice (2%), answering clinical queries (4%) and patient education (1%).

Trends shown in Table 1 demonstrate a peak in activity early in the week, particularly on admission activities, and an increase in discharge activity towards the end of the week.

Table 1: Trends in ward based pharmacist activity through the week

<table>
<thead>
<tr>
<th></th>
<th>Activities on admission</th>
<th>Activities throughout stay</th>
<th>Activities on discharge</th>
<th>Total activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>991</td>
<td>1261</td>
<td>290</td>
<td>2542</td>
</tr>
<tr>
<td>Tuesday</td>
<td>586</td>
<td>1066</td>
<td>326</td>
<td>1978</td>
</tr>
<tr>
<td>Wednesday</td>
<td>488</td>
<td>854</td>
<td>311</td>
<td>1654</td>
</tr>
<tr>
<td>Thursday</td>
<td>545</td>
<td>814</td>
<td>233</td>
<td>1593</td>
</tr>
<tr>
<td>Friday</td>
<td>542</td>
<td>966</td>
<td>353</td>
<td>1861</td>
</tr>
</tbody>
</table>

Complex drug histories (e.g. those requiring contact with more than one primary care provider or use of more than two sources to confirm) accounted for 19% of all drug histories verified by a pharmacist. Complex TTHs (e.g. those involving anticoagulants, compliance aids or controlled drugs) accounted for 19% of TTHs clinically checked by a pharmacist.

Of the total 3213 medication histories, prescription charts and TTHs reviewed, 44% were found to have problems; 30% of these problems were amended by the pharmacist in line with Trust policy and the remainder were communicated to the prescriber for review.

Of the 43 pharmacists covering the wards during the audit period, 10 were listed as independent or supplementary prescribers. Twenty-nine prescribing activities were conducted by pharmacists during the audit period, accounting for 0.3% of total activity.

Discussion and conclusion
The majority of pharmacist ward based time was spent on clinical screening of patients’ medication, communicating prescription problems to prescribers, completing medicines reconciliations and ordering medicines. Activity shows a general decline mid-week, with a slight increase on Friday (where discharge activity peaks); unsurprisingly Monday had the highest number of both admissions-related and overall activity due to a reduced pharmacy service over the weekend. Ordering medicines was the third most frequent activity performed by pharmacists. This activity is considered to be suitable for completion by a ward based technician, which would then facilitate an increase in pharmacists’ time for other activities.

Fifty-four per cent of prescriptions reviewed by a pharmacist were found to have problems, demonstrating that pharmacist screening of prescriptions is essential to patient care. Pharmacists amended prescriptions (in line with Trust policy) for 30% of all prescription problems identified, thus demonstrating their value in reducing time taken to resolve medicines-problems and optimising patient care. Waste activity was shown to be low; the most common waste activity being contacting the prescriber about problems previously communicated (58% of waste activity), which could be further reduced by either increasing amendments made by pharmacists or wider implementation of pharmacist prescribing.

Limitations included no record of time taken to complete activities. Some considerations tried to account for this (e.g. highlighting how many medicines reconciliations and TTHs were deemed to be “complex”), however, a further study to identify time spent on each task would provide more detailed information on where pharmacist time is used on the ward. Other areas for further study include analysis of prescription problems detected to determine the significance of the problems identified.

References
Introduction
In the Leeds Teaching Hospitals Trust (LTHT) almost 3000 outpatient prescriptions were dispensed for oral methotrexate (March 2012 to March 2013). The use of methotrexate is multifactorial due to its dual mechanism of action. Methotrexate is effective in treating many conditions in several specialities, however its mechanism of action can cause important and marked haematological side effects, of which prescribers and pharmacists are responsible for regulating and recognising. \(^1\)\(^2\) The National Patient Safety Agency (NPSA) released several alerts with recommendations for the safe prescribing and dispensing of oral methotrexate that all NHS and related organisations should adhere to.\(^3\)\(^4\)\(^5\) To support adherence to these alerts a pharmacy checklist has been developed which is attached to the outpatient prescription.

Aim
The primary aim of the audit was to establish if LTHT is compliant with the NPSA alert “Improving compliance with oral methotrexate guideline”. The secondary aim was to investigate whether local trust guidelines regarding prescription receipt and labelling are being followed.

Objectives
The first objective was to investigate adherence to the following local guidance:
- Patients receive appropriate patient information leaflets and a ‘patient-held monitoring and dosage booklet’ (blue book)
- Recent blood tests are documented in accordance with local shared care guidance

The second objective was to audit against the following standards, of which 100% compliance would be expected:
- The LTHT ‘methotrexate checklist’ is being fully completed prior to dispensing
- Methotrexate was being dispensed correctly according to strength of tablet and quantity
- Methotrexate was being labelled correctly with the correct wording and day of week which methotrexate should be taken

Method
The audit was undertaken in December 2012 and the data collected was retrospective from September to December 2012 inclusive. In total 42 prescriptions were audited and the data analysed. Outpatient prescriptions for methotrexate were the target population for this audit. Only one outpatient pharmacy was used to collect the data due to department inconsistencies with practice and variations of checklists. The exclusion criterion for the audit was 1) Oncology indications 2) Subcutaneous administration (prescribed through homecare services only). The pharmacy dispensing system was used to identify the cohort of patients to be audited.

The data collection tool was created and the auditor collated the results. The audit criteria were devised to cover the recommendations by the NPSA and the standards set out in trust’s standard operating procedures. Ethics committee approval was not required.

Results
Fifty seven per cent of the prescriptions audited had the form endorsed by the prescriber and of the prescriptions where checklists were present; the most common question to be completed correctly/fully was the dose to be taken (84%). The question that was answered the most poorly was the strength of tablet previously taken to ensure consistency (2%).

<table>
<thead>
<tr>
<th>Criteria</th>
<th>No (%) meeting criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescription: methotrexate prescribed as weekly dose</td>
<td>39 (93%)</td>
</tr>
<tr>
<td>Prescription: strength of tablets stated</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Pharmacy checklist attached to prescription</td>
<td>37 (88%)</td>
</tr>
<tr>
<td>Pharmacy checklist completed fully</td>
<td>3 (7%)</td>
</tr>
<tr>
<td>Methotrexate dispensed correctly</td>
<td>42 (100%)</td>
</tr>
<tr>
<td>Methotrexate labelled with the day on which to be taken</td>
<td>3 (7%)</td>
</tr>
</tbody>
</table>

Discussion
The results show that prescribing standards as recommended by the NPSA and required by local guidelines are adhered to poorly. Prescribers have a responsibility to ensure consistency with methotrexate to reduce potential risk and harms to the patient. The prescriptions required endorsements to be made by the pharmacist stipulating the strength of tablet to be supplied.

Although the reasons for not completing the checklist fully are not clear, lack of space on the checklist and confusion from technical/dispensing staff regarding what was expected may be attributable. SOP’s for the ‘safe processing of oral methotrexate prescriptions for outpatients’, instructs employees to ask the necessary questions on receipt of the prescription to ensure the NPSA recommendations are followed. There is no way of establishing when the checklists were completed or attached to the prescriptions audited (ie on receipt of the prescription or on handing out). However the low percent compliance of labelling the day of which the methotrexate is to be taken is an indication that the questions are not being asked or they are being asked once the medication has been dispensed. It is possible that not all prescriptions audited were assigned a checklist, conversely they may have and inadvertently been detached. The design of the pharmacy checklist appears not to support best practice and needs re-designing.

Recommendations to improve prescribing include further staff training and a pre-printed prescription template to help with safer prescribing. A trial of a new ‘Methotrexate Checklist’, which has a more structured approach, is being trialled. To establish if this has encouraged safer dispensing practices a re-audit to assess trust compliance in 12 months is also recommended. By updating current SOPs, further training can be provided to ensure and enforce correct use of the checklist by dispensary staff.

References
2. Johnston, Andrew; Guðjónsson, Johann Eli; Sigmundsdottir, Hekla; Runar Ludviksson, Björn; Valdimarsson, Hildur. “The anti-inflammatory action of methotrexate is not mediated by lymphocyte apoptosis, but by the suppression of activation and adhesion molecules”. Clinical Immunology 114 (2): (2005) 154–63
Introduction

Warfarin has demonstrated effectiveness in preventing primary and secondary thrombosis in a range of conditions such as atrial fibrillation and venous thromboembolism. However, optimising warfarin therapy can be challenging due to factors including unpredictable pharmacokinetics, numerous drug interactions and a narrow therapeutic window. A 2006 National Patient Safety Agency (NPSA) risk assessment identified the transfer of care of patients on warfarin as an area of particular concern with increased potential for error and patient harm. In our large teaching Trust, two specific tools were previously developed and implemented to support effective communication and safe transfer of care; a warfarin section within both the Trust’s inpatient drug chart and the Electronic Discharge Communication (EDC). In addition, within the Trust there is an expectation that all patients discharged on warfarin should have a patient-held record of their warfarin therapy using the well known ‘yellow book’ devised by the NPSA and British Society for Haematology. Accurate and comprehensive completion of these tools is an important aspect of communication across settings and safe transfer of patients on warfarin.

Objectives

- To assess the accuracy and extent of completion of these warfarin therapy communication tools within one of the hospitals of our Trust.
- To audit against the following standards: (1) all patients taking warfarin should have the warfarin section of their drug chart and EDC fully completed; (2) all patients should have their yellow book fully completed at discharge.

Method

The audit was carried out between March and April 2013. A data collection form was specifically designed, piloted and amended for the audit. Inpatients taking warfarin were identified via correspondence with the pharmacy warfarin technicians, checking the daily Trust-wide international normalised ratio (INR) report and EDC system. Data were collected on completion of the warfarin section of the drug chart and EDC. At the point of discharge, patients’ yellow books were reviewed and data collected on their completion. Ethics approval was not required as this was an audit.

Result

Data were collected over 17 days for 43 patients. Of the 43 patients, 12 (28%) were newly started on warfarin during their admission. None of the audit standards were fully achieved, with 31 (66%) inpatient drug charts and 42 (98%) EDCs completed. In addition, not all discharged patients on warfarin had a yellow book. Of the 31 patients who had been on warfarin at admission and who had a yellow book, only 14 (45%) brought their yellow book into hospital. Of the remaining 17 patients, a third stated that their clinic did not issue them with a yellow book or that they used alternative documentation (less than half the patients brought this alternative documentation with them). None of the 17 patients were issued with a yellow book during their inpatient stay. The 12 newly started warfarin patients were all issued with a yellow book, therefore 26 patients had a yellow book (60%). Due to investigator availability at the point of discharge, data on completion of the yellow book were not available for all patients; data were available for seven newly started patients. See Table 1 for results. At patient discharge, 11 yellow books had been fully completed, equating to 29% (11/38) of observed patients having a completed yellow book. Reasons for incomplete yellow books included a lack of clarity as to whose responsibility it was; with prescribers stating that pharmacy staff could complete it, and pharmacy staff stating that prescribers were best placed to complete the information.

Table 1 – Summary of missing information found in the yellow books of newly or previously started patients

<table>
<thead>
<tr>
<th>Documentation</th>
<th>Newly started</th>
<th>Previously started</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Information</td>
<td>N = 7</td>
<td>N = 14</td>
</tr>
<tr>
<td>Anticoagulant Clinic</td>
<td>3 (43%)</td>
<td>5 (36%)</td>
</tr>
<tr>
<td>GP Details</td>
<td>6 (86%)</td>
<td>5 (36%)</td>
</tr>
<tr>
<td>Condition Details</td>
<td>4 (57%)</td>
<td>5 (36%)</td>
</tr>
<tr>
<td>INR results/warfarin dosing</td>
<td>4 (57%)</td>
<td>8 (57%)</td>
</tr>
<tr>
<td>Date of next appointment</td>
<td>4 (57%)</td>
<td>3 (21%)</td>
</tr>
</tbody>
</table>

Discussion

This audit has established the need for further work to improve the completion of warfarin communication tools. The standard that all patients should have a completed yellow book was least well adhered to. The audit revealed that the majority of patients admitted on warfarin do not bring a yellow book into hospital, and that not all anticoagulation clinics provide patients with yellow books. It is a NPSA requirement that a written record of a patient’s anticoagulation control be provided to patients, however it does not mandate that this be in the form of a yellow book. The proportion of patients admitted into the Trust hospital attending clinics that used alternative patient-held documentation was unexpected.

The results of the audit therefore call for a review to current guidance regarding yellow books; a key question to answer is “Should all patients discharged from the Trust on warfarin have a yellow book?” (e.g. even if their anticoagulation clinic does not use them or even if they have a yellow book at home)? Actions that should be implemented to improve adherence to standards include: collaborating with the Trust’s anticoagulation clinics as well as other local clinics to remind / educate warfarin patients to bring their hand-held anticoagulation control record to hospital with them; clarifying the role of the healthcare team in completing communication tools and highlighting the importance of comprehensive and accurate completion of these tools. An emphasis on the role of pharmacists in reviewing the accuracy of the patient-held record as part of the screening process is also required. Once these actions have been implemented and the standards appropriately revised another audit should be undertaken. Limitations of this audit included the relatively small number of patients, lack of data collection for patients discharged over the weekend and incomplete data on completion of patients’ yellow books due to logistics of investigator availability at patient discharge. Warfarin continues to be one of the drugs most frequently implicated in preventable hospital admissions and transfer of care can increase the potential for harm, therefore adhering to communication standards remains a priority to facilitate safety of the patient pathway.

References

21. Continuing education session programme in a pharmacy department – does it meet expectations?

Nickless G, McFarlane F. Wirral University Teaching Hospitals NHS Foundation Trust

Introduction

Pharmacists are required to undertake mandatory continuing professional development (CPD) to maintain registration with the GPhC. One of the aims of the Francis Report is for trusts to enhance education, training and support of staff. One of the roles of the Education and Training (E&T) team at Wirral University Teaching Hospital NHS Foundation Trust (WUTH) is to co-ordinate the departmental continuing education (CE) session programme for pharmacists. Each week one or two CE sessions (covering areas such as updates in clinical specialties, audit results feedback and conference feedback) are provided for pharmacists. All pharmacists are asked to deliver a CE session each year and whilst attendance is not compulsory it is strongly encouraged. The programme, in its current format, has been running for over five years and has never been formally evaluated.

Objectives
• Evaluate pharmacists’ opinions of the current arrangements for departmental continuing education sessions
• Identify which topics are most / least useful to pharmacists
• Identify which topics pharmacists would like repeated on a periodic basis

Method

A questionnaire using a mixture of open and closed questions was designed using Survey Monkey© (to ensure anonymised responses) and sent via e-mail to all pharmacists currently working in the department in August 2012. Likert scales (scores 1-5) were used for questions asking staff to rate the usefulness of functions or indicate their level of agreement with a statement. Reminders were sent to staff to try to maximise the response rate. Ethical approval was not deemed to be necessary since this was a service evaluation.

Results

A response rate of 44% (23/52 pharmacists) was achieved. The frequency of sessions was deemed “about right” by 70% of respondents; 30% considered the frequency “too many”. Respondents were generally in agreement that all staff should contribute to the delivery of sessions (average Likert score = 4.09/5) and that some topics should be repeated on an annual basis (average Likert score = 4.3/5). Respondents did not agree that attendance should be compulsory if they had other commitments (average Likert score =2.34 /5).

Table 1: Pharmacists’ opinions of the usefulness of the CE sessions’ themes (1= no value, 5 = extremely valuable)

<table>
<thead>
<tr>
<th>CE Session Type</th>
<th>Average score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical updates / refreshers from specialist pharmacists</td>
<td>4.61</td>
</tr>
<tr>
<td>Departmental issues</td>
<td>4.17</td>
</tr>
<tr>
<td>Procedural topics (e.g. major incident, clinical trials)</td>
<td>4.09</td>
</tr>
<tr>
<td>Feedback on audits conducted</td>
<td>4.0</td>
</tr>
<tr>
<td>Diploma case studies</td>
<td>3.52</td>
</tr>
<tr>
<td>Feedback from conferences</td>
<td>3.0</td>
</tr>
</tbody>
</table>

The most commonly suggested topics to be repeated at least annually were:
• Clinical topics (20 in total):
  o Cardiology topics (7)
  o Updates from specialists on their area (5)
  o Anticoagulation (3)
  o Respiratory topics (3)
  o Diabetes topics (2)
  o Guidelines updates (2)
• Staff development (7 in total):
  o Support with individual review process (4)
  o CPD recording (3)

Discussion and Conclusion

Pharmacists generally feel that the current frequency of CE sessions is adequate. There was strong agreement that all staff should contribute to the delivery of these sessions. Pharmacists were keen that some topics need to be repeated on at least an annual basis. The topics suggested for repetition tended to cover two main themes:
• Clinical topics commonly encountered in practice e.g. cardiology, respiratory and anticoagulation. The Trust has a target for reducing the number of patients with INRs > 8, so it was not surprising to see anticoagulation suggested. Since pharmacists considered clinical updates / refreshers from specialist pharmacists to be the most useful type of CE session, clinical topics would be expected to be the most common type of session suggested for repeating at least annually.
• Individual staff development e.g. CPD recording to meet GPhC requirements and appraisal preparation to ensure adequate preparation for their annual review.

Pharmacists considered feedback from conferences to be the least useful topic for a CE session. This suggests that presenters may need guidance on what to cover in their feedback session. Additionally it would be helpful to explore attendees’ expectations in more depth in order to maximise the usefulness of conference feedback sessions. Diploma case studies were considered to be the 2nd least valuable topic; one possible reason could be that attendees feel they learn more from experts in a particular area. A potential way to make attendance at these presentations more beneficial to all staff would be to introduce an element of peer review to the session. Peer review would enable attendees who are fairly familiar with the topic covered by the case presentation to have an opportunity to develop a different skill. The Pharmacy department plan to introduce this practice in the near future.

There were a few limitations to this study. Firstly less than half of the pharmacists in the department responded (possible due to work pressures); however low response rates are not uncommon for this type of study. It was outside the scope of the study to evaluate if attendance at CE sessions actually increased staff knowledge and improved practice. Generalisability of the findings could be questioned but since WUTH deals a variety of specialties, results may not be too dissimilar in other organisations. This study will be repeated after implementing the recommendations to evaluate their impact.

References
Introduction
Pharmacists are required to undertake mandatory continuing professional development (CPD) to maintain registration with the GPhC. The Francis Report has recommended that trusts aim to enhance education, training and support of staff\(^1\). The pharmacy department at Wirral University Teaching Hospitals NHS Foundation Trust has had an official Education and Training (E&T) team for approximately seven years. The team are involved in numerous activities including co-ordinating the departmental continuing education (CE) sessions, supporting individuals with the individual review (IR) process, sign-posting staff to courses, developing the rotational training programme for junior pharmacists and co-ordinating the department’s involvement in the education of pharmacy undergraduates, medical students and junior doctors. Staff views regarding the E&T team have never been formally evaluated.

Objectives
- Evaluate pharmacists’ opinions of the help offered to them by the E&T team
- Identify areas where the E&T team could offer more assistance to pharmacists

Method
A questionnaire using a mixture of open and closed questions was designed using Survey Monkey\(®\) (to anonymise responses) and sent via e-mail to all pharmacists currently working in the department in August 2012. Likert scales (scores 1-5) were used for questions asking staff to rate the usefulness of functions. Reminders were sent to staff to try to maximise the response rate. Ethical approval was not needed for this study as it was a service evaluation.

Results
The survey was circulated to 52 pharmacists (both part and full time), of which 23 responded to the on-line survey (44% response). The main results are summarised in Table 1.

<table>
<thead>
<tr>
<th>Question</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPD recording</td>
<td>3.94</td>
</tr>
<tr>
<td>Preparing for and conducting appraisals</td>
<td>3.82</td>
</tr>
<tr>
<td>Delivering an undergraduate student visit</td>
<td>3.59</td>
</tr>
<tr>
<td>Delivering a continuing education (CE) session</td>
<td>3.57</td>
</tr>
<tr>
<td>Signposting to courses available within Trust</td>
<td>3.45</td>
</tr>
<tr>
<td>Conducting ward based assessments for junior pharmacists (seniors only)</td>
<td>3.36</td>
</tr>
<tr>
<td>Preparing for ward based assessments (junior pharmacists only)</td>
<td>3.11</td>
</tr>
<tr>
<td>Review of training materials produced</td>
<td>3.05</td>
</tr>
<tr>
<td>Applying for courses</td>
<td>2.86</td>
</tr>
<tr>
<td>Signposting for courses external to the Trust</td>
<td>2.8</td>
</tr>
</tbody>
</table>

The most commonly cited strengths of the team were:
- Preparation of the CE sessions timetable (8)
- Approachable / helpful / supportive / organised (6)
- Supporting all hospitals staff, e.g. doctors (3)
- Support when writing articles / reports, encouraging staff to present at conferences (2)
- Knowledgeable on a whole range of subjects (2)

The most commonly cited areas for improvement were:
- Support for junior pharmacists in their training (4)
- Accessibility / unclear exactly what the E&T can help you with and how best to engage them (3). One respondent also suggested designating a day each month or fortnight for a drop in session / confidential advice; especially for diploma students who may feel they need specific support with one particular area before they encounter problems
- Streamline paperwork (e.g. for inductions, appraisals, junior pharmacist training) (3)

Some examples of general comments received included:
- “A really popular and respected team - an asset to any department!”
- “Overall very proud of E&T team and enjoy most of the education offered. Feel not supplying enough information of external courses or careers opportunities”

Discussion and Conclusion
Pharmacists were generally positive with their comments about the E&T team and consider them to be approachable and well organised. They value the CE session programme, help offered with CPD recording and assistance with preparing for appraisals. Staff were least satisfied with information and assistance with applications for external courses. However, this may partly reflect the reduced funding available for such courses in the NHS’s current financial climate. A member of the E&T team now circulates a monthly bulletin that they receive highlighting training opportunities within the North West. Help with producing training materials also received a relatively low satisfaction score. During this study the E&T team began work on standardising departmental training packs and all materials now need to be reviewed by the E&T team before they are implemented. However, staff weren’t informed of this at the time so this action is unlikely to have biased results.

Two areas highlighted for improvement were making the E&T team’s roles clearer to staff and supporting junior pharmacists with their training. The E&T team’s induction checklist for new staff is being reviewed to address this as part of a wider review of the induction process. A recent review of the departmental structure has allowed a member of the E&T team to provide more training and support to the junior pharmacists. The E&T team will repeat this review in a year’s time to evaluate the measures implemented.

Two main limitations to this study. Firstly, responses received from less than half the pharmacists, (possibly due to work pressures); however, low response rates are not uncommon in this type of study. Secondly, there was no correlation made between responses given and grade of pharmacist. It would have been useful to review if different grades of pharmacist responded differently. Generalisability to other Trusts’ pharmacy departments cannot be assumed, but the department at WUTH contains pharmacists at different grades with varying levels of experience.

References
Introduction

In January 2010 NICE released CG92 entitled Venous Thromboembolism: Reducing the risk. This stated that approximately 25,000 people in the UK die from preventable hospital-acquired venous thromboembolism (VTE) every year. One way of reducing VTE risk is by pharmacological VTE prophylaxis with dalteparin. Dalteparin prescribing increased at Buckinghamshire Healthcare Trust (BHT) as a result of CG92. However there were reports of missed doses and confusion over responsibility of ongoing patient monitoring and prescribing as it was not assigned to primary or secondary care. In response to this, BHT developed the Dalteparin Amber Initiation Guideline (AIG) (116.1) which provided prescribing and monitoring guidance for dalteparin for primary and secondary healthcare professionals.

This audit aims to assess compliance with this guideline.

The BHT Dalteparin AIG states that all treatment doses and the first 6 weeks of prophylactic dalteparin doses should be prescribed, supplied and monitored by secondary care. After 6 weeks, the GP can continue prescribing prophylactic doses for patients with active cancer or requiring ongoing cancer treatment, immobile patients where oral anticoagulation is not suitable and high-risk patients for travel. All prescribing for obstetrics and gynaecology should remain under secondary care and all biochemical and haematological monitoring should be hospital only.

Adverse effects of dalteparin include Heparin Induced Thrombocytopenia and Thrombosis (HITT), haemorrhage, elevation of liver transaminases and hyperkalaemia due to aldosterone secretion inhibition. Therefore the AIG requires all patients prescribed prophylactic doses to undergo monitoring of FBC, U&Es, LFTs, and the patients weight be recorded before dalteparin is initiated and then FBC monitoring on days 1, 5, 9 and 14.

Compliance with this guideline supports safe and effective prescribing of dalteparin as well as reducing risk to patients and costs from treating long-term morbidities associated with VTE.

Objectives

- To identify all patients discharged on dalteparin during the audit period (5th to 9th November 2012)
- To assess the appropriateness of the dalteparin dose and quantity prescribed and dispensed
- To assess whether monitoring is being conducted in accordance with BHT AIG 116.1

Methods

A five-day prospective data collection from 5th to 9th November 2012 was undertaken at acute Trust sites, Stoke Mandeville Hospital and Wycombe Hospital. Data which included patient demographics, dalteparin dose, duration and indication was collected using a data collection form designed for the audit. This was completed by ward and dispensary pharmacists for all dalteparin outpatient and discharge prescriptions. The form was piloted and amendments were made to make the form easier to use. JAC pharmacy and prescribing system was used to confirm the quantity of dalteparin dispensed for the cohort of patients. Indigo Review (Trust biochemistry monitoring software) was used to track monitoring. Ethics approval was not required.

Results

Data was collected for 46 patients consisting of 10 patients prescribed treatment and 36 prescribed prophylactic doses. This comprised 33 discharge and 13 outpatient prescriptions.

A weight was known for 39 of 46 patients; 7 prophylactic dalteparin prescriptions were dispensed without knowing a weight.

<table>
<thead>
<tr>
<th>Standards</th>
<th>Target</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct dose prescribed for patient’s weight (n=46)</td>
<td>100%</td>
<td>76%</td>
</tr>
<tr>
<td>Correct dose dispensed for patient’s weight (n=46)</td>
<td>100%</td>
<td>85%</td>
</tr>
<tr>
<td>First 6 weeks of prophylactic doses prescribed and supplied by the hospital (n=36)</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>All treatment doses supplied by the hospital (n=10)</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Monitoring performed in accordance with AIG (n=256)</td>
<td>100%</td>
<td>49%</td>
</tr>
</tbody>
</table>

Table 1 – Audit standards, target percentages and achieved percentages

Discussion

To ensure an appropriate dose of dalteparin is prescribed and dispensed, the patient’s weight is required for both prophylactic and treatment doses. A weight was known for all treatment doses, however 7 prescriptions for prophylactic doses were dispensed without knowing the patients weight. Inclusion of the patient’s weight on all dalteparin prescriptions and compliance with BHT guideline 26, which states that all patients should have their weight recorded on the drug chart on admission, would help ensure a dose is given based on the patient’s weight. The current VTE risk assessment forms do not mention a prophylactic dose based on the patients weight and the ‘Stroke IC’ risk assessment form suggests a ‘default dose of 5000 units s/c daily’. Updating these forms to consider weight will highlight to prescribers and pharmacists that weight should also be considered for prophylaxis.

All prescriptions for dalteparin were prescribed and supplied with the correct quantity in accordance with the AIG. Monitoring performed in accordance with the AIG was 49%, which could have been caused by the monitoring requirements in the AIG and trust VTE guidelines contradicting each other. The AIG requires all patients to be monitored in accordance with the requirements stated above, however the Trust VTE guideline only requires surgical patients to obtain the full requirements. This is potentially confusing for the prescriber and therefore both guidelines need standardising. Postnatal patients may find it difficult to travel back into hospital for blood tests, which may have also contributed towards the low rate of monitoring. According to the British Committee for Standards in Haematology (BCSH) postnatal patients have a low risk of HITT and post-operative patients do not require routine platelet monitoring therefore reducing their monitoring requirements should be reviewed. Issuing blood cards to patients which state the date they need to obtain a blood test could also be undertaken to improve monitoring.

References

1) NICE CG92 Venous thromboembolism: reducing the risk - January 2010
2) 733.2 BHT Policy for Thromboprophylaxis in Adults
3) 116.1 BHT Dalteparin for Prophylactic use in Surgery, Oncology, Haematology and Medicine - Amber Initiation Guideline
5) Guideline 26 Physiological observations of adult non-obstetric inpatients, BHT
Background
Local Clinical Commissioning Groups have been working towards reducing the use of oxycodone (and fentanyl patches) due to the lack of clinical advantages over morphine and significant cost differences. Guidance from the National Institute for Clinical Excellence (NICE) recommends the use of regular morphine as first line therapy for patients in palliative care.

Oxycodone has been implicated in medication safety incidents. Locally, confusion between the two formulations of oxycodone (Oxycontin® and Oxynorm®) has occurred resulting in either potential overdose or poor analgesic effect. Potential for addiction to oxycodone is widely documented particularly in the USA. Concerns about its abuse potential have been expressed by general practitioners in our locality.

This audit aims to analyse the appropriateness of prescriptions for regular oral morphine and oxycodone to determine whether introduction of a policy to use morphine as first line strong opioid will result in a reduction in oxycodone use.

Objectives
- To define criteria for the use of oxycodone
- To identify patients prescribed regular oral oxycodone or morphine.
- To determine appropriateness of these prescriptions against defined criteria.
- To measure the incidence of routine prescription of adjuvant therapy to manage opioid side effects. e.g. antiemetics and laxatives.

Standards
The standards were set after discussion with Pain Team and Palliative Care consultants. Audit standards are:
1. 100% of patients are prescribed regular oral morphine unless contraindicated or an alternative is recommended by a pain management specialist prescriber: Situations where an alternative to morphine first line is justified include:
   - Renal impairment (eGFR<30) or fluctuating renal function
   - Hepatic impairment
   - True allergy to morphine
   - Intolerable side effects despite optimal management (e.g. nausea)
   - Patients with sickle cell disease where oxycodone is included in their pain management plan.
   - Specialist prescribing by pain team/palliative care
2. 100% of patients prescribed regular strong opioids are prescribed additional analgesia for breakthrough pain.
3. 100% of patients prescribed regular strong opioids are co-prescribed laxatives.
4. 100% of patients newly prescribed strong opioids are prescribed anti-emetics.

Method
Data were collected from the electronic prescribing system (EPMA) and electronic patient records (EPR) on a point-prevalence basis. All prescriptions for inpatients on each ward were screened on one occasion over a period of two weeks in February 2013. Paper-based prescriptions, paediatrics and maternity services were excluded from the audit. Data were collected for patients prescribed regular oral morphine or oxycodone using a piloted data collection proforma. The study was registered as an audit. Ethics approval was not required.

Results
Thirty-four patients prescribed regular oral morphine or oxycodone were identified. Eighteen patients were prescribed oxycodone and 16 were prescribed morphine (Table 1).

Table 1: Characteristics of prescriptions and patients prescribed regular oral opioids

<table>
<thead>
<tr>
<th>Regular opioid prescribed (n=34)</th>
<th>Morphine</th>
<th>Oxycodone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>Opioid prescribed by pain team/palliative care</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Patients with sickle cell disease</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Patients with possible hepatic impairment</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Inappropriate choice of opioid</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Patients prescribed opioids for breakthrough pain (n=32)</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Oxycodone prescribed for breakthrough pain</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Morphine prescribed for breakthrough pain</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>No opioid prescribed for breakthrough pain</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Patients prescribed laxatives</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Patients prescribed anti-emetics</td>
<td>10</td>
<td>14</td>
</tr>
</tbody>
</table>

Discussion
Standard 1 was not met as oxycodone was prescribed for 8 patients where morphine was not contraindicated (8/34, 24%). Five patients prescribed regular oxycodone were prescribed morphine for breakthrough pain, confirming that morphine could have been prescribed in preference to oxycodone. Standard 2 was not met. 6% (2/34) of patients were not prescribed breakthrough analgesia. Only 68% (n=23) of patients were co-prescribed laxatives. The number of patients newly prescribed opioids was not known as start dates could not be established for all patients prescribed opioids prior to admission.

Conclusion
More work is needed to ensure appropriate prescribing of oxycodone and to promote the use of morphine. This includes trust approval of a policy to use morphine first line, and agreement and promotion of criteria for appropriate use of oxycodone. This will empower pharmacists to challenge inappropriate prescribing. Order sets within EPMA can be used to direct prescribers towards choosing morphine first-line and to promote co-prescription of laxatives and anti-emetics. The impact of interventions and compliance with the agreed standards and the ‘Morphine First’ policy will be assessed on an ongoing basis.

References
Introduction

Previous studies have found that the majority of medication errors occur at the time of medication prescribing at the point of transitions of care. \[^2\] Critical care discharge summaries are written by junior doctors on transfer to general wards and were introduced three years ago at this hospital. They include information on medicines use, but are not checked by a pharmacist. A number of discrepancies have been informally observed when pharmacists have seen the document in the notes. In this Trust, all general wards have electronic prescribing, but the critical care units (ICU) still use paper drug charts. When patients arrive on the ward, the information in the paper drug chart is transcribed onto the electronic system. It is unknown whether information on the critical care discharge summary is used to inform this process and whether discrepancies in the summary make any difference to patient care.

Aim

- To evaluate the extent and impact of medication discrepancies at the point of handover at the interface between ICU and general wards.

Objectives

- To assess the accuracy of a patient’s ICU discharge summary regarding their current medication (on ICU) and medication history
- To assess the impact of discrepancies on care at ward level after ICU discharge

Method

100 patients with a discharge summary were randomly selected from a total of 377 patients discharged from ICU between July and September 2012. Of these 62 records were available.

Medication listed in the discharge summary was assessed for accuracy using the patient’s drug history, notes, drug chart and ICU records. Discrepancies were categorised as intentional or unintentional and recorded on a proforma piloted for the purpose. After discussion with the ICU pharmacist the investigator made this judgement. The total number of antibiotics and anticoagulants prescribed in ICU without a review date in the discharge summary was also recorded. The data were then entered onto a spread sheet and analysed.

Adverse outcomes recorded in the notes were noted.

Results

46/62 patients (74%) had at least one discrepancy. The maximum number of discrepancies one patient had was 16. A total of 277 medication discrepancies were found; 182 (66%) were unintentional. The mean number of unintentional discrepancies in patients with at least one discrepancy was 3.96 (182/46). Mean number of unintentional discrepancies in the total population was 2.95 (182/62).

The unintentional discrepancies were where the medication was either omitted from the ICU discharge summary completely or, the strength, dose, or frequency were missing. Of the 182 unintentional discrepancies, 85 (47%) were the omission of medication in the ICU discharge summary, which included medication history items (59, 32%). 62 (34%) were due to either anticoagulation therapy or antibiotic courses not having a review date and the remaining 35 (19%) were due to omission of dose, frequency or form. 65 antibiotics were prescribed in total, 22 (34%) were missing a review date.

Medication that was commonly omitted in the ICU discharge summary included paracetamol (8), proton pump inhibitors (8), opioid analgesia (6), laxatives (7), and antidiabetics (5). Reasons for these omissions in the ICU discharge summary were not noted and therefore could have had a great impact on a patient’s care particularly the medication that the patient was on prior to admission.

90% of patients had medicines prescribed electronically within 24 hours of transfer and 80% were reconciled by a pharmacist within 24 hours. However, occasionally medicines reconciliation on the ward was delayed by up to 4 days if transfer occurred at weekends.

Discussion

On average each patient had 3 discrepancies which included omission of medication prescribed in ICU, a medication history item, anticoagulation or an antibiotic. This is clinically significant as these omissions have the potential to cause harm to the patient if accurate information is not documented correctly at the time of transition of care.

A previous study found that the most common error was omission of a regularly used medication by the patient. \[^2\] In this study, 32.4% of unintentional discrepancies were omission of medication history items. Classes of medication included: cytotoxics, antiepileptics, antidepressants and antipsychotics.

Despite relatively rapid reconciliation by ward pharmacists, 11/62 patients (18%) suffered adverse incidents (pain, omission of critical medication) due to errors in discharge summaries.

The poor quality of ICU discharge summaries could be due to lack of training in medicines reconciliation, or low importance attached to handover of medication information. Discharge summaries are sometimes written too far in advance of actual discharge, or discharge is rushed when dealing with a severely unwell new admission.

Previous studies have shown that pharmacist involvement and targeting the intervention to a high risk patient population, such as those admitted to ICU, can reduce medication errors. \[^3\] One recommendation from this study would be that ICU pharmacists check the medicines section of the discharge summary.

References

Introduction
The Scottish Antimicrobial Prescribing Group (SAPG) was established in 2008 to lead the national antimicrobial stewardship programme. SAPG has produced a range of national guidance documents for antimicrobial management teams (AMTs) to implement at local level. In 2009, two options for gentamicin dosing (GGC; Greater Glasgow and Clyde) and Hartford guidelines for adult patients were endorsed by SAPG and implemented throughout NHS Scotland. This intervention aimed to improve the prescribing of these agents. However, previous studies have demonstrated that organisational infrastructure is important for effective use of guidelines and that barriers to physicians using guidelines arise from deficits in knowledge, attitudes and behaviours. Therefore, a quality improvement programme was commissioned to assess the impact of implementing the new guidelines and to provide a better understanding of the unintended consequences and patient safety issues that might arise. During 2010-11, a series of national quantitative and qualitative baseline studies were completed in collaboration with the Association of Scottish Antimicrobial Pharmacists (ASAP) to provide evidence for a programme of improvement which was developed and delivered during 2012-13.

Objectives
The objectives of the baseline phase were:
- To establish the extent of use of the guidance and determine the appropriateness of gentamicin and vancomycin prescribing and monitoring in hospitals throughout Scotland.
- To assess how fit for purpose the guidance was in supporting front-line clinicians to deliver safe and effective patient care.
- To produce recommendations for improvement interventions.

The objectives of the improvement phase were:
- To produce updated guidance for gentamicin and vancomycin use, supported by on-line calculators.
- To develop standardised documentation for prescribing and monitoring of gentamicin and vancomycin.
- To develop a national on-line education resource on gentamicin and vancomycin use to meet the learning needs of nursing, medical and pharmacy staff.

Methods
The programme did not require ethics approval. The baseline phase began with a Survey Monkey questionnaire that was sent to antimicrobial pharmacists from each of the 15 health boards across Scotland to seek feedback on local implementation of the gentamicin and vancomycin guidance. A point prevalence survey then examined compliance with the guidance by collecting data from all patients who were prescribed gentamicin and/or vancomycin on a specified date across acute hospitals in each health board. A qualitative study was also conducted using focus groups and one-to-one interviews. Data were analysed using the framework approach to identify relevant themes.

The improvement phase began with discussions at national meetings of SAPG and ASAP where key recommendations on the interventions required to improve the use of gentamicin and vancomycin were agreed. It was decided that the content and presentation of national guidance for gentamicin and vancomycin and the available on-line calculators should be updated. An additional online calculator for the Hartford gentamicin guidance was also required. It was also agreed that standard prescription charts for prescribing, administering and monitoring of gentamicin and vancomycin should be devised and that national educational material should be developed to support clinical staff in using gentamicin and vancomycin safely and effectively.

Results
The baseline phase confirmed implementation of the guidance across NHS Scotland and use of on-line calculates in most board areas. Some boards used specific prescription forms and 81% provided education for staff on gentamicin and vancomycin use. Results from the point prevalence study demonstrated that both agents were generally prescribed in accordance with the SAPG guidance; however, a number of areas for quality improvement were identified. The initial gentamicin or vancomycin loading dose was consistent with the SAPG guidance in 61% and 65% of patients, respectively. In the qualitative study, 27 pharmacists and 32 doctors provided largely positive feedback on the content of the gentamicin and vancomycin guidelines. However, they identified barriers to implementing the guidelines and suggested methods that could be used to improve prescribers’ knowledge of prescribing and monitoring.

Using the information from the baseline phase, the SAPG guidance was updated. Previous calculators for gentamicin (Greater Glasgow and Clyde guidance) and vancomycin were updated and a new calculator was created to support the Hartford gentamicin guidance. These resources were tested and disseminated to health boards for implementation and also made available via the SAPG website. Prescription and monitoring charts were developed to support the two gentamicin regimens and were evaluated in several health boards prior to national implementation in July 2013. Prescription and monitoring charts for vancomycin are currently being tested. Two educational resources, comprising a series of case studies that cover practical and clinical aspects of prescribing, monitoring and administering gentamicin or vancomycin have been developed for online learning using learnPro®, a learning platform available in all health boards.

Conclusion
This quality improvement programme has highlighted the benefits of national multi-professional collaboration to develop, test and implement initiatives to improve the management of serious infections in hospital patients. Standardisation of guidance and documentation for gentamicin and vancomycin has been welcomed by the clinical community. The identification of training needs has enabled development of a readily accessible national multi-professional e-learning resource. These resources are now being utilised by all clinical frontline staff to minimise harm from these agents and to support their effective use.

References
Introduction

It is widely acknowledged that patients who present to hospital with clinical signs indicative of infection will be initiated on antimicrobial treatment. Therapy should be guided by the clinical information available at the point of review and guidelines developed locally. Decreased antibiotic innovation and increasing antibiotic resistance is of growing concern and the number of patients who present with antibiotic-resistant infections is increasing. Inappropriate prescribing of antibiotics contributes to antibiotic resistance, failed or impaired clinical cure and healthcare associated infections (HCAI). In Aneurin Bevan Health Board (ABHB), antimicrobial prescribing should be undertaken in compliance to the ABHB Adult Antibiotic Guidelines.

Aim

To determine the extent to which antibiotic prescribing on the medical admission wards at the Royal Gwent Hospital (RGH) comply with ABHB Adult Antibiotic Guidelines.

Objectives

- To establish the percentage of patients prescribed antibiotics that comply with the ABHB Adult Antibiotic Guidelines, for the relevant clinical condition, on the medical admission wards;
- To review patients prescribed restricted antibiotics and determine the percentage of these that have microbiology approval where required;
- To establish the percentage of patients who have a duration or review date specified on their prescription chart and/or in their medication notes.

Method

Standards were designed in accordance with the ABHB Adult Antibiotic Guidelines and audit objectives. Audit standards were that; 100% of patients should have antibiotics prescribed in line with the relevant clinical indication; 100% of patients prescribed restricted antibiotics should have microbiology approval where required and 100% of patients prescribed antibiotics should have a duration or review date specified. Ethics approval was not required because all data collected was for audit purposes. A pilot study was undertaken to evaluate the data collection tool and identify potential issues with audit logistics.

All medical patients who had been admitted to RGH via the medical admission wards and who had been prescribed antibiotics were reviewed. Surgical and paediatric patients were excluded from final data collection to reduce bias. Data was collected over a two-week period in May 2012 on the medical admission wards within RGH. Retrospective data was also collected for all medical patients who received antibiotics in Accident and Emergency (A&E) and were admitted directly to a medical ward bypassing the medical admissions area.

Data was reported in terms of compliance to the audit standards and thematically analysed based upon clinical indication.

Results

A total of 76 patients and prescriptions for 95 antibiotic items were included in the audit. Three patients had antibiotics prescribed for indications not listed in the ABHB Antibiotic Guidelines. These were excluded from analysis for this standard. Non-compliant antibiotic prescribing, according to specific clinical indication, was identified in 39 patients [53% (n=73)]. See Table 1. Fourteen patients were prescribed restricted antibiotics, accounting for 14 of the total 95 antibiotic items prescribed. Microbiology approval for restricted antibiotics was not obtained by prescribers for 5 of these patients [35% (n=14)]. Durations and/or review dates were not specified on the medication chart, or in the medical notes, in 59 patients reviewed [78% (n=76)].

Table 1: Non-compliant antibiotic prescribing ranked by clinical indication (n=39)

<table>
<thead>
<tr>
<th>Indication</th>
<th>Number of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Acquired Pneumonia (CAP)</td>
<td>16</td>
<td>41</td>
</tr>
<tr>
<td>Mixed diagnosis / indications</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>Urinary Tract Infection (UTI)</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>Cellulitis</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Exacerbation of COPD</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Hospital Acquired Pneumonia (HAP)</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Discussion / Conclusion

The audit outlined that antibiotic prescribing on the medical admission wards at RGH did not meet the required standard. Just over half of the patients who were included in the audit received antibiotics that were not recommended in the local policy for the treatment of their clinical indication. This data highlights a growing concern that inappropriate antibiotic prescribing could contribute to increasing emergence of antibiotic-resistant infections and potential treatment failure. Given the proportion of non-compliant prescribing, all reasons for non-compliance should be investigated to ensure patient safety is maintained. Scheduled focus groups and/or presentation of results to the medical directorate are planned to investigate reasons for non-compliance.

The method by which microbiology advice is gained by prescribers should be reviewed with regard to restricted antibiotics. Implementation of antibiotic review at 48 hours, as per Department of Health (DoH) guidelines, would improve compliance to the ABHB Adult Antibiotic Guideline, thus improving the overall quality of antibiotic prescribing at RGH. A 48-hour review would allow prescribers access to the relevant clinical information and enforce a review in a timely manner, leading to reduced inappropriate antibiotic prescribing. The implementation of the 48-hour review is due to be discussed with a scheduled focus group, Microbiology and Medical directorate clinicians.

Indications identified outside of the current guidelines should be reviewed and discussed with Microbiology, with a view to including these in updated editions to standardise prescribing across the Health Board.

The audit was limited in terms of time available for data collection and retrospective justification of non-compliant antibiotic prescribing. Further work is necessary to investigate the reasons for non-compliance and to address the issues regarding inappropriate antibiotic prescribing.

References:

Introduction

‘Antimicrobial Stewardship: Start Smart - Then Focus’ specifically highlights the use of point prevalence studies to monitor compliance with the Trust’s antimicrobial stewardship programme.

The Trust had manually undertaken annual point prevalence studies (PPS) between 2003 and 2009. Since 2009, a series of ‘mini audits’ have been carried out focusing specifically on documentation of indication, duration and appropriate IV to oral switch. As a result of these ‘mini audits’, three Key Performance Indicators (KPI’s) were introduced throughout the Trust in April 2011 to monitor prescribing of antimicrobials.

Electronic Prescription and Medication Administration (EPMA) System was introduced within the Trust in 2009 and rolled out to all adult, non-critical care wards over the following three years. The system records the electronic prescription, and documentation of administration of all drugs. Reports can be designed to search for specific aspects within the EPMA system, for example, allowing quick identification of patients with an active antimicrobial prescription. Point prevalence studies will complement and expand upon the KPI data and also provide more detail of trends in antimicrobial prescribing practice since the last PPS in 2009.

Aim and objective

To undertake a point prevalence survey (PPS) of antimicrobial prescribing across the Trust, using the EPMA system, and to compare results obtained with previous PPS and identify trends and areas for improvement. The feasibility of undertaking a PPS via the use of the EPMA system will also be examined, with respect to burden of data collection, ease of results analysis and timeliness of feedback.

Method

Data was collected via an electronic antimicrobial report identifying patients with active antimicrobial prescriptions, from the EPMA system only. Patients in the women and childrens and critical care areas, that still use paper drug charts were not included in the study. All inpatients due for a systemic antimicrobial drug on the day of data collection, as prescribed on the EPMA system, were included in this study. For each antimicrobial, the route of administration, indication, start and stop date and any documented 48 hour review was collected. The number of restricted antimicrobials, and whether their prescribing was in line with Trust guidelines or approved by medical Microbiology was also collected from the electronic patient records.

Results

Table 1 compares the results of recent PPS audits. 763 patient’s charts across 38 wards were screened, representing 95.0% (763/803) of the total EPMA beds occupied. 41.8% (319/763) had been prescribed at least one antimicrobial. A greater proportion of patients were prescribed antimicrobials (41.8%) in this study in comparison to previous studies. The directorate with the greatest antimicrobial consumption was Haematology.

The percentage of antimicrobials with a clearly documented indication was 82.2% (447/544). This is a significant improvement from the 33.2% revealed in the 2009 PPS. Only 24.8% (135/544) of antimicrobial prescriptions included a stop date and 34.9% (188/544) of the total antimicrobials prescribed were ‘restricted’ but only 52.9% (90/170) being prescribed as per guidelines or Microbiology approval.

Table 1: Representation of recent PPS results

<table>
<thead>
<tr>
<th></th>
<th>PPS 2007</th>
<th>PPS 2008</th>
<th>PPS 2009</th>
<th>PPS 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of pts seen (% of total occupied beds)</td>
<td>783 (92.1%)</td>
<td>805 (92.4%)</td>
<td>791 (92.8%)</td>
<td>763 (95.0%)</td>
</tr>
<tr>
<td>No of pts prescribed antimicrobials (%)</td>
<td>306 (39.0%)</td>
<td>319 (39.6%)</td>
<td>306 (38.7%)</td>
<td>319 (41.8%)</td>
</tr>
<tr>
<td>Documented indication on drug chart</td>
<td>21.0%</td>
<td>37.9%</td>
<td>33.2%</td>
<td>82.2%</td>
</tr>
<tr>
<td>Documented duration on drug chart</td>
<td>24.0%</td>
<td>28.8%</td>
<td>26.4%</td>
<td>24.8%</td>
</tr>
<tr>
<td>IV : Oral antimicrobial (%)</td>
<td>54 : 46</td>
<td>47 : 52</td>
<td>45 : 43</td>
<td>56 : 40</td>
</tr>
<tr>
<td>‘Restricted’ antimicrobials as per Trust guidelines/Micro approved (%)</td>
<td>82%</td>
<td>70%</td>
<td>88%</td>
<td>47.0%</td>
</tr>
</tbody>
</table>

Discussion & Conclusion

The results from this study present some significant differences compared to previous PPS. The increase in documentation of indication since 2009 supports enhanced review of antimicrobial prescriptions by doctors and pharmacists. However, documentation of the indication is a mandatory field on EPMA antimicrobial prescriptions and still falls short of the 90% target. Although a mandatory field on all antimicrobial prescriptions, the indication is entered as free text. Therefore, 17.8% of all antimicrobial prescriptions included an indication that was unclear to the reviewer, and therefore would be unclear to other healthcare professionals caring for the patient. This is unacceptable, and increases the risk of inappropriate use of antimicrobials, including unnecessarily extended course durations.

An improvement in inclusion of stop dates is seen, however it remains far from its target. This may highlight the need to modify the EPMA prescription to incorporate, for example, mandatory stop dates for all systemic antimicrobial prescriptions. The use of stop dates on IV prescriptions may also explain the greater proportion of IV:oral antimicrobials seen in comparison to previous years. This stop date may be for the complete treatment course without taking into consideration IV to oral switch. Therefore, the need for review may be overlooked, since the prescription includes a stop date, regardless of route of administration.

EPMA improves the ability to undertake a PPS within those areas where electronic prescribing is utilised. The practicality of EPMA allows a single pharmacist to collect, manipulate, analyse and present the data collected in a matter of a few weeks. Historically, a PPS involved greater than ten pharmacists to manually collect the data. Manipulation and analysis would then be undertaken by a single pharmacist before presentation of the results, usually four months after the original data collection. Hence, EPMA allows for prompt feedback and more frequent studies, supporting enhanced antimicrobial stewardship.

There have been positive developments in antimicrobial prescribing since the last PPS in 2009, supported by the use of EPMA. However more work can be undertaken to improve and optimise antimicrobial stewardship via the use of electronic prescribing, including: introduction of syndromic prescribing, possible inclusion of mandatory stop dates, enhanced documentation of antimicrobial review at 48 hours and plan of action via pre-populated clinical notes entries.

References

Background
4.7% of admissions are due to avoidable medication-related harm[1]. Local tracking of suspected medication-related admissions (April 2006 – March 2011) (n=201) showed 16.4% (n=33) involved antimicrobials[2]. Targeted actions should be directed at emerging themes[3].

Objectives
- To analyse suspected avoidable antimicrobial admissions
- To identify and implement practical interventions to help reduce admissions
- To trigger cross-sector feedback regarding antimicrobial patient safety issues
- To stimulate MHRA yellow card submissions involving antimicrobials

Method
Between 1/4/2011 and 31/3/2013, ward pharmacists in Wrexham Maelor Hospital recorded suspected avoidable antimicrobial-related admissions using a data collection form, refined from earlier project work[4]. To aid contributory factor analysis, pharmacy staff collected recent antimicrobial drug histories during the medicines reconciliation process. The antimicrobial stewardship team used their once daily ward round to clinically assess patients (a study limitation). The Patient Safety Pharmacist then tracked the patient and gleaned additional information via primary care /healthcare records (a study limitation). Root cause analysis (RCA) then ensued. Yellow MHRA cards were submitted, sometimes retrospectively once an adverse drug reaction (ADR) trend was recognised. Feedback was individualised, or themed. Delivery was periodic via local medical meetings, alerts, cross-sector pharmacy educational events, and microbiology-pharmacy co-authored emails. Refinement of the feedback process allowed smoother collaboration with independent contractors. This project was confirmed as an audit project and supported by the Local General Practitioner (GP) Prescribing Leads. Ethics approval was not required.

Results
Table 1: Themed analysis of suspected antimicrobial admissions (n=94)

<table>
<thead>
<tr>
<th>Theme</th>
<th>Drugs* involved</th>
<th>*admissions may involve &gt;1 drug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contra-indication</td>
<td>Nitrofurantoin</td>
<td>(n=15)</td>
</tr>
<tr>
<td>Dose/choice</td>
<td>Nitrofurantoin</td>
<td>(n=1), Quinolones (n=6), co-amoxiclav (n=10), Penicillins (n=29), Cefalosporins (n=12), Macrolides (n=10)</td>
</tr>
<tr>
<td>Drug interactions</td>
<td>Warfarin (n=9), calcium (n=4), iron (n=1), calcium + iron (n=1), simvastatin (n=1)</td>
<td></td>
</tr>
<tr>
<td>Avoidable ADR</td>
<td>Ciprofloxacin-seizure</td>
<td></td>
</tr>
</tbody>
</table>

Non-compliance did not feature and no patients unable to absorb the medication (e.g. due to vomiting) were included. 70 MHRA yellow cards were submitted. When drug choice or dose was not evidence-based, the ‘dose/choice’ category was applied. 80.8% (n=76) of all cases involved specialist assessment, of which 61.8% (n=47) were themed ‘dose/choice’. Analysis revealed possible contributory factors: access to specialist advice, immune system status, lack of catheter change/ patient counselling. 7 patients had serial antimicrobial courses prior to admission. Of 16 nitrofurantoin-treated patients, 93.75%(n=15) had a creatinine clearance (CrCl)<60ml/min, and 18.75%(n=3) had a low Body Mass Index (BMI). Standard reference[5] and specialist text[6] gave conflicting renal prescribing advice. In February 2013 a nitrofurantoin safety message was inserted into relevant MSU reports, onto ‘scriptswitch’ (a GP prescribing decision support tool) and was emailed to local prescribers and pharmacists. August 2013 saw the MHRA’s Drug Safety Update feature nitrofurantoin prescribing considerations, which included current renal function. Referring to estimated glomerular filtration rate (eGFR) in its monographs, the BNF only mentions eGFR limitations in the renal impairment prescribing section. Pathology reports are to include ‘extremes of BMI’ in a revised eGFR validity statement. Bacteriostatic nitrofurantoin was used in 1 catheterised patient but can be of questionable efficacy in such. RCA revealed wide dose bands for antimicrobials in the British National Formulary[7] (BNF) and Summaries of Products’ Characteristics (SmPcs) compared to National Health Protection Agency (HPA) guidance. ‘Missed’ drug interactions prompted an organisation-wide cross-sector alert in November 2012. RCA of doxycycline and quinolone therapeutic failures (with concomitant calcium- see table 1 ) uncovered that additional warnings and 7(Appendix 3) fail to mention calcium. This deficiency has been communicated to the BNF and the MHRA. A pharmacy-microbiology authored email (March 2013) recommended patient counselling.

Discussion
Antimicrobial drug history-taking added value. Identification of suspected antimicrobial-related admissions stimulated a preventative multidisciplinary ‘start smart’ approach. Inadequate urine concentration of nitrofurantoin occurs in patients with eGFR < 60ml/min[8]. The Renal Handbook[9] now includes a dose for patients with CrCl of 20-50ml/minute, potentially confusing users of this trusted reference source; nationally significant if nitrofurantoin becomes first-line in urinary tract infections due to increasing bacterial resistance to existing first-line choices. For the ‘dose/choice’-related admissions, lack of local guidance may prompt more BNF or SmPcs consults. Yet these te

References
Background
Crushing tablets or opening capsules to administer medication to patients with swallowing difficulties (SDs) is almost always an unlicensed practice, yet 84% of practitioners admit doing it. It occurs in various settings, including nursing homes, stroke units, hospital elderly medicine wards and critical-care units. Insufficient knowledge of medicines being given in this way can lead to adverse events, such as unintentional overdosage through crushing modified-release preparations, treatment failure, or carer exposure to harmful cytotoxic treatments.

A National Patient Safety Agency (NPSA) alert reported 21 deaths and 79 cases of harm due to misplaced enteral feeding tubes (EFTs). A 2007 NPSA alert warned against using intravenous (IV) syringes for the administration of enteral medication; a process which had caused 33 adverse incidents over 17 months. Accidental IV administration of oral medicines has occasionally caused death.

With no national guidance on medicines management in these patients, Wrexham Maelor Hospital Pharmacy published a book for healthcare professionals and carers looking after patients with EFTs/SDs. It included information on using medicines off-licence, practical guidance on confirming EFT position, recommendations on the use of enteral syringes, and over 500 drug monographs. These contained guidance on dose-matching in relation to feeds, dosage adjustments when converting between formulations, and clinical details specific to each drug. The book was updated in 2010 with improvements to more than 300 monographs, and the addition of nearly 100 suspension formulae.

Originally designed as a point-of-care guide, the limitations of a hard-copy information resource meant the book was primarily used by pharmacists to provide advice (usually remotely) to patients’ carers. There was a desire to improve access by providing them as an e-resource. This was echoed by UKMI services, where information was increasingly being handled electronically.

The NEWT Guidelines Website was launched on August 1st, 2011. Over the next seven months the site received 3491 logons, with 32117 pages being visited. With immediate dissemination of information, the site became more up-to-date than the book, and over the first seven months after launch 270 pages were updated. The site is evolving to contain new information such as guidance for prescribers, and plans for development e.g. smart-phone applications are under consideration.

Objectives and Method
To evaluate user-opinion of the website, find out who was using it, and where, how it could be improved, and whether the provision of an online guideline was improving patient safety. A short questionnaire comprising open, closed and multiple-choice questions was distributed via email to all registered subscribers. Ethics approval was not required for this study.

Results
The response rate was 52% (26/50). Most responders were in primary care teams or UKMI services, and accessed the guidelines weekly or more frequently. 96% preferred to access information of this nature via online sites. The main reasons for this were the desire for paperless working, ease of access for nursing workers, and the desire to use up-to-date resources. 88.5% of responders had used the site to guide individual patient treatment.

User responses:
“It’s easy to use and information can be copied and pasted into MI databank… we used to have to type out what was written in the book... there was room for human error but the online version cuts this risk.”

“Information clearly presented... Everything is referenced... Hyperlinks to other sections of relevance e.g. procedure for crushing tabs... Very quick navigation around site.”

 “[the website] fits in with paperless MI working... information can be updated more regularly than if it is published in a book.”

“I [my] patient needed Atripla [and they] couldn’t swallow. [The website] gave helpful advice and suggested [using] individual components, and advice [was] available on all of these. Excellent! Answered query very quickly.”

“I find the information in NEWT guidelines invaluable – especially for advising GPs with patients with swallowing difficulties. Thank you for all your hard work in putting this together in a very usable format.”

One of the most frequent responses (30%) to “what would improve the site?” was the desire for a “search” function; however 30% stated that there was nothing they disliked about the site. Responses about functionality and ease of navigation were overwhelmingly positive, with the site design being complimented as “very easy to use” and “intuitive and fast.”

Since launch, the site has received increasing numbers of visitors; currently around 45 users logon each day. It is designed to provide guidance on a case-by-case basis, and it appeared that this is how the subscribers are using it; i.e. each visit is to manage the treatment of one individual patient. Therefore at least 45 patients per day are receiving improved, safer care due to use of the unique information provided by the site.

Conclusion
The NEWT Guidelines Website has been welcomed as a valuable information resource. It has a more suitable format than the previous book for paperless-office UKMI services, and the ability to cut and paste information reduces the risk of transcription errors. Its online format has improved accessibility, which has opened out access to include a large number of primary care teams and other primary care professionals. The site is improving patient safety through the provision of unique and widely-accessible information which is easy to navigate.

References
Introduction and Objectives

Gentamicin, an aminoglycoside antibiotic frequently used in the empirical treatment of infection in neonates, has pharmacokinetics which are highly individual, and the adverse effects associated with high levels are serious. Antibiotic plasma level monitoring is required in all patients. In 2002, the reference sources for neonatal gentamicin dosing were the Alder Hey Book of Childrens Doses 19944 (ABCD) and Medicines for Children 19995 (MFC). The ABCD recommended dosing frequency dependent on weight; MFC recommended frequency dependent on gestational age. The dosing regimen in Wrexham Maelor Hospital (WMH) at that time used a lower initial dose than quoted in these, with frequency dependent on gestational age. An initial audit of results developed into a 9 year quality improvement study.

Gentamicin levels should be <2mg/L (immediately before) and >5mg/L (one hour after the third dose [except in special circumstances]).

Methods

A retrospective audit of the dosing regimen in WMH Special Care Baby Unit, which was adjusted – using a dose-modelling tool created with the data – three times over a nine year period, with continuous re-audit and monitoring of levels.

All neonates who had received gentamicin were identified, and details of their dosage, gestational age, weight and antibiotic plasma levels were recorded. Exclusions: neonates who had previously received gentamicin, who had blood results indicating renal impairment (these had early monitoring), or who did not have pre- and post- 3rd/4th-dose levels which could be validated. A computer-based dose-modelling tool was created with the data collected, which used pharmacokinetic equations to calculate individual pharmacokinetic parameters, and then applied formulae to calculate the effect of new dosing protocols on those individuals.7 No ethics committee approval was required for this service evaluation.

Results

933 neonates met the entry criteria over the course of the study; none were excluded from data analysis. The baseline audit (11 months, n=83) showed a low percentage of neonates were achieving therapeutic post-dose levels (fig. 1). The dose-modelling tool was used to predict the effect of re-arranging the neonates to match the gestational age groups in MFC. All gestational age groups were seen to be failing to achieve adequate post-dose levels.

High pre-dose levels were particularly seen in the >37 weeks gestation group (18.2%, n=11). The dose-modelling tool was used to design, and predict the effect of, an improved dosing regimen, which was implemented with continuing audit (2nd audit - 15 months, n=116).

The new regimen improved the number of neonates achieving therapeutic post-dose levels, although the <28 weeks group were still only reaching 57.1% (n=7). This was at the cost of increased high pre-dose levels, particularly in the >37 weeks group (42.9%, n=35).

Further modelling and adjustment reduced the number of high pre-dose levels, although the new >38 week group remained unsatisfactory (35.6%, n=59), with further improvement in post-dose levels (>90% in all sub-groups) (3rd audit - 17 months, n=155). There was a 10 month break in data collection during laboratory process change.

Amendment of gestational age boundaries gave further improvement in both pre- and post-dose levels (4th audit - 55 months, n=535). Therapeutic post-dose levels were >96% in all sub-groups. The number of high pre-dose levels on the final dosing regimen was lower than at baseline.

Discussion

The application of pharmacokinetic equations to single patient gentamicin assay results allows accurate adjustment of drug doses on an individual basis. The application of these equations to the results of the baseline audit allowed the creation of a dose-modelling tool which calculated the pharmacokinetic parameters of a real population, and could be used to predict the effect of future dosing regimens. The collection of further real data (2nd - 4th audits) added to this and made the predictions given by the dose-modelling tool more precise. It was possible for the investigators to re-arrange the data within the tool to view by any patient parameter recorded (e.g. gestational age) in order to assess the predicted results to determine if there were specific sub-groups who were not suited to the proposed doses.

It was noted that the observed results were slightly higher than those predicted. This was considered to be due to gentamicin adsorption onto gel barriers in sample collection tubes.4,5 This unique tool was shown to be accurate and effective in practice and successfully predicted the effects of dose alterations in neonates.

Conclusion

The use of a computer-based pharmacokinetic dose-modelling tool enables the effect of gentamicin regimens designed around any of the parameters recorded (e.g. weight, gestational age) to be predicted. Pharmacokinetic modelling was successfully used to design, amend and fine-tune a dosing regimen for gentamicin in neonates, which produced significantly improved post-dose levels without any adverse effect on pre-dose levels.

References

Introduction
For the treatment of moderate to severe pain, morphine is the long-standing first-line strong opioid of choice. However, its use is frequently limited by adverse effects. Oxycodone is an alternative to morphine and usage data within the Trust has demonstrated an increase over the last five financial years, especially within the Surgery and Oncology Division. Morphine usage over the same period has remained static. Oxycodone is significantly more expensive than morphine and for this reason its use within the Trust is restricted. Recently published Trust guidelines state that oxycodone should only be used if a patient has a documented and true intolerance to morphine and/or renal impairment. In all cases prescribing should be on specialist advice, usually through the pain or palliative care teams.

Objectives
The audit was carried out from July to October 2012 with the aim to assess whether oxycodone is being prescribed appropriately within the Surgery and Oncology division of the Trust, in accordance with local policy. The objectives are therefore:

- To determine the percentage of oxycodone prescriptions prescribed by pain or palliative care teams, or in accordance with their advice.
- To identify the number of patients prescribed oxycodone who have a documented intolerance to morphine, which is recorded on the drug chart and in the medical notes.
- To identify the number of patients prescribed oxycodone who have renal impairment (determined by a creatinine clearance of less than 50mLs/minute).

Standards
- 100% of newly initiated oxycodone prescriptions should be based on the advice of the hospital pain or palliative care teams.
- 100% of patients newly initiated on oxycodone should be receiving oxycodone because of either intolerance to morphine and/or impaired renal function.
- 100% of patients prescribed oxycodone because of intolerance to morphine should have that intolerance documented on the front of the drug chart and in the medical notes.

Method
A data collection form was designed based on the objectives. It was then piloted and finalised prior to the data collection period. Patients prescribed oxycodone were identified during routine pharmacist ward visits, through auditing non-stock issues on the pharmacy computer system, and by checking ward controlled drug registers. For each patient prescribed oxycodone, information was collected on the following: whether pain or palliative care teams were involved, whether the patient is morphine intolerant, documentation of this intolerance and whether the patient has renal impairment. Renal function was estimated in the form of creatinine clearance, calculated using the Cockcroft and Gault equation. Adult inpatients on any ward in the Surgery and Oncology division who were prescribed oxycodone were eligible for inclusion in the audit and a total of 50 patients were recruited. As this was an audit project, ethics approval was not required.

Results
- Just 36% of oxycodone prescriptions were based on pain or palliative care team advice.
- Morphine intolerances were reported in 41% of patients newly prescribed oxycodone and 27% of patients taking oxycodone prior to admission. Hallucinations were the most commonly reported intolerance and table 1 shows the nature of the intolerances reported.
- Documentation of morphine intolerance was often poor, with only 52% of morphine intolerances documented on the ‘Allergy and Hypersensitivity’ section of the drug chart.
- Of the patients not intolerant to morphine, only 35% had renal impairment sufficient to caution the use of morphine. Therefore for the remaining 65%, the justification for using oxycodone was not apparent.

Discussion
There was failure to follow the guidelines with a number of patients being prescribed oxycodone despite having normal renal function and no documented intolerance to morphine. In some cases where intolerance was documented, the true nature of the intolerance was questionable. For example, patients experiencing nausea with morphine were switched to oxycodone without first optimising the use of antiemetic drugs. A number of prescriptions were initiated without specialist advice or approval, with many of the prescriptions written by junior doctors. There appears a lack of awareness of the restrictions surrounding oxycodone use within the Surgery and Oncology Division of this Trust and measures need to be taken to re-enforce the guidelines and ensure appropriate and cost-effective prescribing. Oxycodone initiated in the community appeared more justified suggesting a better awareness of cost implications amongst GPs. This audit was limited by time restrictions and that fact that it was carried out by a single auditor, meaning that it was difficult to capture all the data and ensure an even distribution across the division. In addition, due to the more acute nature of some of the wards involved, there were fewer patients on chronic analgesia, meaning that there was limited data to collect regarding patients who were initiated on oxycodone in the community.

Taking the outcome of this audit forward, the next stage will be to integrate opioid prescribing into both the initial and the surgical inductions for junior doctors, in order to increase awareness of the guidelines. The results will also be communicated within the Pharmacy department, with pharmacists encouraged to challenge all oxycodone prescriptions that do not adhere to the guidelines. Following implementation of these changes, the audit will be repeated and extended Trust wide, with regular re-audit to monitor progress.

References
1. Quinlan, J. The prescribing of strong opioids in Oxford University Hospitals NHS Trust for adult patients. Oxford University Hospitals NHS Trust, Medicines Information Leaflet. 2012 Mar; 7(5)
Background:
Payment by Results guidance states healthcare providers should not be reimbursed for the proportion of emergency readmissions (within 30 days of discharge) that are judged to have been avoidable.1 Locally, this proportion is 25%. Medical errors, prolonged inpatient stay, poor communication at interfaces of care, absent or delayed follow up and certain medical conditions are factors associated with hospital readmission. Recent standards for hospital Pharmacy stress the importance of good communication and safe practice with medicines at transfer of care.2

Readmission prediction tools (e.g. LACE) are based primarily on epidemiological data; no validated prediction tool incorporates medications. There is often an assumption in the literature that an admission that can be predicted can be prevented but this is unproven. We define a medication-related readmission here as “a presence or lack of an effect of a medicine leading to a readmission”.3

Correlations exist between certain medications and admission to hospital but it is not known to what extent they are causal factors; attitudes and adherence to medication may have a stronger influence. Our hypothesis is that meeting each individual’s need for information, risk-management, follow-up or support with their medicines, regardless of epidemiological factors, may prevent readmissions. The New Medicines Service (NMS) and targeted Medicines Use Reviews (tMUR) are designed to address many of these needs but there is poor awareness of and access to these services in our region. A 0.4 WTE Pharmacy Technician with medicines management training was dedicated to facilitate this study.

Objectives:
• Design and implement pharmaceutical care bundles (straightforward sets of best practices intended to improve patient outcomes) to address an individual’s medicine-related needs
• Facilitate uptake of NMS/tMUR after discharge.
• Assess the impact of the inpatient care bundles and facilitating NMS/tMUR on a patient sample.

Method:
A literature search was conducted and medicines correlated with readmission were identified. Pharmaceutical care bundles were designed for each of the medicines identified, and to address factors limiting adherence and concordance. Examples included ensuring adequate inhaler technique, following NPSA guidance for opioids and using a validated method of identifying medicine related problems.4 Many of these actions were already standard pharmacy practice but had not previously been incorporated into care bundles. A signposting/referral pathway to NMS/tMUR was implemented. Where patients were eligible for these services but unable to access them, the service was provided by the Pharmacy Technician over the telephone or as a home visit with patient consent. The model of care used in this study can be encapsulated as REACH; Reconciliation, Education, Access to NMS/tMUR, Concordance & adherence assessment and High risk-medicine management.

Baseline readmission rates were established on two wards similar in population and length of stay in the Medicine directorate. From February to May 2013, the care bundles and post-discharge NMS/tMUR were used by a Pharmacist and Pharmacy Technician on every patient on one ward (the intervention ward) and a standard pharmacy service (medicines reconciliation on admission, clinical medication review periodically and at discharge) was delivered on the other (the control ward). Pharmacy staff undertook discharge communication about medicines on the intervention ward; this was done by nursing staff on the control ward. 30 day readmission rates for both wards were obtained from Trust Informatics. As the methods involved joining up existing services, we were permitted to conduct the study as a service evaluation rather than research.

Results
The readmission rates for the intervention and control wards are shown in Table 1 below. Fluctuation in readmission rates is expected (e.g. seasonal variation) but at no other time in the last 2 years has the readmission rate for one ward been lower than the other for more than 2 consecutive months.

| Table 1: 30 day readmission rates [as % of discharges] |
|----------------------------------|----------|----------|-------|-------|-------|-------|
| Intervention                     | 20.2     | 15.8     | 12.5    | 30      | 16.7     | 13.5     |
| Control                          | 17.7     | 15.2     | 10.8    | 36.6    | 28.6     | 25       |

Implementing the care bundles took an extra 10 minutes on average for each inpatient admission vs standard care. Almost 50% of people eligible for NMS/tMUR could not access it because they were housebound, cognitively impaired or it was unavailable at their Community Pharmacy. Around 80% of those patients accepted the service when hospital Pharmacy staff offered to provide it. Telephone follow up (mirroring NMS) typically took 5 minutes per patient; home visits (mirroring tMUR) typically took 20 minutes plus travelling time. The majority of interventions made by the Pharmacy Technician related to information about medicines (c.90%) and adherence with medicines (c.50%) and could be resolved over the telephone. Positive feedback has been volunteered by patients. Pharmacy staff on the intervention ward identified a wider range of practitioners to communicate with at discharge than nursing staff did on the control ward.

Discussion
Our sample size is insufficient to conclude that REACH produced the observed reduction in readmission rate on the intervention ward but we have demonstrated feasibility of the model. Current provision of NMS/tMUR excludes many people often the most vulnerable to medicines-related problems. We have shown that the majority of these people accept the service when offered and that a medicine management trained Pharmacy Technician is able to REACH out from the hospital and provide those services with occasional Pharmacist support. The model is potentially self-funding from significant cost savings in both primary and secondary care if readmissions are prevented. Future work is planned which will evaluate the impact of readmission care bundles in other specialties and joining up larger patient samples with NMS/tMUR after hospital discharge.

References
34. The impact of prescribing systems on health care professionals’ working practices.
K.Shemilt a,b C.W. Morecroft a C.F. Green a, A.J. Mackridge a, J.L. Ford b, a School of Pharmacy and Biomolecular Sciences, Liverpool John Moores University, Liverpool, b Countess of Chester NHS Foundation Trust, Chester

Background: Prescribing medicines is an established part of healthcare and in recent years, numerous hospitals are moving or planning to move to electronic prescribing systems. When prescribing, the prescriber enters the details of the medicine on the prescription and different sections prompt the clinician to include all relevant information [1]. Since the individualised drug chart is then used as the basis for medicine review, supply and administration in the hospital by all health care professionals (HCPs) within the multidisciplinary team (MDT), it is important that the charts convey clear and practical instructions to those reading them.

Objective: To explore how electronic prescribing and medicines administration (EPMA) systems have an impact on MDTs’ working practice.

Method: Five focus groups (FGs) were conducted with 5-9 participants (37 participants in total: 16 medical staff, 12 nurses and 9 pharmacists). Each FG comprised of one MDT from a specific specialty including medics, nurses, and pharmacists and lasted on average 60 minutes. The FGs were conducted at the end of 2012 in a medium-sized district general hospital that had implemented EPMA 18 months before group meetings. The focus of the discussion was HCPs’ experiences of EPMA and how their working practice had changed when EPMA was implemented. FGs were taped, transcribed and analysed qualitatively using NIVIVO version 9. Ethics approval was given by a University Research Ethic Committee. Participants in the FGs were not randomly selected but self-selected, after invitation from their clinical pharmacist. Therefore it is possible that the sample may have only included HCPs prepared to give opinion on the topic.

Results: Content analysis identified how interaction with the EPMA system had impacted on the HCPs’ working practices; this was considered by all three professional groups both positively and negatively. Three sub-themes included 1) Logistics, how the prescribing system can change physical locality therefore impacting on working practice. 2) Interpreting the system, how each HCP views the system and 3) Operating the system, understanding how to use and work the system.

Logistics
The new logistical re-structure that came with EPMA ensured that to a point; the prescription could no longer be “lost” and was accessible by all HCPs at the same time. However accessing the prescription also had its difficulties;

1. “It’s an absolute nightmare on call because you are not in the same working place……you are on different wards all over the shop so if you forget to log out, then all of a sudden I’m powerless”

2. “It’s like taking your pen away isn’t it!”

A shortage of computers on the wards was cited as a reason for delays, with computer availability becoming worse at peak times in the working day when all HCPs required access at the same time for their specific job roles:

“The main problem is the like getting access to computers definitely, carrying the computer round with you because you weren’t let it go”

Even though some computers were “on wheels” and could be moved around the wards the position of the computers, away from the patient, had changed how the HCPs carried out their work prompting less natural patient contact.

Remote access to the EPMA system had impacted on the HCPs’ working practice in different ways. Prescribing remotely raised safety concerns with medics about not physically examining the patient before prescribing and not having the medical notes at hand, however it was acknowledged that remote access saved time when “on call” for all HCPs. Pharmacists stated how it had enabled them to follow up on outstanding queries that wouldn’t previously have been possible, however this had led to less patient contact.

“it’s (EPMA) been a bit of a double edged sword, in terms of its allowed me to work remotely and more efficiently, which is maybe why I don’t see the patient”

Interpreting the system
The EPMA system was a great improvement now that the prescription was “legible” but the HCPs felt that their ability to perceive risks with the medication and get a clear picture of what medications a patient was taking had been reduced due to the layout and intricacies of the system. The “user friendliness” of the system was important to the HCPs’ stating that a more up to date, “snazzy” system was expected but self-acknowledged that this had led to less patient contact.

“It does give you the feeling that you are trying to run a hospital through a letter box……….and you have got this massive screen in front of you”

Operating the system
Within the MDT, the pharmacists deliberated about how the new “technical” part of checking the prescription had impacted on their check making process more time consuming. Nurses found EPMA overall easier and quicker to use compared to the paper prescription as the EPMA system provided extra information about medications that would not normally have been accessible so quickly; such as administration details or supply comments. Conversely one medic felt working the system had made his prescribing less safe;

“It’s not safer for me because I prescribe the majority of medications so….I don’t write the wrong thing but I can click on the wrong thing and if I’ve written the wrong thing it’s because I’m stupid, if I click on the wrong thing it’s because I have made a mistake”

Discussion and Conclusion: The study has identified ways in which the EPMA system impacted on the MDTs working practices. Solutions may include the HCP automatically being logged out of the system if not used for 15min, hand-held computer devices that can facilitate patient contact, making HCPs aware of the risks associated with remote prescribing, or enabling the EPMA system to be viewed via a “full” computer screen. Our insights into these issues can help ensure that the system design or redesign takes into account all HCPs’ needs in order to facilitate quality care for the patient.

References:
Introduction
Antibiotic resistance is a major burden on healthcare. Growing resistance to broad spectrum antibiotics has led to increased prescribing of intravenous (IV) vancomycin and gentamicin. IV vancomycin and gentamicin have a narrow therapeutic index and cause nephrotoxicity. Vancomycin exhibits an area under the curve-dependent activity against Gram-positive bacteria and treatment aims to maintain vancomycin blood levels above a targeted threshold for a prolonged period of time. Gentamicin has concentration-dependent activity against Gram negative and a limited range of Gram positive bacteria. Bactericidal activity is proportional to the concentration of gentamicin above the minimum inhibitory concentration. It is important that vancomycin and gentamicin are prescribed, administered and monitored appropriately to ensure that serum concentrations of these antibiotics are appropriate in terms of bactericidal activity and/or accumulation and toxicity. To support the rational use of antibiotics, antimicrobial stewardship guidelines have been published. 4 Antibiotic level monitoring guidelines also exist to support the correct prescribing and monitoring of IV vancomycin and gentamicin.

Objectives
This study aimed to evaluate healthcare professionals’ knowledge and adherence to guidelines on antimicrobial stewardship (right drug, right dose, right time and right duration) and antibiotic level monitoring guidelines (timing of blood levels and administration) for IV vancomycin and gentamicin.

Method
A prospective, descriptive, cross-sectional audit was undertaken over four weeks (30th October - 23rd November 2012) on adult, non-obstetric wards, excluding critical care, at a district general hospital. A piloted, standardised self-completed questionnaire was administered to doctors, pharmacists and nurses to determine knowledge of dosing and monitoring requirements for IV vancomycin and gentamicin. Data on adherence to antimicrobial stewardship and antibiotic level monitoring guidelines for IV vancomycin and gentamicin, determined from the drug charts and medical notes, were recorded on a standardised data collection form. Audit criteria are outlined in Table 1. A standard of 100% was set for all criteria. Ethical approval was not required as the study was an audit. Data were entered into SPSS for analysis. Fisher’s exact test was used to compare the knowledge of different healthcare professionals. A p≤0.05 was significant.

Results
Eleven patients (6 female; median age=81 years) were prescribed IV vancomycin and 35 patients (9 female; median age=79 years) were prescribed IV gentamicin. Fifteen prescriptions, including rewritten charts and amendments, were written for vancomycin and 45 for gentamicin. A total of 92 vancomycin blood levels (baseline=11; subsequent levels=81) and 174 gentamicin levels (baseline=34; subsequent=140) were requested. A total of 88 vancomycin and 239 gentamicin doses were administered. Table 1 summarises adherence to the audit criteria. Twenty doctors, 13 nurses and 11 pharmacists completed the questionnaire giving response rates of 67%, 13% and 55% respectively. Generally pharmacists had a better knowledge of the dosing, monitoring and administration requirements for vancomycin and gentamicin (Table 1).

Table 1: Audit criteria and findings

<table>
<thead>
<tr>
<th>Criteria – Prescribing Requirements</th>
<th>Vancomycin (%)</th>
<th>Gentamicin (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose appropriate</td>
<td>80% [8/10]</td>
<td>54 [19/35]</td>
</tr>
<tr>
<td>Review date/duration specified on chart</td>
<td>69 [9/13]</td>
<td>78 [29/37]</td>
</tr>
<tr>
<td>Review date/duration appropriate</td>
<td>100 [9/9]</td>
<td>100 [29/29]</td>
</tr>
<tr>
<td>Target blood level for vancomycin/gentamicin specified</td>
<td>62 [8/13]</td>
<td>49 [43/45]</td>
</tr>
<tr>
<td>Timing of requested vancomycin/gentamicin blood level appropriate</td>
<td>96 [87/92]</td>
<td>94 [144/153]</td>
</tr>
<tr>
<td>Administration instructions appropriate</td>
<td>91 [51/56]</td>
<td>98 [140/143]</td>
</tr>
<tr>
<td>Vancomycin gentamicin blood levels taken at correct time</td>
<td>29 [27/92]</td>
<td>59 [103/174]</td>
</tr>
<tr>
<td>Dose of vancomycin/gentamicin given on time</td>
<td>84 [73/87]</td>
<td>96 [210/239]</td>
</tr>
<tr>
<td>Appropriate alterations to dose based on vancomycin/gentamicin blood levels and renal function</td>
<td>100 [3/3]</td>
<td>69 [9/13]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria – Knowledge</th>
<th>Doctor</th>
<th>Nurse</th>
<th>Pharmacist</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dosing of vancomycin</td>
<td>15% (3)</td>
<td>54% (7)</td>
<td>91 (10)</td>
<td>0.001</td>
</tr>
<tr>
<td>Timing of vancomycin pre-dose blood levels</td>
<td>40% (8)</td>
<td>54% (7)</td>
<td>91% (10)</td>
<td>0.007</td>
</tr>
<tr>
<td>Vancomycin pre-dose blood level</td>
<td>25% (5)</td>
<td>31% (4)</td>
<td>82% (9)</td>
<td>0.003</td>
</tr>
<tr>
<td>Administration of vancomycin in light of level</td>
<td>90% (13)</td>
<td>100% (13)</td>
<td>100% (11)</td>
<td>1</td>
</tr>
<tr>
<td>Dosing of gentamicin</td>
<td>20% (4)</td>
<td>15% (2)</td>
<td>100% (11)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Timing of gentamicin blood levels</td>
<td>40% (8)</td>
<td>77% (10)</td>
<td>100% (11)</td>
<td>0.005</td>
</tr>
<tr>
<td>Gentamicin pre-dose blood level</td>
<td>75% (15)</td>
<td>92% (12)</td>
<td>100% (11)</td>
<td>0.458</td>
</tr>
</tbody>
</table>

Discussion
Adherence to antimicrobial stewardship guidelines regarding prescribing the right antibiotic, at the right dose, at the right time for a specified duration fell below the expected standard of 100% and could lead to antibiotic resistance. The majority of vancomycin and/or gentamicin blood levels were not taken at the correct time. This differs to the findings of an Australian study where gentamicin blood levels were taken at the correct time in 81% of patients. 2 Acute kidney injury (AKI) reportedly occurs in 8.4% and 24% of patients treated with vancomycin and gentamicin respectively. 3, 4 Timely and appropriate antibiotic level monitoring could avoid incidents of AKI and its associated mortality. Doses of vancomycin and gentamicin were also frequently omitted. The timely administration of antibiotics was highlighted by the National Patient Safety Agency. 5 Doctors and nurses knowledge of gentamicin and vancomycin level monitoring requirements need to be improved. Pharmacist led training sessions, the issue of cue cards and displaying of computer screensavers reminding staff of antimicrobial stewardship, antibiotic level monitoring guidelines and need to administer antibiotics at the appropriate time could improve the prescribing, timely monitoring and administration of IV vancomycin and gentamicin. This study was conducted at one hospital site. Antibiotic level monitoring guidelines may differ slightly between healthcare professionals. A p≤0.05 was significant.

References
1. ARHAI. Antimicrobial Stewardship – Start Smart then Focus. DH: London; 2001
Introduction
Wirral University Teaching Hospital (WUTH) NHS Foundation Trust is one of the busiest acute NHS trusts in the region, with a workforce of over 5,500 staff. The pharmacy department at WUTH is committed to achieving the Trust's goals, one of which is to 'provide the best possible patient care.' In order to achieve this goal it is essential that the pharmacy department provides an efficient service out of hours (OOHs) i.e. after 5pm Monday to Friday and all day Saturday and Sunday. Recently, consultants working in medicine and acute care have moved to seven day working so it was appropriate to review the amount and type of work carried out by the pharmacy team at Arrowe Park Hospital OOHs.

Objectives
The objectives of the project were to determine the following OOHs:
1. Number, type and source of bleeps received by the on-call pharmacist
2. Type of work carried out by pharmacy staff (pharmacists and ward based technicians) on the wards
3. Type of work carried out by pharmacists in the dispensary
4. Number and source of discharge prescriptions (TTHs) completed OOHs.

Method
Data collection took place during a two week period in January 2013 and included 38 wards. Separate forms were utilised to collect data from pharmacists working on the wards, pharmacists working in the dispensary and ward based technicians (WBTs). All remaining data was retrieved from electronic systems, including the pharmacy on-call database which was used to identify the number, type and source of recorded bleeps. The bleeps were recorded as appropriate or inappropriate by the on-call pharmacist who dealt with the bleep. The prescription tracker was used to identify the number and source of TTHs completed OOHs. All data was recorded and analysed using Microsoft Excel®. Ethics approval was not required for this project as it was a service review.

Results
A total of seven six data collection forms were completed: thirty eight forms from pharmacists’ activities on wards; twenty five forms from pharmacists’ activities within the dispensary and thirteen forms from WBTs activities on the wards. A total of 242 bleeps were reported. All reported bleeps were considered to be appropriate. The numbers of bleeps reported from each division were as follows: Medical – 99 bleeps; Surgical – 86 bleeps; Women’s & Children’s – 39 bleeps; Other – 18 bleeps and Diagnostics – 0 bleeps.

Thirty eight forms were completed by pharmacists OOHs on the wards; however, four forms were not included in the results because they were incomplete. The ward activity data collection form included 41 different activities. A total of 1302 activities were performed by pharmacists OOHs on the wards. Twenty five forms were completed by pharmacists OOHs in the dispensary. The dispensary data collection form included 17 different activities. A total of 924 activities were performed by pharmacists OOHs in the dispensary.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number performed by pharmacist OOHs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispensary based activity</td>
<td>n=924</td>
</tr>
<tr>
<td>Dispensing medication</td>
<td>173 (19%)</td>
</tr>
<tr>
<td>Clinical check of TTH</td>
<td>152 (16%)</td>
</tr>
<tr>
<td>Review of medication on prescription chart*</td>
<td>124 (13%)</td>
</tr>
<tr>
<td>Ward based activity</td>
<td>n=1302</td>
</tr>
<tr>
<td>Completion of medicine reconciliation form</td>
<td>157 (12%)</td>
</tr>
<tr>
<td>Review of medication on prescription chart</td>
<td>140 (11%)</td>
</tr>
<tr>
<td>Verification of reconciliation</td>
<td>110 (8%)</td>
</tr>
</tbody>
</table>

Table 1: The Top Three Activities Reported to be completed by Pharmacists OOHs. *Electronic prescribing is in place at WUTH, therefore, prescriptions are viewed electronically.

Thirteen forms recording WBTs activities on the wards OOHs were completed and all of the data was included in the results. From the data it was found that the three activities most frequently reported to be completed OOHs by WBTs were as follows:
1. Amendment of medicine reconciliation form (accounted for 29% of the total activities, n=66)
2. Initiation of medicine reconciliation form (accounted for 26% of the total activities, n=59)
3. Completion of locker check for a TTH (accounted for 20% of the total activities, n=46).

A total of 387 TTHs were completed OOHs. The TTHs were received from a variety of sources: Women’s & Children’s division - 130 TTHs; Medical division - 125 TTHs; Surgical division - 122 TTHs and 10 TTHs from the Acute Care division.

Discussion
The results clearly indicate that a variety of work is completed OOHs. The results show that all bleeps received OOHs were recorded as appropriate. It is expected that bleeps are received OOHs due to the absence of a pharmacist on many wards, however, this data may indicate that inappropriate bleeps were not recorded. Table 1 identifies that completion of medicine reconciliation forms is the activity most frequently reported to be completed by pharmacists on the wards OOHs. Table 1 also suggests that pharmacists’ clinical skills may be underutilised when working OOHs in the dispensary as a large proportion of their time was reportedly spent dispensing medication. A large number of TTHs were received by the pharmacy department OOHs. The pharmacy department needs to ensure sufficient staff with an appropriate skill mix is present OOHs, to ensure TTHs are completed within a short time period. Regular review the amount and type of work completed by the pharmacy department OOHs, will help to identify trends in workload OOHs, in turn this will help to identify ways to improve workflow during normal working hours. Similarly, review of medicines supply during normal working hours may reduce the time spent by pharmacists dispensing medication OOHs.

The significant limitations of the project included the small time period and incomplete data collection forms. The pharmacy staff at WUTH are reviewing workload and staffing levels OOHs and the results of this project will help in this service review.

References
Introduction

There are no national guidelines on the prescribing and monitoring of anti-arrhythmic drugs, other than for atrial fibrillation. Anti-arrhythmic drugs are associated with a range of side effects, mainly the prolongation of the QT interval on the ECG, and therefore regular monitoring is highly recommended. Interest had been expressed in reviewing the prescribing and monitoring of anti-arrhythmic drugs within primary care at South East Staffordshire Clinical Commissioning Group (CCG). Excluding digoxin, amiodarone, flecainide and sotalol were the main anti-arrhythmic drugs being prescribed by GPs. A criterion based clinical audit was designed and piloted across a sample of GP practices within the CCG. This audit focussed on the three commonly prescribed anti-arrhythmic drugs and dronedarone. Dronedarone was included due to the recent prescribing restrictions. Digoxin was deliberately excluded because it is also indicated in heart failure and this audit was to be focussed on drugs for the management of arrhythmias only.

Aim

The aim of this project was to determine the practice of prescribing and monitoring of amiodarone, flecainide, sotolol and dronedarone across General Practitioner practices within the South East Staffordshire CCG and to propose interventions where necessary to improve patient safety.

Objectives

- To design a suitable clinical audit that assesses aspects of prescribing and monitoring of anti-arrhythmic drugs in primary care of the South East Staffordshire CCG.
- To pilot the audit across a sample of General Practitioner practices within the CCG.
- To review the results and establish compliance or non-compliance with the audit.
- To recommend changes in current practice where there was non-compliance with the audit criteria.

Method

Audit criteria were drafted according to drug Summary of Product Characteristics and local effective shared care agreement documents for amiodarone, flecainide and sotalol. Then, two local consultant cardiologists were interviewed to obtain their comments on the audit criteria and standards. The audit was split into four sections, one section related to one drug. Each drug had its own set of criteria and data collection sheets. The standard for each criterion was set to 90% to allow for minor discrepancies.

Results

The criteria covered who started the drug, why it was started, monitoring aspects (e.g. ECGs and blood tests) and co-prescription with potentially interacting drugs. The criterion regarding appropriate prescriber was not considered relevant for sotalol as the literature did not make any specific recommendations. The structure of the audit and the data collection forms allowed efficient collection of data from the GP’s electronic clinical systems. However, the criterion regarding co-prescription with interacting drugs did not differentiate between drugs that prolong QT interval and others, so would need to be revised, so it has not been included in the table below.

Table summarising pilot audit data where n is the number of patients

<table>
<thead>
<tr>
<th>Drug</th>
<th>n</th>
<th>Type of criteria</th>
<th>Compliance (%)</th>
<th>Standard met?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amiodarone</td>
<td>29</td>
<td>Appropriate prescriber</td>
<td>86</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Licensed Indication</td>
<td>90</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ECG Monitoring (once yearly)</td>
<td>21</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LFT Monitoring (at six months)</td>
<td>31</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TFT Monitoring (at six months)</td>
<td>35</td>
<td>No</td>
</tr>
<tr>
<td>Dronedarone</td>
<td>3</td>
<td>Appropriate prescriber</td>
<td>100</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Licensed indication</td>
<td>100</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ECG Monitoring (once yearly)</td>
<td>33</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LFT Monitoring (at six months)</td>
<td>100</td>
<td>Yes</td>
</tr>
<tr>
<td>Flecainide</td>
<td>22</td>
<td>Appropriate prescriber</td>
<td>64</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Licensed indication</td>
<td>77</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ECG Monitoring (once yearly)</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>Sotolol</td>
<td>44</td>
<td>Licensed indication</td>
<td>91</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ECG Monitoring (once yearly)</td>
<td>16</td>
<td>No</td>
</tr>
</tbody>
</table>

Discussion

These results demonstrate that prescribing and monitoring of anti-arrhythmic drugs in practices prescribing these drugs the most in South East Staffordshire CCG is not following the recommendations of the product literature for each drug, or the wishes of at least two of the local cardiologists. This may be having an impact on patient safety. As this study is a pilot undertaken at only five practices, to eliminate bias, all practices in the CCG should be audited using the improved audit. The results of the audit should be distributed across practices in the CCG, and GP clinical systems updated to generate reminders when patients are due for monitoring. After performing these changes, the audit should be repeated again after a period of 18 months.

References

Introduction
Clozapine is used where patients fail to respond to other antipsychotic agents. Treatment with clozapine is associated with a potentially fatal agranulocytosis and thus registration with a clozapine monitoring service (e.g. Clozaril Patient Monitoring Service (CPMS)) is required. NICE recommends annual monitoring of weight, blood pressure, waist measurement, blood glucose, and lipid levels. NICE also gives guidance on enhancing clozapine treatment (clozapine augmentation). Inpatients who subject to Section 58 of the Mental Health Act must have a form of treatment, T2 or T3, specifying clozapine use and a maximum antipsychotic dose.

Objectives
The audit objectives are to ascertain that:
1. Patients have their weight, blood pressure, waist measurements, blood glucose, and lipid levels undertaken on annual basis.
2. Responsible medical officer, team base, and case holder information held on the CPMS is accurate.
3. Other antipsychotic drugs are prescribed for clozapine augmentation after a six week trial with clozapine alone trial and after measuring clozapine therapeutic levels.
4. Inpatients who subject to Mental Health Act Section 58 have T2/T3 forms specifying treatment with clozapine and maximum antipsychotic dose.

Standard of 100% compliance was set for all objectives for all patients.

Methods
The population for the audit consisted of all patients actively registered with clozapine treatment on the CPMS database (141). Alternative patients from the CPMS database were selected for the audit sample.

A criteria based data collection tool was developed with web-based software SurveyMonkey® and used for collecting and analysing data. Medical notes, medicines administration record charts, and T2/T3 forms were used for data collection and were examined on retrospective basis from inpatient and outpatient units. The collected information included; clinical indication, physical monitoring information, medical officer, team base, and case holder information, patient status, information on T2/T3 forms, prescribed antipsychotics and their dose and duration.

The audit was undertaken between November 2012 and February 2013. The audit did not interfere with patients’ clinical management and thus ethical approval was not required.

Results
A sample size of seventy-six patients, giving a confidence level of 80%, was audited. Compliance with NICE recommended annual monitoring for seventy-one patients is shown in the Table 1. Five patients started the therapy less than 12 months ago and were not included in the first objective. Their physical monitoring had a similar trend to the rest of the group.

Full compliance for holding accurate information on the CPMS database was not achieved; medical officer and team base entries were correct for 55/76 (72%) patients and case holder information was only correct for 12/76 (16%) patients.

Thirteen patients were prescribed additional antipsychotic drugs after a six week recommended trial with clozapine alone. Amisulpride was the most common choice for augmentation (62%); others included sulpiride, olanzapine, risperidone (oral and depot injection). The maximum daily dose of clozapine before the augmentation ranged from 150mg to 750mg, which was within BNF range. Clozapine therapeutic levels were measured for 10/13 (77%) patients prior the augmentation.

Full compliance (100%) was observed for specifying treatment with clozapine and maximum antipsychotic dose on the T2/T3 forms. The audit also revealed that four patients were using clozapine for unlicensed indications without the required Drug and Therapeutic committee (DTC) approval.

Table 1. Annual physical monitoring compliance with NICE.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>65/71 (92%)</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>64/71 (90%)</td>
</tr>
<tr>
<td>Waist measurement</td>
<td>6/71 (8%)</td>
</tr>
<tr>
<td>Blood glucose</td>
<td>50/71 (70%)</td>
</tr>
<tr>
<td>Lipid levels</td>
<td>29/71 (41%)</td>
</tr>
</tbody>
</table>

Discussion
Poor compliance for undertaking physical monitoring of waist measurements and lipid levels was observed. As clozapine is associated with an increased risk of diabetes mellitus, dyslipidaemia and weight gain, the importance of adhering to physical monitoring is crucial for successful and safe therapy. Recommendations to include NICE monitoring advice was made and implemented to the currently used form for clozapine physical monitoring.

Inaccurate information held on the CPMS could negatively affect both patient’s care and pharmacy work. The CPMS was related to blood results, monitoring frequency changes, and delayed supply and delivery of medication. Awareness of this was raised to prescribers, nurses and pharmacists during the DTC and the Clozapine strategy meetings.

Although clozapine augmentation was done after six weeks of therapy, not all patients had clozapine therapeutic levels measured, which was required to exclude clozapine non-compliance. This was also raised during the DTC and the Clozapine strategy meetings.

Four patients treated with clozapine for unlicensed indications without the required approval were followed up by the pharmacy. Additionally, it was recommended that all request forms for clozapine treatment went through the pharmacy department in order to prevent inappropriate use of clozapine. The recommendation was approved by the DTC.

The recommendations of the audit have also been included in the process of updating the policy of clozapine at the Trust. The limitations of audit included difficulty in assessing medical notes, existence of satellite notes, and initiation of clozapine outside the trust.

References
Background

Urinary tract infections are the second commonest indication for empirical antibiotic treatment both in hospital and community settings and represent an important burden of disease. Awareness of current local antibiotic resistance patterns and resistance trends is vital in order to make effective empirical treatment recommendations to clinicians. Generally, if resistance is above 20% for an antimicrobial many authorities consider that it is not advisable to use it as empirical treatment. Furthermore, the type of patient, comorbidities, devices, gender and age play an important role in the pathogenesis of urinary tract infections (UTIs) and gaining insight into the resistance rates between groups will be extremely useful to guide treatment recommendations for both specific patient groups and individual patients. Currently, nitrofurantoin and trimethoprim are our first and second line treatments for UTI.

The usual causative pathogens of UTIs are gram-negative bacteria from the gastro-intestinal tract such as *Escherichia coli* (*E.coli*) and other Enterobacteriaceae but treating this common bacteria is becoming more difficult since the appearance and spread of extended spectrum beta-lactamase (ESBL) producing Enterobacteriaceae, the CTX-M 15 type being the most prevalent amongst *E.coli* in the UK. As the hospital and local primary care share a Joint Formulary, this study was designed to assess the resistance patterns of the local antimicrobial policy in both hospital and community, helping to guide antibiotic treatment advice for the local population and enhance future surveillance of resistance in the area.

Aim and Objectives

To determine the local resistance rates to first and second line antibiotics amongst urogenital *E.coli* isolates both in primary and secondary care in Hackney and to evaluate whether current recommended therapy is likely to be effective given the resistance levels found.

To analyse if there are significant differences in resistance prevalence between female and male patients and to identify any trends in prevalence of *E.coli* antibiotic resistance.

Methods

This cross-sectional retrospective study analysed culture positive urine samples at the Homerton Hospital. Samples were initially processed by an automated system (sediMAX, Menarin) and positive samples were cultured. A total of 5,709 samples were culture positive for *E.coli* and were then tested for sensitivities to 6 antibiotics by BSAC disc diffusion method using nitrofurantoin (200mcg), trimethoprim (2.5mcg), co-amoxiclav (30mcg), cefalexin (30mcg), cefpodoxime (10mcg) and gentamicin (10mcg). The study used anonymised data and did not require ethics approval, as per NHS Research guidance.

Overall prevalence of resistance to the above antibiotics was determined for two six month intervals one year apart. Differences in antibiotic resistance percentages between periods was analysed with standard statistical methods (Chi square test) using a statistics software package (SPSS).

Results

Results show very low resistance to nitrofurantoin in uropathogens both in primary and secondary care settings. However, resistance to trimethoprim was above 30% for all groups of patients whether in hospital or community and has maintained similar levels over the last two years. Resistance to co-amoxiclav, cefalexin and gentamicin remained stable or decreased slightly while resistance to cefpodoxime, a marker for ESBL (Extended Spectrum Beta-Lactamase) production, was significantly higher for the second period (*χ²*=5.61, df=3, *p*=0.018).

Table 1. Resistance

<table>
<thead>
<tr>
<th>Nitrofurantoin</th>
<th>Trimethoprim</th>
<th>Co-amoxiclav</th>
<th>Cefalexin</th>
<th>Cefpodoxime</th>
<th>Gentamicin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistances</td>
<td>Apr-11</td>
<td>Apr-13</td>
<td>Apr-11</td>
<td>Apr-13</td>
<td>Apr-11</td>
</tr>
<tr>
<td>F</td>
<td>2.7%</td>
<td>1.2%</td>
<td>33.2%</td>
<td>34.9%</td>
<td>10.9%</td>
</tr>
<tr>
<td>M</td>
<td>3.7%</td>
<td>1.0%</td>
<td>35.9%</td>
<td>36.1%</td>
<td>13.4%</td>
</tr>
<tr>
<td>T</td>
<td>2.8%</td>
<td>1.2%</td>
<td>33.6%</td>
<td>35.1%</td>
<td>11.2%</td>
</tr>
</tbody>
</table>

F: Female; M: Male; T: Total

When comparing results from female and male patients, differences in uropathogen resistance seemed to be wider for co-amoxiclav, cefalexin and cefpodoxime, suggesting a higher resistance amongst isolates from male patients.

Discussion

Nitrofurantoin resistance was found to be very low and has decreased over the last 2 years, therefore it remains a good empirical choice for UTI treatment. Trimethoprim is currently the second line oral treatment recommended in the local antibiotic policy, however, from the results above, it does not seem to be a valid option for empirical treatment of UTI in secondary or primary care in Hackney. Alternative oral treatments such as cefalexin and, in patients at high risk of developing *Clostridium difficile* infection, pivmecillinam or fosfomycin should be considered. Bacteria from the urinary tract can reach the blood stream and cause urosepsis. *E.coli* being the most common cause of bacteremia. The higher cefpodoxime resistance reported in the second period indicates a higher prevalence of ESBL in uropathogens and increases the risk of empirical therapy for sepsis being incorrect. The periods compared were not identical and seasonal variation might have affected these results although it did not affect similarly the resistance rates reported for the rest of antibiotics. These findings will be presented to the Antimicrobial Management Group in order to evaluate the alternative second line treatments proposed above.

A limitation of this study was that patient mix and demographics may have been tested more than once. Also, resistance may vary widely between different centres within the UK, due to factors such as patient mix and demographics.

References


Introduction

The 'core' hours for provision of clinical pharmacy services at this two-site Trust are between '9-5' Mon-Fri and from '9-2' on weekends. The 'out of hours' (OOH) service refers to all calls received between 5pm and 9am 7 days a week. On average, the service receives 1800-2000 calls a month, via switchboard, to a junior pharmacist based on the acute campus. On the busiest nights, this can result in significant delays in responding to and actioning calls. There is also a financial burden associated with working overtime to complete such workload. Permanent records of all calls are made via a computer based electronic on-call manager system\(^5\). The call-type is assigned to one of 17 pre-agreed categories.

Objective

To discern the reasons why the OOH pharmacy service is accessed and make recommendations for improvement.

Method

Data on the nature and timings for all calls received in March 2013 were extracted from the pharmacy ‘on-call’ manager system and analysed. The project was registered with our local audit department. Ethics approval was not required.

Results

A total of 1,845 calls were received in March 2013. Detailed breakdown of calls is shown in table 1.

Table 1 : Breakdown of calls received by OOH service over 4 weeks

<table>
<thead>
<tr>
<th>Category</th>
<th>Total no. of calls</th>
<th>% in relation to all calls</th>
<th>Themed categories (% of all calls)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New prescription (non-stock)</td>
<td>574</td>
<td>31.1</td>
<td>Supply-related calls excl CDs</td>
</tr>
<tr>
<td>New prescription (stock)</td>
<td>24</td>
<td>1.3</td>
<td>(1108 calls; 60%)</td>
</tr>
<tr>
<td>New discharge prescription (TTO)</td>
<td>241</td>
<td>13.1</td>
<td>'Chasing' calls</td>
</tr>
<tr>
<td>Re-supply of non-stock drug</td>
<td>141</td>
<td>7.65</td>
<td>(250 calls; 13.6%)</td>
</tr>
<tr>
<td>Re-supply of stock drug</td>
<td>101</td>
<td>5.5</td>
<td>MI</td>
</tr>
<tr>
<td>Supply of sterile product</td>
<td>24</td>
<td>1.3</td>
<td>CDs</td>
</tr>
<tr>
<td>Supply to another Trust</td>
<td>3</td>
<td>0.05</td>
<td>Other</td>
</tr>
<tr>
<td>Chasing for TTO</td>
<td>100</td>
<td>5.4</td>
<td>(220 calls; 11.93%)</td>
</tr>
<tr>
<td>Chasing for drug chart</td>
<td>82</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>Chasing for drug (in-patient item)</td>
<td>68</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>Medicines Information (MI)</td>
<td>196</td>
<td>10.62</td>
<td></td>
</tr>
<tr>
<td>Controlled drug (CD) – non-stock</td>
<td>38</td>
<td>2.06</td>
<td></td>
</tr>
<tr>
<td>Controlled drug (CD)– stock</td>
<td>33</td>
<td>1.79</td>
<td></td>
</tr>
<tr>
<td>Chemotherapy related advice</td>
<td>6</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>Out-patient prescription advice</td>
<td>31</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>Resolved (no longer needed)</td>
<td>38</td>
<td>2.06</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>145</td>
<td>7.85</td>
<td></td>
</tr>
<tr>
<td>GRAND TOTAL</td>
<td>1,845</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

The most common reason for accessing the OOH service was ‘supply’ - almost two-thirds of all calls. More than half of these were for new non-stock requests, one-fifth were for a ‘re-supply’, and another one-fifth for TTOs.

Recommendations for reducing ‘supply-related’ calls

- Risk assess all drugs on the hospital pharmacy catalogue with the view to allow safe and secure borrowing of selected non-stock drugs – this should include clear rules for borrowing with full audit trail to ensure drug security.
- Pursue electronic stock lists where if a ward has run out of a drug they routinely stock, they can borrow it from a neighbouring ward without the need to contact the pharmacist.
- Review and consider increasing the range of drugs available in the emergency drug cupboards/room.
- Provide monthly reports to directorates regarding the number of TTO requests made ‘out of hours’. This should prompt an investigation as to why these were not completed during ‘core’ working hours.
- Re-education of pharmacy staff about ensuring sufficient quantities are ordered to prevent re-supply OOH.
- Continual proactive review of the range and stock levels of drugs by clinical and stores teams in response to monthly analysis of calls.

‘Chasing’ calls were the second highest reason for calls. Most of these related to TTOs, despite there being an electronic tracking system. A third of these were for drug charts – the current system requires ward staff to leave the drug chart in pharmacy and be returned after screening. A similar number of calls related to in-patient items – the current system does not allow the urgency of a drug request to be known until the pharmacist returns the call.

Recommendations for reducing ‘chasing’ calls

- Re-education of ward staff to use the existing electronic tracker system.
- Screen the drug chart at point of receipt and return the drug chart immediately (rather than holding drug charts in a queue) with drugs to follow.
- To pursue linking the current pharmacy on-call manager system to an existing hospital wide system which is used by ward staff to contact doctors - this would allow all calls being assigned a priority level at time of submission.

‘Medicines information / advice related calls accounted for the third highest category of calls.

Two-thirds were related to guidance about IV drug administration, antibiotic prescribing and electrolyte replenishment – through re-education, future calls can be avoided by the caller referring directly to the respective Trust intranet guidelines.

Controlled drugs (CDs)

Almost half of all CD requests were for those which were on the respective wards stock list. There are issues around CD drug storage capacity on some wards but there is a need to review CD stock lists and quantities held at ward level to minimise stock related calls.

Limitations of the audit

The study period (March) might have shown up a higher than usual number of calls relating to a re-supply because fewer drug charts would have been screened due to staffing levels.

Conclusion

Successful implementation of all of our recommendations would result in reduction of non-value added calls and an overall reduction in calls by approximately one third. Monthly analysis of calls will be undertaken to assess the impact of our recommendations and enable feedback to directorates regarding most appropriate use of the OOH service. The overall aim is to make best possible utilisation of the OOH clinical pharmacists skills (e.g. more input on admissions wards) rather than a predominantly supply related service.

References

1. Nottingham University Hospitals NHS Trust - On Call Manager Version 7.0
**41. An audit of parenteral nutrition standard bag usage for adult patients in a large teaching hospital**

Westbrook, N, Harris, C. Pharmacy Department, Oxford University Hospitals NHS Trust, Oxford

**Introduction**

Parenteral nutrition (PN) is a complex nutrient admixture, which is administered intravenously to meet part or all of a patient's nutritional requirements. PN is indicated when a patient is unable to meet their nutritional requirements orally or enterally or has a non-functioning gut. It is suitable for both short and long term use and can be continued in the home environment.

Historically, PN regimens have been tailored to meet the individualised nutritional requirements of a patient. Recently, the introduction of standardised regimens has been advocated as a means of reducing cost and improving stability assurance. Oxford University Hospitals NHS Trust is a large teaching hospital trust, with an established nutrition service providing intestinal failure services for type I, II and II patients. It provides inpatient PN for approximately 300 patients per year via an outsourced aseptic service. A contract renewal offered financial incentive for the use of standardised PN bags. In response to a cost improvement programme (CIP), the nutrition team was required to achieve a target of 30% standard bag usage. To ensure that standard bags were used appropriately, local guidance was developed by the nutrition team based on clinical, nutritional and administration risk in accordance with guidance from the British Pharmaceutical Nutrition Group (BPNG) and National Confidential Enquiry into Patient Outcome and Death (NCEPOD).

At the time of the audit the nutrition team had access to a range of 8 standard bags, all with fixed macronutrient, micronutrient and electrolyte content. Seven bespoke bags were also available, with fixed macronutrient content but variable electrolyte and micronutrient content. If a patient's nutritional requirements could not be met using these products, a tailored regimen could be compounded (scratch bag).

**Objective(s)**

To audit PN use against the local nutrition team guidance. The key aims were; to determine the percentage standard bag used, to identify the main indications for using a tailored or scratch bag, to determine the average number of days a patient is prescribed a standard bag and to determine the profile of bag usage between specialties.

Ethical approval was not required as this was a clinical audit.

**Method**

All PN prescriptions for patients initiated on PN between the 1st May and 22nd October 2012 were included in the audit. A simple data collection form was developed. Prescriptions were audited retrospectively. Simple statistical analysis was performed using Excel.

**Results**

A total of 104 patients received 1035 bags during the audit period, 531 bags (51%) standard bags, 298 (29%) bespoke bags and 211 (20%) scratch bags.

Patients received a mean of 4 days (range 0 – 26) of standard PN. 53 (51%) patients did not receive a standard bag or switched from a standard bag, 35 (66%) of these had more than 1 indication for non-standard bag use. The indications for switching to a scratch/bespoke bag are detailed in table 1.

**Table 1 – Indications for not using a standard bag**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Number (n=53)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid restricted</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>High nitrogen requirements</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>Very high electrolyte requirements</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>Very high fluid requirements</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Required a low lipid or lipid free regimen</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>HPN patient (inpatient episode)</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Glutamine required</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Low electrolyte/electrolyte free requirement</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>High calorie requirements</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Limited venous access</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

The specialties that used the highest proportion of bespoke and scratch bags were renal (100%, n=5), transplant (85%, n=113), gastroenterology (80%, n=54) and critical care (60%, n=176).

**Discussion and conclusion(s)**

Implementation of the local nutrition team guidance achieved a use of standard bags in excess of the CIP target of 30%.

All use of non-standard bags was justified according to the local clinical guidelines. Patients received a mean of 4 days (range 0-26) of standard PN, indicating standard bags were used predominantly for short term therapy only.

The most common reasons for using a tailored bag reflect the complexities of the specialties with the highest use. The patients within the gastroenterology and transplant cohort are more likely to have fistulae, open abdominal wounds or short bowel syndrome and therefore require higher nitrogen, fluid and electrolyte regimens. Patients within critical care and renal services are more likely to be fluid restricted.

An extended range of standard bags may increase the overage percentage used and release potential savings. Further evaluation of the composition of the non-standard regimens, potential volume usage, shelf life and potential wastage from stock holding should be considered in the development of an extended range of standard bags.

**References**

Introduction

EPMA is promoted as improving the safety and efficiency of both prescribing and administration of medicines. It was hoped that EPMA would increase legibility of prescriptions, reduce inappropriate prescribing, reduce errors made in generating discharge prescriptions and facilitate faster discharges. This audit was designed to evaluate staff perceptions of EPMA at Royal Liverpool and Broadgreen University Hospitals NHS Trust (RLBUHT), with regards to safety and efficiency of medicines management.

Objectives

- To collate the opinions of doctors, nurses, pharmacists and pharmacy technicians of the safety and efficiency of the EPMA system at RLBUHT.
- To identify the perceived strengths and weaknesses of EPMA.
- To identify improvements that could be made to EPMA that would address staff-identified weaknesses in the system.

Methodology

A questionnaire was designed and piloted, re-edited and distributed in October 2012 to each pharmacist, their ward technician, two nurses and two doctors on their wards. Respondents were questioned about their experience and perceptions of EPMA by a mixture of core and profession-specific questions. Ethics approval was not required for this audit.

Results

143 questionnaires were distributed and 84 (59%) were returned. Response varied between professions. As regards to safety, the opinions of medical and nursing staff were divided as to whether EPMA improved patient safety or not, with 73% of doctors feeling that allergy status was better documented and clearer with EPMA than the previous paper-based system. Pharmacists felt strongly that EPMA was less safe than the previous system. All pharmacy technicians and 95% of pharmacists believed that they spend less time with patients since EPMA was introduced at the hospital, but this opinion was shared by only 55% of nurses and 38% of doctors.

Regarding efficiency, half of the doctors who responded believed that EPMA has reduced their workload, with 69% agreeing that discharge prescription completion was both quicker and easier. Nurses and pharmacy technicians were more divided in their opinions but 95% of the pharmacists reported an increase in their workload, with 86% believing that time taken for completion of medicines reconciliation had increased and 54% believing that time taken to verify an in-patient prescription had increased.

When asked whether or not they would recommend the EPMA system at RLBUHT to other Trusts that have yet to implement it, 54% of those who responded replied in the affirmative, although there was wide response between professions. Staff expressed their opinions of the strengths and weaknesses of EPMA and what improvements could be made. The most common strengths, weaknesses and recommendations are listed in Table 1.

<table>
<thead>
<tr>
<th>Profession</th>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacist (n=22)</td>
<td>-Easy to read</td>
<td>-Too many different screens</td>
<td>-Improve the ordering system</td>
</tr>
<tr>
<td></td>
<td>-Audit trail</td>
<td>-Creates more work</td>
<td>-Make antibiotic indication and review date</td>
</tr>
<tr>
<td></td>
<td>-Remote access</td>
<td>-Less time for patients</td>
<td>-Recording compulsory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Doctors select wrong drug</td>
<td></td>
</tr>
<tr>
<td>Doctor (n=26)</td>
<td>-Remote access</td>
<td>-Not enough computers</td>
<td>-Reduce the number of automatic warnings appearing on screen</td>
</tr>
<tr>
<td></td>
<td>-Easier completion of discharge prescriptions</td>
<td>-Can’t always find the medication on the list to prescribe</td>
<td>-Provide more computers</td>
</tr>
<tr>
<td></td>
<td>-Clear allergy status</td>
<td>-Less time with patients</td>
<td></td>
</tr>
<tr>
<td>Nurse (n=27)</td>
<td>-Easy to read</td>
<td>-Computer carts are bulky/heavy</td>
<td>-Improve the ordering system</td>
</tr>
<tr>
<td></td>
<td>-No more missing paper charts</td>
<td>-Slow internet connectivity</td>
<td>-Provide more training for doctors</td>
</tr>
<tr>
<td>Pharmacy Technician (n=9)</td>
<td>-Easy to read</td>
<td>-Single user access to patient’s profile is frustrating</td>
<td>-Find a way around single user access to a patient’s profile</td>
</tr>
<tr>
<td></td>
<td>-Remote access</td>
<td></td>
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</tbody>
</table>

Discussion/Conclusion

EPMA has been perceived to have brought some improvements to both safety and efficiency, but has also raised new problems of its own. These include selection errors (wrong drug/dose/form), “careless” discharge prescribing without considering any changes needed and “pop-up” fatigue associated with the numerous internal alerts of the system. Commonly occurring errors and near-misses should be highlighted to all users of EPMA to reduce the potential for error. The reported reduction in direct contact between patients and pharmacy staff may negatively impact on patient safety. Whilst most users of the system perceive no reduction in workload since EPMA was implemented, it has made certain tasks within the hospital easier, such as medicines administration and discharge prescription completion. EPMA has provided a better audit trail, improved legibility of prescriptions and has created a better awareness of a patient’s allergy status, which were seen to be among the advantages of implementing EPMA. Specific recommendations arising from the study include: resolution of the connectivity issues, an improved ordering system and better staff training, especially in areas where common errors are being made. These should result in fewer missed doses, faster discharges and improved staff perceptions of the system. Limitations of this audit may include the choice of staff given the questionnaires and the variation in use between the different professions. The results of this audit have been fed back to the EPMA implementation team at RLBUHT.

The overall consensus was that patient safety has increased since the implementation of EPMA at RLBUHT, although this opinion was not shared by pharmacy staff. It was agreed that efficiency of medicines management has decreased with the new system in place. Our staff perceptions of EPMA may be useful to other Trusts with the advent of EPMA in Trusts throughout the United Kingdom.

References

Introduction
The increasing prevalence of antimicrobial resistance and scarcity of new agents threatens to limit our ability to prevent and cure infective illnesses.\(^1\)\(^2\) Despite knowledge of the threat of resistance and lack of new agents, antibiotics are still prescribed for viral infections and self-limiting bacterial infections. Reports claim that approximately half of antimicrobial prescriptions are either incorrect or unnecessary.\(^3\)

Emergency departments see a variety of infections and provide both a point of access to primary care and an entrance point to secondary care. This audit formed part of an ongoing audit cycle to evaluate adherence to local guidelines for antimicrobial prescribing in the Emergency department at University College London Hospitals NHS Foundation Trust.

Aim
To evaluate adherence of the antimicrobial prescribing guidelines in the Emergency department.

Objectives
- To review the indications for antimicrobial prescribing
- To evaluate adherence with regards to drug choice, dose and duration of therapy
- To compare results with the audit conducted 2 years ago
- To identify which aspects of the clinical guidelines require revision or update

Method
Data was collected retrospectively over a six week period. Ethics approval was not required as data was collected as part of a cyclical audit program. Antimicrobial prescriptions issued from pharmacy and the Emergency department were used to collect prescribing data across all age groups.

Patient medical records were used to identify the indication for the antimicrobial, presenting symptoms, microbiological results and history of recent infection or antimicrobial therapy. Prescriptions including an incorrect choice of agent, dose or duration were considered non-adherent, but were considered adherent if appropriate reason for the discordant choice could be deciphered from consultation records.

Results
A total of 2204 Emergency department prescriptions were screened, of which 1221 (55.4%) contained at least one antimicrobial agent. Of the 1292 antimicrobial courses evaluated, 59.5% were adherent to guidelines, whilst in 7.7% adherence could not be determined due to absence of any specific clinical guideline. Adherence for choice of agent used, dose and duration was 81.3%, 95.7% and 87.5%, respectively. The table below compares the results of the current audit to the one conducted two years ago.

Table 1: Adherence to guidelines in the current and previous audit

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Adherent</td>
<td>41.7% (n=161)</td>
<td>59.5% (n=760)</td>
</tr>
<tr>
<td>Non-adherent</td>
<td>46.1% (n=178)</td>
<td>32.8% (n=419)</td>
</tr>
<tr>
<td>No clinical guideline</td>
<td>12.2% (n=42)</td>
<td>7.7% (n=99)</td>
</tr>
</tbody>
</table>

The reasons for non-adherence and the proportion of non-adherent prescriptions characterised by each were: wrong drug (37.3%), too short course length (29.6%), unnecessary drug (25.9%), wrong dose (14.5%), too long duration (12.6%) and omitted drug (2.8%).

The majority of non-adherent prescribing involved upper respiratory tract infections (RTIs) followed by skin and soft tissue infections and urinary tract infections. 74.3% prescriptions judged to be unnecessary were for upper RTIs, including non-specific viral RTIs, bronchitis, and cases of otitis media not meeting the guidelines' criteria for antibacterial treatment.

The majority of prescriptions long durations (12.6%) involved 5 - 7 day courses prescribed for cystitis in women, for which guidelines indicate a three day course, whilst in 29.6% of cases (primarily pyelonephritis and tonsillitis) the duration was shorter than suggested in guidelines.

Discussion
The results indicate improvement in overall adherence since the 2011 audit following introduction of new guidelines and education of medical staff at that time.

Respiratory tract infections comprised the majority of prescriptions. The complexity of differentiating between bacterial and viral causes and the potential harm from under-treating serious infections such as pneumonia is reported as prompting prescribers to consider the potential for benefit to outweigh the disadvantages of unnecessary antibiotic use.

The results suggest a trend towards choosing a broad spectrum agent where a first line antibacterial with a narrower spectrum would be appropriate; mirroring observations in the literature that deviation from guidelines is usually in the direction of more broad-spectrum therapy. Since infections presenting in primary care are generally community-acquired, a similar spectrum of susceptibility might be expected in the Emergency department, making use of narrow-spectrum agents duly appropriate.

The results highlight the need to improve awareness of appropriate antimicrobial prescribing by providing easier access to guidelines and prescriber education, to manage the expectations of patients and finally to revise the current guidelines, in particular to include more information on diagnosis and when to consider delayed prescriptions.

References
Introduction
Many patients in the community are unable to take food and water by mouth and require placement of an artificial enteral feeding tube (EFT) to maintain their hydration and nutritional status. In 2010 an estimated 49,000 patients were on home enteral tube feeding, 69% of these patients were in their own homes, 40% being independent [1]. Some patients may also use their EFT for administering medication. Medications given via an EFT are unlicensed and there is limited guidance for prescribers, patients and carers. The use of inappropriate medication formulations can result in tube blockage [2], resulting in delayed feeding, call out of a community nurse or admission to hospital to have the tube replaced.

Objectives
The aim of the study was to determine clinical practice of EFT use for medication administration by patients, by obtaining details of the medication, techniques and associated problems.

Method
A 15 item survey containing mainly closed factual questions and some open questions was designed to ascertain practice when administering medication via EFTs. Details of the tubes, medicines and formulations currently in use were requested. No patient identifiers were requested.

The proposed survey was reviewed anonymously by a group of PINNT members, a small selection of minor comments were returned with general endorsement of the survey.

The questionnaire was sent to 130 appropriate members by PINNT on behalf of the researcher in December 2010.

There was no follow up of non-responders.

Data was analysed using Excel for simple statistical and thematic analysis.

Ethical approval for this study was granted in 2009 by the Mid and South Buckinghamshire Research Ethics committee.

Results
71 completed responses were received (54.6%), 6 returned uncompleted (4.6%). The age distribution was 22 patients between 0-18 years, 12 patients aged 19-40, 22 patients aged 41-65, 15 patients more than 66 years of age. There was no correlation between tube type or size and the age of the patient. 7.1% of patients did not know what type of tube they had, 35.7% did not know what size it was.

Of the 71 patients returning completed surveys 58(82%) used their tube to administer medication daily, 3 patients were not on regular medication but occasionally used the tube for liquid antibiotics.

For those patients administering medication via their tube a total of 237 medicines were administered, average 4.1 medicines/day (range 0-15, mode 3). 192(81%) of medicines were in an appropriate formulation. 45(19%) doses required manipulation, 21(8.9%) of these were available as a licensed formulation not requiring manipulation.

Analgesics, proton pump inhibitors and laxatives were the most commonly administered medication. Omeprazole and lansoprazole were most commonly associated with tube blockage, this was reported by 11(58%) of the 19 patients taking these medication.

8 patients reported crushing tablets, 10 patients reported mixing medication together prior to administration.

Patients were most likely to seek advice regarding medicines from their hospital doctor or GP, generally seeking information from one or more sources. Pharmacists did not often advise on the formulation used but were seen as a source of information.

5 respondents specifically commented on the lack of knowledge by health care professionals about this route of administration.

Conclusion
This small study reveals that a large proportion of patients on home enteral tube feeding also use their tube as a route of medication administration. There is evidence in this group of patients that drug administration via this route is varied both in formulations used and methods of administration.

Patients with EFTs in the community are at risk of tube blockage due to inappropriate medication formulation use, particularly from crushing tablets and mixing medication together.

Consistent guidance is required for patients and carers to avoid variation in administration practices and prevent crushing inappropriate formulations and mixing medications.

GPs are the main source of advice for these patients; improved access to guidance is required for them when prescribing for patients who require medication to be administered via their EFT to improve administration practices and also improve patient confidence in the advice given.

Patients do seek advice from pharmacists regarding this route of administration, it is important that these pharmacists know where information resources are available.

The generalizability of this study is limited by the sample group, as members of a patient support group it is possible that this patient group is more informed about their condition and sources of information. A further study in a larger group of patients is warranted.

References
Introduction
Appropriate and timely treatment for alcohol withdrawal is important to prevent the development of Wernicke's encephalopathy, Korsakoff's syndrome, seizures or delirium tremens. Also, inappropriate management of alcohol withdrawal can be associated with significant morbidity and mortality in some cases (3). Symptoms of alcohol withdrawal can occur within a few hours of reducing or stopping use of alcohol (2). Due to this, timely management of alcohol withdrawal is vital; to minimize risk to patients and allow prompt initiation of treatment to prevent development of withdrawal symptoms, as per NNUH guidelines (6). National Institute for Health and Clinical Excellence guidance (31) recommends that treatment is started based on symptom triggers. However at the NNUH, treatment is given using three different fixed reducing detoxification regimens with additional when needed treatment according to symptoms dependent on alcohol usage (31). It is believed that a number of patients do not receive appropriate treatment regimens according to guidelines (31), which could impact on patient care. Due to this, we were interested to know if patients were receiving optimal treatment.

Objectives
- To undertake an audit against the following standards:
  1. All patients have appropriate detoxification treatment reducing regimen prescribed on initiation of treatment (31).
  2. All patients have rescue detoxification treatment prescribed and available on a when needed basis within the prescription chart (31).
  3. All patients have intravenous thiamine prescribed in accordance with guidelines (31).
  4. All patients have a full alcohol history documented in patient medical records (31).
  5. Trust alcohol and drugs service (TADs) have been contacted to review patients (31).
  6. No patients are prescribed vitamin b co-strong treatment (31).
- Review results and recommend changes to improve compliance to standards if necessary.

Method

All wards were included in the audit; with all patients over 16 years old included. Patients were eligible for the audit if they were prescribed any form of alcohol detoxification treatment whilst an inpatient at the NNUH.

Data was collected using a standard data collection form via a convenience sampling strategy. The process and data collection form was piloted in mean pharmacy admissions. All wards were included in the audit; with all patients over 16 years old included.

Method

Data was collected using a standard data collection form via a convenience sampling strategy. The process and data collection form was piloted in order to ensure the data collection form was appropriate. Data collection took place over a period of a month (12/2012). Patients were identified throughout the collection period by ward pharmacists, as they reviewed prescription charts daily and could then pass identified patients details onto the auditor. The auditor was then able to collect data on the identified patients by reviewing the prescription chart and medical notes. Ethics approval wasn’t required as this was an audit project; however, the audit was registered with the NNUH.

Results
During the data collection period 34 patients receiving detox treatment were identified, of which 68% (95% confidence interval (C.I.) = 51-83) were male with a mean (SD) age of 55yrs (15). In addition, 53% (95% C.I. = 36-70) were under the treatment of a gastroenterology consultant and 47% (95% C.I. = 30-64) under treatment of other specialties. This data is sufficient to make decisions regarding standards based on the fact TADs receive an average of 50 patient referrals per month for alcohol; of which not all receive detox treatment. Adherence to audit standards for all patients identified is presented in Table 1; adherence to standards 3 & 4 was generally good, however the level to adherence to standards 1, 2, 5 & 6 was below the level of acceptability. Other data was collected but is not presented within this abstract.

Table 1: Adherence to audit standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Compliance with standard, % (95% C.I.), N=34</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>35.3 (19-51)</td>
</tr>
<tr>
<td>2</td>
<td>73.5 (59-88)</td>
</tr>
<tr>
<td>3</td>
<td>88.2 (77-99)</td>
</tr>
<tr>
<td>4</td>
<td>91.1 (82-100)</td>
</tr>
<tr>
<td>5</td>
<td>61.8 (45-78)</td>
</tr>
<tr>
<td>6</td>
<td>73.5 (59-88)</td>
</tr>
</tbody>
</table>

Discussion
The audit revealed that prescribing of fixed dose reducing dose detoxification on treatment initiation did not meet the expected standard (3). In addition, prescribing of rescue treatment charted on the when needed section of the prescription chart was sub-standard. These results may be due to time constraints of junior doctors who often have to initiate this treatment, or possibly due to a lack of awareness of hospital protocol. This could lead to inappropriate management of alcohol withdrawal and potentially cause treatment complications and prolonged hospital admissions. Prescribing of IV thiamine was generally good; which may have been due to prescribers recognizing the risk to patients of low thiamine stores. Documentation of alcohol histories on admission was satisfactory, meaning that patients at risk of withdrawal could be identified quickly. A low number of patients had TADs referrals made; this may have been due to a lack of awareness of the importance of TADs or staff not taking responsibility for referrals. A high number of patients were not prescribed vitamin b co-strong, although there is improvement needed; this may have been due to guidelines changing recently. The audit has a number of limitations. Firstly, data was collected by pharmacists using a convenience strategy; which could mean pharmacy interventions may have affected results. Secondly, it was sometimes difficult identifying timings of prescribing decisions and appropriateness of prescribing using medical notes alone. It was not possible to identify patients who needed treatment but did not receive detoxification treatment.

The prescribing of fixed dose reducing and rescue detoxification treatment must improve; this could be facilitated by the introduction of pre-printed treatment chart containing the regimens used to allow quick and accurate treatment initiation. To increase TADs referrals, pharmacists should take responsibility for referral of patients to the service by identification during ward work. Once changes are implemented, the audit will be repeated.

References:

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Introduction
Nottingham University Hospitals NHS Trust spends approximately £250k per annum on bottled medical gases. As Medical gases are classified as a medicine the budget is held within Pharmacy. A trust Medical Gases Committee was formed following the release of the NPSA rapid response alert – oxygen safety in hospitals\textsuperscript{1}. The aim of this committee is to provide the framework to ensure that the Trust complies with current legislation and best practice guidelines for medical gases.

A trust wide audit was conducted of medical gas cylinders to establish a baseline of the assets held. This information was compared to the company asset tracking system i.e. the number of cylinders NUH is paying rental for, a large negative discrepancy was found with no clear audit trail and no overall ownership to ensure these discrepancies were highlighted, accounted for, or investigated. The audit also revealed breaches in safe management and storage of bottled gases across the trust. Concerns raised from the audit initiated a service improvement project to improve safety and a pharmacy cost improvement programme for 2011–2012 was registered for medical gases.

Aim
To demonstrate how improved understanding and taking ownership of medical gases can improve patient safety and save the trust money.

Objectives
1. Develop a consistent management pathway with a clear audit trail including the introduction of external and internal tracking of cylinders between the suppliers and NUH.
2. Agreed stock lists for all bottled gases within the trust.
3. Communication to staff of safe management and handling of medical gases.

Method
As a result of the audits findings a multi-disciplinary team was formed including the Medical gas committee and representation from Finance and Procurement. Over a period of a year a number of measures were put into place including a consistent management pathway with clear paper/electronic audit trails for the ordering and supply of medical gases. Ward stock lists were agreed with the key personnel for each area considering if piped oxygen was available, type of patient, storage etc. A policy was written for the management, transportation and storage of cylinders. A communications strategy was developed to inform staff of developments and key issues relating to the safe management of medical gases. A cylinder amnesty was undertaken to facilitate the return of cylinders that had been stored for considerable periods and outside of NUH trust.

Results & Discussion
Due to the large discrepancy in actual cylinders an investigation and internal validation of the inventory data held by the company was reviewed including 4,573 delivery notes and invoices over the past 5 years. They discovered 97 inventory management entry errors from the original invoices; i.e. discrepancies and mistakes in the invoicing. The NUH trust procurement team assisted with negotiations with the company to financially write-off any remaining discrepancy.

The process of reviewing the data highlighted a number of gaps and areas of vulnerability that needed to be addressed to ensure this did not happen again. Hence a consistent management pathway was developed which consisted of the following:

- Cylinders are now tracked using bar code readers which transmit data instantly to the central asset tracking system using the mobile data network. This allows instant tracking of all cylinders in NUH and cylinders that are transferred to other hospitals with patients to be credited back to NUH when returned to the company.
- Stock lists have been implemented and clinical stock holding reviewed. Ward stock levels were re-based with an aim of maximising the use of piped medical gases. G-sized cylinders were removed where appropriate in-line with NPSA recommendations\textsuperscript{1}. The ward stock lists have provided the Patient Escort Team with greater control over the delivery of cylinders. Inappropriate deliveries have been reduced saving time for their team. We plan to integrate the list data into the asset tracking system in October 2013 following completion of pending system developments.
- Policies to support the correct procedure for the management, transportation and storage of cylinders.
- Ordering and invoicing is now coordinated through the pharmacy services procurement team. They check rental charges against the tracking system including emergency deliveries which have now been eradicated.
- Review and rationalising of all the delivery points across the trust resulting in reduced delivery costs.
- The medical gas committee regularly scrutinise the Key Performance Indicators from the company to ensure compliance.

A communications strategy has been developed through the creation of a ward-poster, regular trust-wide bulletins and communications to local trusts and organisations that may have removed/received cylinders from our trust in the past. This raised the profile of medical gases leading to improved storage, management, prescribing and usage within the trust.

Conclusion
The various cylinder rationalisation strategies have resulted in considerable annual savings in excess of £90k with more recurrent savings to still be achieved. Medical gases are a medicine and therefore consideration into their management including ordering, storage, prescribing and transfer should be taken into account. This needs a multi disciplinary team approach to ensure ownership for the safe and cost effective management of medical gases. The main limitation was found to be communication and ensuring staff were aware of the changes and implications of stock lists and storage of medical gases. However, we believe that this work could be reproduced in other trusts with considerable implications on patient safety and cost efficiency.

References
Introduction
30-70% of patients have unintentional medication changes when admitted to hospital.\(^1\) This could be avoided by encouraging patients to bring their own medicines into hospital via the Green Bag scheme to facilitate medicines reconciliation. The Green Bag scheme is a Quality, Innovation, Prevention and Productivity (QIPP) project implemented in 2010 by South Central Strategic Health Authority (SHA). This scheme aims to improve medicines reconciliation at point of transfer, facilitate medication transfer and reduce medicines wastage. Critical medicines like insulin could be given on time and missed doses could be avoided, which complies with the 2010 National Patient Safety Agency (NPSA) alert: Reducing harm from omitted and delayed medicines in hospital.\(^2\) It has been reported that potential savings of £3.6m per year could be made in the South Central region if 40% of the patients bring their medicines into hospital.\(^3\)

In May 2011, it was recorded that only 14.3% of patients within the South Central region used Green Bags to bring their medicines into hospitals.\(^2\) To further improve uptake of the Green Bags, the "Bring Your Medicines into Hospital using a Green Medicine Bag" regional campaign was launched in February 2012. This audit aims to assess the implementation of the Green Bag scheme within acute sites of BHT.

Objectives and Standards
1. To determine the number of inpatients who bring any of their medications (PODs) into hospital at the point of admission (standard 70%)
2. To determine the number of inpatients that brought their own medications into hospital using Green Bags (standard 80%)
3. To determine the number of inpatients on regular medications that were given Green Bags on discharge (standard 100%)
4. To assess availability of Green Bags as stock on wards at Amersham (AH), Stoke Mandeville (SMH) and Wycombe Hospitals (WH) (standard 100%)
5. To identify any possible barriers to deter the use of Green Bags within BHT.

Method
A data collection form was adapted from the regional audit tool kit,\(^4\) piloted and amended following feedback. Training sessions for all pharmacists were held before the audit period. Data was collected prospectively over a period of 7 days in January 2013 across the acute sites (AH, SMH and WH) by pharmacists in dispensaries and wards at point of clinical screening/medicines reconciliation/discharge. Discharge was defined as the point at which the discharge prescription was dispensed. The following information was collected:

1. type of admission (elective/ emergency)
2. whether patients brought in their medication, with or without using green bags
3. whether patients were discharged with Green Bags

Green bag availability on the wards was physically checked by the investigator during one day of the audit period. A Green Bag evaluation survey adapted from the regional toolkit\(^1\) was also conducted among nurses, doctors, ambulance crew and pharmacy staff. Ethics approval was not required as the survey did not include patients.

Results
158 admissions and 261 discharges across acute sites in BHT were analysed. 104 (66%) were emergency admissions and 54 (34%) were elective. 12 (8%) patients were not on regular medications before admission. Out of the 261 discharges, 164 (80.5%) patients were discharged with regular medications. 29 wards including and were inspected for Green Bags availability. Table 1 summarises the Trust’s performance against the standards. The majority of staff (81%, n=106) were aware of the scheme and were happy with the Green Bag design (53%). But mixed feedback was received as to whether this scheme was beneficial.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Standard (%)</th>
<th>Achieved (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Patients brought any of their PODs into hospital</td>
<td>70</td>
<td>71</td>
</tr>
<tr>
<td>2. Patients used Green Bag to bring their medications into hospital</td>
<td>80</td>
<td>18</td>
</tr>
<tr>
<td>3. Patients on regular medicines were given Green Bags on discharge</td>
<td>100</td>
<td>21</td>
</tr>
<tr>
<td>4. Wards have Green Bags available to be given to patients</td>
<td>100</td>
<td>90</td>
</tr>
</tbody>
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Discussion
The audit showed that the Green Bag scheme is underutilised in BHT as not all audit standards were met. The majority (71%) of admitted patients brought medications into hospital which is encouraging, but not many came in with Green Bags (18%). Given that this scheme has been in place across the region for nearly 2 years, a higher uptake would be expected. However, the South Central SHA have emphasised that the Green Bag is only a tool to encourage patients to bring their medicines into hospital. Considering the majority of the admissions (66%) were emergencies, most patients (71%) brought in their medicines and used other ways (82%) besides Green Bags to bring their medicines in, which was acceptable. Only 21% of patients on regular medicines were given Green Bags on discharge, which could also contribute towards the low usage of Green Bags. Most staff (65%) recognise the value of Green Bags to facilitate medication transfer, but actual usage was low. The fact that not all wards have Green Bags available (90%) could have contributed to low use. The survey revealed that there were issues concerning obtaining further supplies and who should supply the Green Bags to patients.

This audit has a number of limitations. The results on discharge may have been under-reported as data collection was not done at the point of discharge. Patients could have received Green Bags from the ward just before discharge which was unrecorded. Ideally data should be collected when patients were discharged by nurses or by telephoning patients at home to ensure they have received Green Bags. Standard 1 may be an overestimate of the PODs brought into hospital because some patients did not bring all their PODs.

As the Green Bag scheme is a regional initiative, the Trust will continue to engage with it. The benefits of the Green Bag scheme will be reinforced via staff bulletin and staff induction. This scheme could also be incorporated into the Trust’s “Omitted and Delayed Doses” leadership group to drive this scheme forward. To ensure Green Bag availability on all wards, especially in areas like A&E, physical spot checks could be incorporated in pharmacists’ quarterly controlled drugs audit. A relaunch of the Green Bag scheme should be conducted by targeting specific patients groups: more than 4 regular medications; age over 65 with regular medicines before expanding into other patient cohorts. These patients should be given Green Bags when admitted to facilitate medication transfer and on discharge. To encourage its use, Green Bags could be placed in GP surgeries and community pharmacies. This would require further discussion with the Clinical Commissioning Group. Pharmacists will provide Green bags on discharge at ward level and in dispensaries. Elective admissions will be given Green Bags at pre-admission clinics. A re-audit should be carried out in 1 year’s time to measure effectiveness of the above recommendations.

References
Background and rationale: In May 2012, a mother discharged from HEY Women’s and Children’s Hospital died of pulmonary embolism two weeks after giving birth. 1 Thromboembolism is a major source of maternal mortality and morbidity in pregnancy, and the risk is particularly high during the postpartum period. 2 Most deaths from thromboembolism are potentially preventable through identification of risk and appropriate prophylaxis. In order to reduce the impact of VTE, Commissioning for Quality and Innovation Payment Framework (CQUIN) schemes 2010/11 has introduced a target for acute providers to risk assess at least 90% of patients admitted to hospital using the national risk assessment tool. 3 Risk assessment of pregnant women is certainly part of the CQUIN goal.

Aim: To measure the compliance level of the current clinical practice to the Trust policy and the national guidelines Royal College of Obstetricians and Gynaecologists (RCOG) Green-top Guideline no. 37a 2009 2 for VTE prevention.

Objectives:
- To check maternal records to see if VTE risk assessment is completed appropriately on admission and the risk is reassessed, if the risk changes, post-delivery;
- To assess if the correct choice and duration of postpartum VTE management is given to postnatal women corresponding to their risk assessment results;
- To identify any discrepancies in prophylactic dalteparin prescribing for postnatal women on drug charts and discharge letters (TTOs);
- To check the documentation in maternal records to see if appropriate advice about prevention and management of VTE is given to postnatal women on discharge;
- To identify if postnatal women attended postnatal thrombosis review after discharge.

Method: A data collection form was created consisting of five sections which correspond to 12 criteria all of which required a standard of 100%, except for VTE risk assessment where only 90% compliance was needed in accordance to the CQUIN target. Data was collected retrospectively by looking at the maternal records of postnatal women who were discharged from HEY Women’s and Children’s Hospital between August 2012 and October 2012. These maternal records were returned from community midwives and sampled randomly after being compiled in the medical notes. The audit involved the use of postnatal maternal records, the Trust risk assessment documents, VTE electronic transcripts, drug charts and TTOs; all could be found in medical notes. This is an audit project, ethical approval was not needed.

Results: See Table 1. Overall 100 postnatal women’s maternal records were audited. Only 62% were risk assessed using the Trust risk assessment document. The accuracy in decision making for the VTE management plan was low, where only 85.5% (53/69) were found to have received the appropriate treatment, consistent with the assessment results documented. Out of the 100 postnatal women, 39 were prescribed with dalteparin. Compliance of dalteparin prescribing to the guidelines was achieved reasonably well, with 92.3% on appropriate prophylactic duration, 87.2% on correct prophylactic dose, and 100% for both correct route of administration and dosing frequency. Good prescribing practice was also observed on TTOs; nearly all had no discrepancies and had sufficient number of dalteparin doses written-up for discharge. This was sometimes after pharmacist intervention. In terms of counselling, 90 out of 100 were advised on recognising signs and symptoms of VTE. This was done by taking the wording “postnatal check as per core plan” as the evidence. Of the 61 women who were judged to be at lower risk (no dalteparin prescribed), 53 were encouraged to mobilise and avoid dehydration to prevent VTE. 100% (34/34) of those prescribed with TED stockings were counselled on the proper fitting of the stockings. Despite all these positive outcomes, documentation of counselling evidence in medical notes was poor. Lastly, all 100 postnatal women attended postnatal thrombosis review after discharge.

Discussion and Conclusion: The audit highlighted poor compliance in using the Trust VTE risk assessment document for assessing the risk of postnatal women. In contrast, the informal VTE assessment section, a simple pre-assessment by midwives, in the maternal records was found to be better completed. This suggested that incorporating the Trust risk assessment document into maternal records or drug charts may help to improve the compliance rate. Compliance in prescribing VTE prophylaxis could have been higher; ideally, no errors could have occurred. This revealed that there might still be some issues around understanding and following the guidelines among the medical staff and so further work is ongoing to enhance staff training and education. Another contributing factor which could have caused prescribing errors was poor documentation of information such as maternal weight and prophylactic duration. Documentation of counselling evidence was also sparse, and this was a key limitation in the audit. The extent and quality of counselling was uncertain as only recorded as “postnatal check as per core plan”.

Pharmacy is now working with medical and midwifery colleagues to improve documentation, training and practice. We have already implemented a VTE risk assessment and prescribing page into a new drug chart. Regular training sessions are ongoing and re-audit planned.

References:
Introduction

Electronic Prescribing and Medication Administration (EPMA) has been live on all adult wards at King’s College Hospital (KCH) since 2012. Prior to the use of EPMA it is unlikely that pharmacists would have hand-written and signed a prescription on a drug chart themselves, however the implementation of EPMA has given pharmacists access to full prescription ordering rights. A pharmacist can now generate an order on a drug chart which is immediately active for administration and this has potentially changed the way pharmacists are practicing. Documentation is vital to ensure that interventions made by pharmacists are clear, both for patient safety and continuity of care, and where quality of care could be challenged contractually or legally. This service evaluation aims to look at how much pharmacists are generating and cancelling drug orders, whether pharmacists are documenting their changes and whether their documentation is adequate to support pharmacists from a legal standpoint.

Objectives

- Determine the percentage of orders made and cancelled by pharmacists over a 6 month period
- Review the types of drugs commonly ordered and cancelled by pharmacists.
- Determine what percentage of a sample of orders made or cancelled by pharmacists have a reason fully documented
- Determine where possible the reasons orders are being prescribed or cancelled by pharmacists

Method

All inpatient prescriptions ordered or cancelled by pharmacists between June and November 2012 were retrospectively identified using EPMA. The following orders were excluded:
1) Medication history and discharge orders
2) Any orders prescribed or cancelled in non-ward locations
3) All non-drug and fluid orders
4) Orders prescribed or cancelled on wards not using electronic clinical notes

75 new orders and 75 cancelled orders were randomly selected using Excel. A new order includes changing an existing order e.g. switching formulation, and entirely new prescriptions. Using EPMA and electronic clinical notes the reasons for generating and cancelling orders and their documentation were identified. Where no reason was documented clinical judgement was used in order to identify a reason. A reason was considered to be fully documented if both the action taken and why it was taken was stated, and if the details of the action were documented but no reason why then this was considered to be partially documented. A reason could be documented by any member of the healthcare team.

The data was recorded on a pre-piloted data collection form and the results analysed using Microsoft Excel. As this was a service evaluation, ethics approval was not required in accordance with organisational policy.

Results

1. A total of 344,083 prescriptions were ordered using EPMA between June and November 2012. 7% (23,215) of these were made by pharmacists.
2. Of the sample of new orders analysed 59% (44/75) were entirely new prescriptions, the remaining 41% (31/75) were to make a change to an existing order.
3. 119,077 prescriptions were cancelled, 21% (24,608) of which were cancelled by pharmacists.
4. Analgesia, inhalers, laxatives, proton pump inhibitors (PPIs), enoxaparin and Calceos were the most commonly ordered drugs by pharmacists. The top three being, omeprazole (4%, 819), Calceos (3%, 785) and paracetamol (3%, 742). The drugs most commonly cancelled by pharmacists were morphine sulphate injection (6%, 1462), PPIs (4%, 903), paracetamol (multiroute) (3%, 813) and enoxaparin (3%, 810).

3. The level of documentation of reasons for new and cancelled orders made by pharmacists is shown in table 1.

Table 1: The extent of documented reasons for new and cancelled orders

<table>
<thead>
<tr>
<th></th>
<th>Full documentation</th>
<th>Partial documentation</th>
<th>No documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>New orders (n=75)</td>
<td>33% (25)</td>
<td>12% (9)</td>
<td>55% (41)</td>
</tr>
<tr>
<td>Cancelled orders (n=75)</td>
<td>49% (37)</td>
<td>24% (18)</td>
<td>27% (20)</td>
</tr>
</tbody>
</table>

4. For 28% (21/75) of new orders no clear reasons for prescribing could be found, 33% (25/75) had reasons fully documented but clinical judgement was needed to identify reasons for the remaining 39% (29/75). Where reasons were identified, most commonly orders were made by pharmacists to reconcile drug histories (31% 17/54) and to bring prescribing in line with KCH guidelines (15% 8/54).

Discussion

This data shows that pharmacists at KCH are generating on average 4000 new orders a month. Of these new orders over half (55%) had no documentation and 28% had no identifiable reason. Pharmacists are cancelling a fifth of all cancelled orders and full documentation is occurring in half (49%) of these cases. However the detail of information recorded to determine why a prescription was cancelled was not sufficient in 18% of cases. This shows that whilst documentation is occurring it is not standard practice and it is often not sufficient to determine why a new order has been made or one has been cancelled. It is likely that electronic prescribing has made changing prescriptions more commonplace but it has not encouraged good documentation to support this. When considering the drugs most commonly prescribed by pharmacists and the reasons identified the results show that pharmacists are often initiating new orders to optimise patient’s drug therapy. When considering the types of drugs most frequently cancelled and the documented reasons, the results suggest that pharmacists are more likely to be discontinuing therapies for safety reasons, for example to remove duplicated prescriptions.

These results show standardisation of what is recorded, when and where is needed along with education on the implications of pharmacists not documenting their actions. A wide variety of orders are being made and cancelled and are occurring for many different reasons and it may also be prudent to produce recommendations for pharmacists on what is appropriate.

References

2. King’s College Hospital NHS Trust guidelines: Standards for the structure and content of pharmacy entries and communications in medical notes. Date pub: February 2012
**Introduction**

NPSA Rapid Response Report (RRR) 2009/006: Oxygen safety in hospitals highlighted risks of poor management of gas cylinders when stored on wards, especially identifying empty cylinders as a common cause of incidents. It therefore recommended that the use of oxygen cylinders should be minimised and encouraged increased use of piped oxygen in accordance with the Health Technical Memorandum 02-01 Part A. This audit focussed on finding out how the Trust measured up to recommendations and suggestions made in NPSA RRR 2009/ 006, the Department of Health Estates and Facilities Alert 2010 008: Medical gas cylinders and their trolleys; and AAGBI Safety Alert: Safe Handling of Oxygen Cylinders _ November 2012.

**Objectives**

1. To identify the proportion of wards in the Trust with access to piped oxygen
2. To ascertain the number of cylinders and types of medical gases stored on wards and departments within the Trust’s three main sites
3. To ascertain the clinical need for medical gases supplied in cylinders on the wards as assessed by the ward manager
4. To identify how cylinders are stored on wards

**Method**

A prospective audit was carried out in order to determine the use, requirements and safe storage of AD, F and G sized medical Air, Oxygen and Equanox® (Oxygen 50%: Nitrous Oxide 50%) cylinders located on all wards within the main hospitals of the Trust. All wards and departments in the hospitals were visited between Monday 5th and Friday 9th November, 2012. A ‘Medical Gas Cylinder Audit Questionnaire’ was designed and used to collect information on quantities of all cylinders that fell within the required categories; the perceived average weekly consumption; the purpose for them being on the wards as stated by the sister/nurse-in-charge; and the storage conditions in which the cylinders were found. Access to piped oxygen on wards was also recorded. All data from each form was collated for each individual hospital. Two days were spent at the larger sites while a day was spent collecting data in the smallest hospital. Ethics approval was not required because this was an audit. Standards were agreed locally and are set out below:

1. 100% of wards should have access to piped oxygen
2. 100% of wards should have access to a Resuscitation trolley with an oxygen cylinder
3. 100% of wards with access to piped oxygen should have access to appropriate quantities of AD-sized cylinders
4. 100% of G-sized cylinders found on wards should be safely secured to a stable structure

**Results**

The Trust was only able to meet Standard 2. Standards 1 (objective 1), 3 and 4 (objective 4) were not met, with outcomes of 91%, 43% and 0% respectively. Results of physical counts of cylinder and gas type (objective 2), presented in Table 1, were compared with information about clinical need obtained from the nurse in charge of the wards during the data collection week (objective 3). It was found that the perceived clinical need for medical gas cylinders was consistently lower than the numbers found on wards. Any deviation from the estimated requirements for AD sized oxygen cylinders were deemed as having inappropriate quantities.

**Table 1: Quantities of AD, F, and G size medical gas cylinders found on wards and departments of the 3 visited hospitals**

<table>
<thead>
<tr>
<th>Medical Gas Cylinder Size</th>
<th>Stoke Mandeville</th>
<th>Wycombe</th>
<th>Amersham</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oxygen</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AD</td>
<td>171</td>
<td>119</td>
<td>10</td>
</tr>
<tr>
<td>F</td>
<td>81</td>
<td>29</td>
<td>7</td>
</tr>
<tr>
<td>G</td>
<td>22</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td><strong>Equanox®</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AD</td>
<td>22</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>F</td>
<td>11</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>G</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Air</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>G</td>
<td>10</td>
<td>12</td>
<td>2</td>
</tr>
</tbody>
</table>

**Discussion**

The audit highlighted necessary areas of improvement in the management of medical gas cylinders within the Trust. It was found that wards kept either inadequate or excessive quantities of portable oxygen cylinders for emergency purposes, with many of them having no designated area of storage. The audit showed that there was access to a resuscitation trolley on every ward, which would be expected to be used during an emergency. Arrangements can be made for Portering staff to supply additional cylinders required for transfers. This would help to reduce the storage of excessive quantities of portable cylinders on wards, including High Dependency and Intensive Care Units, which are required to keep an additional AD oxygen cylinder at each patient’s bedside. No AD sized cylinders were found on beds. It is recommended that Lead Pharmacists liaise with ward managers in order to determine appropriate ward stock levels of cylinders, and arrange to hold information sessions on their wards to promote the recently launched Medical Gases e-learning. Also, as highlighted in the Safe Handling of Oxygen Alert, poor storage and excessive quantities of cylinders on wards can pose health and safety risks to both staff and patients. In order to reduce such risks, it is recommended that cylinders are stored securely with controlled access using logs of entry and exit on the ward. For safety purposes, heavy cylinders (F and G sizes) should be attached to wall brackets or a stable structure on the ward. The Trust Medical Gas Committee should consider the use of manifolds where piped access is impractical. Finally, removal of excess gas cylinders from wards could potentially reduce rental and filling costs to the Trust and further analysis of the potential savings should be undertaken when determining ward stock levels.

**References**

Introduction

The administration of medication is a complex process, especially in a ward environment with several patients - many of whom are on a number of medications. All medication, if not given by nursing staff, should be recorded appropriately according to trust policy, using omission codes and written records in patient’s notes. This audit focuses on the recording of administered medication on in-patient prescription charts. The standards in an NPSA alert [1] in 2010 resulted in a list of critical medicines (drugs that should not be missed or delayed) being formed. This list has been incorporated in the Blackpool Teaching Hospitals trust policy: Administration of Medicines [2]. Ethics approval was not required.

Objective

To assess whether omission codes are being used and information recorded correctly, in line with Blackpool hospital trust policy.

Method

The audit took place on dates between 9th October and 11th December 2012. The intention was to review all in-patient prescription charts on all wards at the hospital. Three wards were not audited due to outbreaks of vomiting and diarrhoea. On wards audited, not all charts and notes were available. The administration of medication over the previous 24 hours on drug charts was reviewed. Omission codes used on the charts were recorded, along with any information, or lack of, to support the use of the code. In addition, blank sections and other codes/symbols used were recorded. Drug names, doses and number of omissions were noted. Furthermore, if the drug was a critical drug, questions were asked to determine whether an incident form had been completed, as per trust policy.

Results

5150 items were audited. 10.4% (538) had been assigned an omission code, were blank or had another symbol. 46.1% of these 538 items had been recorded incorrectly or inappropriately (see figure 1). In addition, there were 18 separate incidents involving critical drugs.

Discussion

Code 1: The majority of medications were analgesics, anti-emetics and laxatives. The rest of the recorded refusals consisted of some patients being unable to remember or not present at the time of the audit. In some cases the incorrect code had been entered.

Code 2: All recording was appropriate. It is important to ensure patients are given medication on returning to the ward.

Code 3: One item had been assigned an incorrect code, prompting the importance of recording accurately.

Code 4: The majority of patients nil by mouth, were waiting for surgery in the afternoon. An antiepileptic was missed in a patient who was being investigated for a gastrointestinal bleed – no alternative route was used. The sister of the ward was not aware of a procedure to follow regarding critical medicines. This identified the need that critical medicines need to be highlighted on charts, and staff to be aware of the policies regarding certain drugs. Code 5: 62.5% of code 5 items had been ordered appropriately, however in other cases, lack of attention to pharmacy notes such as ‘not stocked’ resulted in some items being ‘code 5’ for 6 days. In addition, the wrong code had been used in cases where patients had medication stock in their bedside cabinet, or when they were self-administering. A critical medicine was omitted due to the ward having no stock. Staff were unaware the drug was on the critical medicines list, and did not obtain a supply following trust policy.

Code 6: Allowing patients to administer their own medication can allow a continuation of independence to a degree, whilst they are in hospital. However, to allow a patient to do this, staff members need to be confident the patient knows what medication they are taking, why and how. Drugs recorded inappropriately included patients not being counselled on use, for example, rinsing out the mouth after using a steroid inhaler, or patients not using the drug the same number of times that had been recorded on the drug chart. When doing the medication round, staff must check that a patient has taken their medication, before they annotate the prescription chart.

Code 7: When using code 7, trust policy states: ‘Any other reason must be documented within the patient’s record and communicated to the prescriber and the team’. Some reasons were recorded on drug charts, however not to the appropriate level of detail. Promotion of recording information is needed on wards. ‘Blanks’/‘unsigned drugs: Having ‘blanks’ on a prescription chart is unacceptable. It increases the risk of medication errors: potential overdose, or causing harm by withholding treatment in chronic diseases or acute infections for example. VTE prophylaxis and anti-epileptics were some of the drugs left blank. If a medication is given, it should be signed for at the same time. If a medication is unable to be given, the appropriate omission code should be used. Other symbol used: 51.6% of these had crosses displayed in the boxes to denote the withholding of a drug for a specified number of days for a clear reason stated. Other symbols used included question marks, dots and crosses, with no explanation for use. This, similarly to leaving drugs unsigned for, can increase the risk of medication errors.

Conclusion

The results have shown that despite omission codes being used for the majority of items, correct recording of information is not occurring in line with trust policy. A more effective recording system with additional staff training needs to take place. Prescribed drugs that are on the critical list need to be highlighted on charts to make staff more aware that the drug must be given, or obtained as soon as possible if not in stock on the ward, in line with trust policy [2, 3]. The audit has shown that pharmacists have a notable role in assuring not only the clinical safety and effectiveness of drugs, but also in the education of staff in promoting the awareness of critical drugs and ensuring appropriate recording of all medication.

References

Introduction:
Patients admitted to intensive care units (ICUs) often require complex drug therapy. Due to limited intravenous (IV) access, nurses are frequently forced to consider co-administering drug infusions via Y-sites. As not all drugs are compatible with one another, compatibility must be considered. The administration of an incompatible combination can have potentially serious patient consequences.

Aim:
To assess whether current practices in regards to mixing of IV drugs on the ICU at Royal Marsden Hospital (RMH) are in line with their guidelines.

Objectives:
1. To determine what infusions are being mixed through IV lines on the critical care unit
2. To identify the proportion of mixed combinations that are supported by published compatibility data
3. To investigate whether any inappropriate mixing of drugs occurred which could have been avoided
4. To gain an understanding of what resources are used by the nurses on ICU to check for IV drug compatibilities and how often visual checks of lines are carried out.

Material & Methods:
Two data collections tools were designed, one to collect patient data on infusions that were running, and the other to survey nursing staff on the frequency of visual checks for mixed drug combinations. Standard references used by the researcher to check compatibility were Thames Valley Y-Site Intravenous Compatibility Chart, Micromedex and Medusa. The only compatibility data available to the nurses on the ICU was the Thames Valley Y-Site compatibility chart and an additional document written by the pharmacist. If compatibility for a drug combination was not listed, the ICU pharmacist should be contacted for advice. Data was collected prospectively over a period of 8 weeks from 3rd February to 30th March 2012 on the ICU at RMH. A total of 49 data collection sheets were used in relation to 24 patients, and a total of 16 surveys in relation to 16 nurses.

Results:
In total 80 drug combinations were recorded, of which 94% (n=75) were two drug combinations and 6% (n=5) were three drug combinations. 84% of drug combinations were compatible. In the remaining cases (n=11), the ICU pharmacist was informed and intervened where necessary. In 4% (n=3), of these cases the combinations were found to be compatible at a concentration different to that used. In 1% (n=1) the combinations were found to be incompatible, and in the remaining 11% (n=9) there was no data to support compatibility documented in the standard reference sources.

82% (n=66) of the 80 drug combinations running were documented on the electronic prescribing system. In the remaining 18% of cases, the combination was either not documented, or the drug combination documented was different to that actually running. In 72% of cases, the initial reference source used to check compatibility was documented (70% was compatibility chart). However, in a number of cases the compatibility chart had been documented as used to check combinations which had either no standard compatibility data documented, or the combination was actually incompatible. Visual checks had been documented for 59% (n=47) of the 80 drug combinations recorded.

The results of the nursing survey showed that the majority of nurses (94%) used the compatibility chart as their first reference source to check compatibility. In terms of the frequency of visual checks, the responses varied however the majority of nurses reported that they carried out visual checks at the start of shift and/or when a new drug is started.

Discussion:
Of the 80 combinations recorded, 29 (36%) could have been avoided by utilising free lumens/lines. All three cases in which the drug combination was documented as ‘compatible at a different concentration to that used’, involved the drugs, insulin soluble and furosemide running centrally. All seemed compatible upon visual inspection. Y-site tests documented on micromedex found this combination to be compatible at a higher concentration to that used and so the ICU pharmacist was happy to let these combinations continue to be co-infused.

The one situation in which an incompatible combination was found was running furosemide and vancomycin. Upon visual inspection this combination could not be inspected due to the Y-site being covered. As this combination is documented as incompatible on micromedex, it had to be stopped. The concentrations tested by micromedex were higher than what was observed, but the ICU pharmacist stopped this combination for the safety of the patient. The obvious alternative which was implemented was to run vancomycin separately on the free peripheral line, enabling furosemide to run alone.

In the remaining nine cases, the ICU pharmacist was informed because the combinations running had no compatibility data documented in the standard reference sources to support compatibility, shown in table 1. In all these situations, the pharmacist should have been consulted prior to administering these combinations. The drug compatibility guideline states that it is inappropriate to mix 3 or more drugs in-line due to lack of compatibility information and advises to consult the ICU pharmacist for advice. It may have been the case that the nurse had administered the combination in the past, and therefore saw no problem in doing it again. Upon visual inspection all combinations appeared compatible, except for the first one which could not be visually inspected due to the Y-site being covered.

<table>
<thead>
<tr>
<th>DRUG A</th>
<th>DRUG B</th>
<th>DRUG C</th>
<th>LINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin soluble</td>
<td>Clonidine</td>
<td>-</td>
<td>Peripheral</td>
</tr>
<tr>
<td>Neostigmine</td>
<td>Insulin soluble</td>
<td>-</td>
<td>Peripheral</td>
</tr>
<tr>
<td>Glucose 50%</td>
<td>Hartmann’s solution</td>
<td>-</td>
<td>Central</td>
</tr>
<tr>
<td>Glucose 50%</td>
<td>Insulin soluble</td>
<td>-</td>
<td>Central</td>
</tr>
<tr>
<td>Insulin soluble</td>
<td>Furosemide</td>
<td>Potassium chloride</td>
<td>Central</td>
</tr>
<tr>
<td>Alfentanil</td>
<td>Propofol</td>
<td>Atracurium</td>
<td>Central</td>
</tr>
<tr>
<td>Insulin soluble</td>
<td>Furosemide</td>
<td>Potassium chloride</td>
<td>Central</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>Midazolam</td>
<td>Propofol</td>
<td>Vascath</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Potassium Chloride</td>
<td>Hartmann’s solution</td>
<td>Central</td>
</tr>
</tbody>
</table>

Table 1: Showing Y-site combinations with no compatibility data identified and the line on which it was running.

The results of the nursing survey showed that the majority of nurses (94%, n=15) used the compatibility chart as their first reference source to check compatibility, followed by the pharmacist as their second source (56%) if compatibility is not documented in the first. This suggests that nursing staff are following standards set in the drug compatibility guidelines. However, the results from the audit suggest that this was not always the case. The variation in frequency of visual checks highlights an area for improvement.

Conclusion:
The results of this audit demonstrate there is room for improvement in order to increase adherence to guidelines. This study also identifies that there is a lack of compatibility data for some drugs commonly used in ICU.

References:
Introduction
Due to a recent change in Trust antibiotic guidelines and the introduction of vancomycin use throughout the hospital, it was decided to undertake an audit of vancomycin prescribing. Vancomycin is a glycopeptide antibiotic which has a long duration of action allowing it to be administered every 12 hours.1 Vancomycin is effective in the treatment of Methicillin-Resistant Staphylococcus Aureus (MRSA). Due to its narrow therapeutic index, vancomycin needs careful monitoring as incorrect dosing can cause nephrotoxicity, ototoxicity or lack of efficacy.2 The Trust’s ‘Antibiotics of Choice’ guideline provided instruction for the prescribing of vancomycin and this guideline provided the basis for this prospective audit.3 Ethics approval was not required as this is an audit.

Aim
To assess the compliance with the Trust’s antibiotic guideline with regard to the prescribing of vancomycin at Darent Valley Hospital.

Objectives
1) To identify whether the patient’s body weight is documented in the medical/nursing notes or on the drug chart, when prescribed vancomycin
2) To identify whether the patient receives the correct loading dose for vancomycin relative to their body weight.
3) To identify whether vancomycin levels are scheduled and taken at appropriate times.
4) To identify if the appropriate vancomycin maintenance dose is prescribed.
5) To identify whether the antibiotic doses are given at appropriate times.

Method
A data collection form was designed and piloted to collect the required data. All adult patients prescribed intravenous vancomycin, excluding those on Intensive Treatment Unit (ITU), between November 2012 and January 2013 were be included. Patients were identified by pharmacy staff and the data were manually collected by the auditor.

Results
40 patients were identified during the audit period. The data showed that 55% [22] of patients had their weight documented, 72.5% [29] of patients had the correct loading dose, 62.5% [20] of patients were monitored correctly, 76.92% [30] of patients had the correct maintenance dose and 60% [24] had vancomycin administered at the prescribed time. Only 22.5% [9] of patients complied with all of the audit standards.

Discussion
In this audit the results indicated that the standards were not met in 77.5% [31] of the prescriptions. The standards with the lowest compliance were the documentation of body weight and correct administration times (55% [22] and 60% [24] respectively). Regarding the documentation of weight, six of the twelve patients who received loading doses outside of the guideline did not have a documented weight.

With regards to correct administration times, it is important that vancomycin is given at the correct time to ensure that levels are kept within the therapeutic range and do not become sub therapeutic or toxic.

The therapeutic drug monitoring of vancomycin was carried out at the correct time in 62.5% [20] of patients. Wrong timing or absence of serum levels make it difficult to assess whether the current dosing of vancomycin is clinically appropriate and safe for the patient.

The results show that some patients are not receiving the correct doses of vancomycin. This can cause increased risk of nephrotoxicity and ototoxicity in the case of vancomycin toxicity an ineffective treatment and resistance where the dose is sub therapeutic.

Incorrect prescribing of vancomycin poses a risk and patients are receiving doses outside of the policies. It is possible for a patient to receive a maintenance dose of 1.5g twice daily when the correct dose would be 750mg twice daily, if the prescriber does not take the age of the patient under consideration.

This audit had a number of limitations. Firstly there was a small sample size as the number of vancomycin patients in the hospital was relatively small. Secondly pharmacy input may have skewed the results of the audit. Thirdly the presence of the auditor may have also skewed the results as not answering questions about a patient’s treatment if asked would be negligent.

The recommendations from this audit revolve mostly around raising awareness of the problems that are currently presenting in vancomycin prescribing. This includes posters to raise awareness, the introduction of more pharmacy led training for prescribing and monitoring of vancomycin and the use of reminder stickers to help with vancomycin level timing limits.

An ideal solution to the problem with vancomycin prescribing would be the development of an antimicrobial application for phones. This would make an easily accessible resource that would reduce errors in all antibacterial prescribing including vancomycin. The problem with the development of an application such as this is the cost. Development would need the input of an external source. However the development of a similar programme at Imperial College Healthcare NHS Trust showed excellent uptake rates of the application, with 100% of junior doctors downloading the application within twelve months. It also showed that the application was accessed on average 1900 times a month, compared to 211 hits on the Intranet version of the antimicrobial policy.4

References
Introduction
Naloxone and flumazenil are critical drugs used in emergencies to reverse the over sedative effect of opioids and benzodiazepines respectively. Over sedation can result in respiratory depression and ultimately death; the National Patient Safety Agency (NPSA) issued a report (Reducing harm from omitted and delayed medicines in hospital) which highlighted the issue of ensuring drugs, including reversal agents, are stored and available to aid prompt administration2. The main drivers for this audit are Department of Health never events; opioid overdose of an opioid-naïve patient, and overdose of midazolam during conscious sedation. Pharmacy has the key responsibility for ensuring the storage and availability of the reversal agents which is imperative to improving the clinical outcome of patients who have been over-sedated and in preventing never events, resulting in less financial penalties for our trust and possible reduction in excess paid to the NHS Litigation Authority.
A measure of compliance is derived from the Care Quality Commission (CQC), stating that, ‘medicines required for resuscitation or other medical emergencies are accessible in tamper evident packaging that allows them to be administered as quickly as possible’2. The NUH Medicines Code of Practice dictates that naloxone and flumazenil should be stocked by all wards and departments and these areas ‘must keep a designated supply of drugs on the cardiac arrest trolley for cardiac arrest and other clinical emergencies’2.

Aims and Objectives
The aims of this audit are to determine compliance against the CQC and NUH Medicines Code of Practice. Audit criteria and standards:

- Standard 1 (Storage) – 100% of clinical areas should store naloxone and flumazenil in tamper evident packaging on the cardiac arrest trolley.
- Standard 2 (Availability) – 100% of clinical areas should stock at least two ampoules of naloxone 400micrograms/1ml and flumazenil 500micrograms/5ml.
- Standard 3 (Knowledge) – 100% of nursing staff should know who can administer naloxone and flumazenil and be aware that naloxone can be administered under a patient group direction (PGD).

Method
A total of 67 clinical areas were audited (41 wards, 13 clinics and 13 theatres) at NCH over a one week period (w/c 05.11.2012). In each clinical area, a registered nurse was asked to locate the ward stock of naloxone and flumazenil. A data collection form was completed and the following information recorded: storage location (in tamper evident packaging), the availability of drugs (appropriate quantity and if the stock was in date). Nurses were questioned on if they knew who could administer naloxone and flumazenil and whether they were aware of, or had read the PGD on the administration of naloxone. Exclusions included some theatres due to access restrictions. Data analysis was conducted using Microsoft Excel1. Ethical approval was not required for this audit.

Results
Table 2. Storage location of naloxone and flumazenil (n= 67)

<table>
<thead>
<tr>
<th>Storage Location</th>
<th>Naloxone 400micrograms/1ml</th>
<th>Flumazenil 500micrograms/5ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside the CD Cupboard</td>
<td>7 (10%)</td>
<td>5 (8%)</td>
</tr>
<tr>
<td>Outer of the CD Cupboard</td>
<td>12 (18%)</td>
<td>11 (16%)</td>
</tr>
<tr>
<td>IV Drugs Cupboard</td>
<td>27 (40%)</td>
<td>24 (36%)</td>
</tr>
<tr>
<td>Cardiac Arrest Trolley*</td>
<td>19 (28%)</td>
<td>19 (28%)</td>
</tr>
<tr>
<td>None found</td>
<td>0 (0%)</td>
<td>6 (9%)</td>
</tr>
<tr>
<td>Other (Omnicell®)</td>
<td>2 (3%)</td>
<td>2 (3%)</td>
</tr>
</tbody>
</table>

*Drugs stored on the cardiac arrest trolley were stored in tamper evident packaging.

See Table 1. At NCH naloxone was stocked in all clinical areas, however in 9% of clinical areas (6 wards), stock of flumazenil could not be located. All stock holding locations held at least 2 ampoules of both drugs. In one location, one box of naloxone kept in stock had expired, however the ward had a further in date supply. Only 50 nurses from a potential of 67 were interviewed. 38 nurses were not aware of a PGD for the administration of naloxone, 12 were, of which 10 had read it. 6 nurses thought they could administer flumazenil without a doctor prescribing this drug.

Discussion and Conclusion
Standard 1 was 28% compliant with 19 clinical areas storing their naloxone and flumazenil on the cardiac arrest trolley in tamper evident packaging as per CQC standards. These drugs were frequently stored in the IV drugs cupboard which is the most logical location to store these drugs if not on the cardiac arrest trolley. Almost a third of naloxone and flumazenil was stored in the CD cupboard which is against the NUH Medicines Code of Practice and the ward is restricting access to these drugs, often requiring two sets of keys to be used in order to gain access to this area. For standard 2, 96% of wards were compliant with only 6 wards without stock of flumazenil. To improve adherence to standard 1 and 2, these drugs should be stored in tamper evident packaging on the cardiac arrest trolley in every ward and department.

Of the nurses interviewed only 20% were complaint with standard 3. To aid the prompt reversal of opioid toxicity there is already trust-wide PGD allowing nurses to administer naloxone for patients who have received an opioid and are presenting with respiratory depression (respiratory rate < 88p/min). A trust wide PGD for the administration of flumazenil would prevent confusion and ensure prompt administration of flumazenil.

Limitations of the audit were that not all nurses were available to be interviewed and the grade of nursing staff being interviewed varied.

Recommendations:
1. All clinical areas should store naloxone and flumazenil in a tamper evident box in the cardiac arrest trolley led by the NUH Medicines Management committee by February 2013.
2. To create and implement a trust wide PGD, in conjunction with the Assistant Head of Pharmacy and associated healthcare professionals, for the administration of flumazenil by trained nurses by May 2013.
3. A re-audit should be undertaken by pre-registration pharmacists on the storage and availability of naloxone, flumazenil and anaphylaxis drugs at NCH in November 2013.

References
Introduction
The timing for Parkinson's medicines administration is crucial, as a delay can significantly affect Parkinson symptoms which may prolong hospital admission and inhibit recovery. Hence Parkinson's medication should be stated on a 'critical list of medicines' after responding to the National Patient Safety Agency (NPSA) 'reducing harm from omitted and delayed medicines in hospital'. North Bristol Trust (NBT) responded to this alert by conducting audits and service developments to improve missed doses. No work has focused on the timing for critical listed medicines such as those for Parkinson's, therefore this audit aimed to investigate this alongside tests of change to improve the timeliness of Parkinson's medicines administration.

Aim
To improve the timing of administration of Parkinson's medication for patients whilst in hospital, to prevent a possible worsening of Parkinson symptoms.

Objectives
- Assess whether patients with Parkinson's are receiving their medication on time every time.
- Discover whether Parkinson's medicines are prescribed with the times of administration.
- Identify the time frame when Parkinson's medicines should be administered within.
- Investigate whether 'Get it on Time' stickers and endorsing times on drug charts improve the timing of Parkinson's medicines administration.

Method
This was a retrospective study of doses for Parkinson’s medicines administered to patients on Care of Elderly and Neurology wards within November 2012 to January 2013. A data collection form was designed to capture the number of doses on time (within or equal to 30 minutes of the dose stated), a dose delayed (1, 2 and 3 hour time frames) or a missed dose (more than 4 hours). Ethics approval was not required as this was an audit project.

Stage 1 (baseline data) identified many Parkinson’s medicines had no time of administration and staff were unaware of these patients on the ward. Tests of change aimed to encourage Doctor's/Pharmacists to endorse times for Parkinson’s medicines and apply yellow 'Get it On Time' stickers to the front of drug charts, to highlight these patients to ward staff. Posters were distributed to emphasise this, with approval obtained from Parkinson’s UK to utilise the National campaign ‘Get it On Time’. The re-audit was completed February to March 2013 to determine any improvements in doses given ‘on time’. Patient questionnaires also aimed to discover whether any adverse symptoms occurred if a dose was delayed, within a particular time frame.

Results
See Table 1. The total number of doses audited in stage 1 = 436 and re-audit = 202. The number of missed doses in stage 1 was 10/436 (2%) and in the re-audit 11/191 (6%). Further delays/omissions did not occur 70% in stage 1 and 62% in the re-audit. Several drug charts in stage 1 had the interventions of stickers and times endorsed already. When comparing doses ‘on time’ (within or equal to 30minutes) 52% doses were on time with no intervention; whereas 72% doses were on time with these interventions. Stickers and administration times were endorsed on 52% drug charts in stage 1 and 92% in the re-audit. No critical list of medicines is recommended by North Bristol Trust.

Five patient questionnaires were completed which showed all Parkinson’s medicines were reconciled on admission with no dose delays or omissions reported to worsen symptoms. 3/5 believed self-administration would help improve timing, 2/5 were unaware of the specialist Parkinson’s nurse at North Bristol Trust and 3/5 felt staff awareness of Parkinson’s and importance of medicine timing, needed improvement.

Table 1: Stage 1 and Re-audit results

<table>
<thead>
<tr>
<th>Audit Criteria</th>
<th>Target</th>
<th>Exception</th>
<th>Stage 1</th>
<th>Re-audit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Delays in administering the first dose do not occur</td>
<td>100%</td>
<td>None</td>
<td>99.5%</td>
<td>99%</td>
</tr>
<tr>
<td>2. Further dose delays/omissions do not occur</td>
<td>90%</td>
<td>Refusal, absent</td>
<td>70%</td>
<td>62%</td>
</tr>
<tr>
<td>3.A ‘critical list’ contains Parkinson’s medicines</td>
<td>100%</td>
<td>None</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>4.Parkinson’s medicines are endorsed with times</td>
<td>100%</td>
<td>None</td>
<td>76%</td>
<td>92%</td>
</tr>
<tr>
<td>5.Parkinson’s medicines should be given ≤30minutes of the time stated on the drug chart</td>
<td>90%</td>
<td>Refusal, absent</td>
<td>70%</td>
<td>62%</td>
</tr>
</tbody>
</table>

Discussion
No standards set by Parkinson’s UK ‘Get it On Time’ (audit standards 1 - 4) were adhered to. A dose ‘on time’ was considered to be within or equal to 30 minutes, as there is no existing National guideline for this. Doses ‘on time’ did not improve after the tests of change; (before 70%, re-audit 62%). The limitations were that less re-audit data was collected and several delayed doses (>2hours) skewed the overall results. Also admission times were not consistently documented, which meant although delays in the first dose was near 100%, this may be less. No ‘critical list’ of medicines is recommended by NBT, as the Medicines Governance group agreed each medicine is considered important to be on time. Endorsing times of administration and ‘Get it On Time’ stickers produced 72% doses ‘on time’ i.e. within 30 minutes; compared to only 52% of doses ‘on time’ without these tests of change. These interventions are to be recommended in the NBT ‘Medicines Management policy’ for consistent implementation.

Further work is required to achieve the standards and future audits may consider a larger data collection, pill timers to aid nurses of specific timings as carried out by Norfolk and Norwich University Hospitals, and staff awareness of Parkinson’s medicine management.

References
Background
Omitted or delayed doses were found to be the second largest cause of incidents reported to the National Patient Safety Agency (NPSA) during 2005 – 2006. As a result, the NPSA produced seven ‘Priorities for Action’ one of which stated that health care professionals should ‘ensure that medicines are not omitted; should report all serious omissions or delays of medicines, and these should be periodically audited and the results used to inform system improvements’. Omitted doses from certain classes of medication such as antibiotics, anti-epileptics, anticoagulants and insulin can have potentially serious effects if missed completely or delayed. Omitting medicines may not always be considered a serious error; for example drugs with long half-lives. At Leeds Teaching Hospitals Trust (LTHT) missed doses are documented with a number on the administration chart that corresponds to the reason for omission. For example, a code ‘6’ denotes an omitted medicine at the doctors request and a code ‘4’ is an omitted medicine due to lack of supply.

Aim
The aim of this audit is to monitor whether standards of practice regarding missed and delayed doses related to a code ‘4’ are being complied with in the acute medicine wards setting.

Objectives
Identify prevalence of code ‘4’ on medication charts
Determine whether correct procedures were followed by nurses for documenting a delayed or omitted dose
Establish the reasons why a code ‘4’ had been documented

Standards
100% of drug doses (including critical medicines) should not be omitted or delayed due to the drug being unavailable
100% of drug administration charts must have action taken to obtain drug clearly documented on final page of the chart

Method
Data collection was carried out retrospectively over a period of one week (during Monday to Friday) in October 2012 on the acute medicine admission wards in St. James University Hospital. Each ward was visited in the morning and every available chart was assessed for a code 4 in the ‘once only’, ‘regular’ and ‘when required’ sections of the chart. A data collection form was designed to capture all the necessary information for each dose omission. This included information such as: the name of the drug; what time the dose was missed; if a chart had been seen by a member of pharmacy staff; if the reason for the missed dose had been recorded on the back of the chart and whether the medication was actually available on the ward for the patient to take (i.e. miss-coded code 4). The missed doses were categorized either as the item being available on the ward or the item being unavailable on the ward. Prescribed items that were not supplied from pharmacy (such as stockings) were excluded from the audit. Ethical approval was not required.

Results
In total, 157 charts were surveyed and 53 code 4’s were documented. The most common reason for a code ‘4’ was that the item was “truly” not available on the ward (as to be expected) as it was recently prescribed and either not yet on order or on order but not yet available (see table 1). Four of the missed doses were critical medicines, three of which were medicines used to treat Parkinson’s Disease. 43 (81%) of missed doses occurred at 8am and 110 charts (75%) with recorded missed doses had been seen by a member pharmacy.

Table 1: Comparison of the availability of drugs coded as ‘not available’

<table>
<thead>
<tr>
<th></th>
<th>Ward 26</th>
<th>Ward 28</th>
<th>Ward 29</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coded ‘4’ but actually available on ward (as stock/patient’s own drug)</td>
<td>1 (5%)</td>
<td>1 (7%)</td>
<td>1 (6%)</td>
<td>3 (6%)</td>
</tr>
<tr>
<td>Coded ‘4’ and truly not available on ward</td>
<td>19 (95%)</td>
<td>14 (93%)</td>
<td>17 (94%)</td>
<td>50 (94%)</td>
</tr>
<tr>
<td>Total missed doses</td>
<td>20</td>
<td>15</td>
<td>18</td>
<td>53</td>
</tr>
</tbody>
</table>

Of the total 1,951 doses reviewed in the audit, 53 (3%) were coded as a ‘4’. Of all of the code ‘4’s recorded, 33 (62%) had the correct documentation on the back of the chart recording the reason why it was missed and action taken to resolve the problem.

Discussion
The majority of missed doses coded as ‘4’ were correctly coded and were not available on the ward. There was no significant difference between the results found on any of the wards. A similar audit carried out by Garcia at the Kings College Hospital found similar results with 3.6% of doses being omitted due to the drug being unavailable.

There were some limitations to the study that included; data only being collected for one week (during week days) in one specialty; data was collected retrospectively and so cannot verify the code 4 recorded. Also, the total number of doses for each time period was not recorded which limits the conclusions that can be drawn from the data.

Recommendations
Ensure pharmacists arrange a speedy supply of medication where necessary
Ensure nursing staff are aware of the stock available on ward and encourage to order non-stock medication before dose is due
Nursing staff to clearly document actions taken when code ‘4’ used
Encourage prescribers to highlight medication to be ordered at the point of prescribing, especially with regards to critical medicines. Guidance highlighting the critical medicines could be added into the local induction procedure
Investigate when prescriptions for 8am doses are written and what opportunities there are to obtain the medicine before time of administration

References
**E. An audit to determine the extent to which chemotherapy prescribing at the Royal Gwent Hospital complies with the All Wales Dose Banding recommendations**

Morris K and Daniel R, Aneurin Bevan University Health Board, Newport, South Wales

**Introduction**

Dose banding is a system where individually calculated doses of drugs are placed within defined ranges or bands. A standard dose is determined for each band, which can then be given using individual or a combination of pre-filled syringes or infusion bags. Some of the benefits of dose banding include a reduction in patient waiting times as a result of improved pharmacy work flow and a decrease in expenditure due to reduced drug wastage.

The All Wales Dose Banding (AWDB) document includes chemotherapy drugs that have been considered suitable for dose banding. For each chemotherapy drug, the document lists a number of different strength preparations recommended for use by Welsh hospitals in order to make up the prescribed dose. The chemotherapy drugs listed in the AWDB document include: Cyclophosphamide, 5-Flourouracil, Docetaxel, Doxorubicin, Epirubicin, Gemcitabine, Methotrexate, Irinotecan and Oxaliplatin.

As the dose banding is standardised throughout Wales there is a potential to batch produce the required infusion bags and syringes within Welsh units. This audit aims to evaluate the level of compliance with the standardised dose banding at the RGH site. An overview of the current situation will facilitate further planning of collaboration proposals across Wales in order make best use of resources available.

**Aim**

To determine the extent to which the technical services unit at the Royal Gwent Hospital (RGH) complies with the AWDB recommendations for: Cyclophosphamide, 5-Flourouracil, Docetaxel, Doxorubicin, Epirubicin, Gemcitabine, Methotrexate, Irinotecan and Oxaliplatin.

**Objectives**

1. To quantify compliance with the AWDB of chemotherapy document and investigate reasons for non compliance.
2. To identify the quantity of strengths and source used of each drug as listed in the document to inform future purchasing and production decisions.
3. To identify drugs which are not currently included in the AWDB of chemotherapy document to inform future updates of the document.

**Method**

Standards were developed in line with the AWDB recommendations and consist of: 100% of the doses prescribed for the given chemotherapy drugs within the RGH can be provided by the strengths listed in the AWDB document.

Data was collected at the RGH technical services unit for each chemotherapy prescription over a period of three months (1st of July – 30th of September 2012). Information regarding the drug dispensed, whether it was dose banded, the preparations and strengths provided and the source of the product were recorded. This data was compiled and analysed using Microsoft Access® and reported in terms of compliance for each drug. Eye drop preparations such as Mitomycin eye drops were excluded from the results. All other chemotherapy preparations were included.

**Results**

During the data collection period, 622 chemotherapy preparations were prescribed at the RGH site. Of the total chemotherapy drugs prescribed 27% (n=622) were included in the AWDB document.

For the drugs included in the AWDB document, 83% (n=171) of the doses prescribed at the RGH could be administered using the preparations listed. Gemcitabine, Irinotecan and Oxaliplatin were not prescribed at the RGH during the data collection period.

**Table 1 - Compliance of the chemotherapy drugs listed in the AWDB document.**

<table>
<thead>
<tr>
<th>Chemotherapy Drug</th>
<th>% compliance</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-Flurouracil</td>
<td>100</td>
<td>(n=20)</td>
</tr>
<tr>
<td>Epirubicin</td>
<td>100</td>
<td>(n=18)</td>
</tr>
<tr>
<td>Methotrexate</td>
<td>100</td>
<td>(n=3)</td>
</tr>
<tr>
<td>Cyclophosphamide</td>
<td>97</td>
<td>(n=78)</td>
</tr>
<tr>
<td>Doxorubicine</td>
<td>75</td>
<td>(n=36)</td>
</tr>
<tr>
<td>Docetaxel</td>
<td>28</td>
<td>(n=16)</td>
</tr>
</tbody>
</table>

Twenty-eight percent of the Docetaxel doses prescribed could be produced using the infusion bags recommended in the AWDB document. Two doses of Vincristine were prescribed over the data collection period; 1mg and 2mg.

One-hundred and sixteen (68%) of the chemotherapy listed in the AWDB document were sourced from industry. The remainder of the chemotherapy was produced in house on a named patient basis.

**Discussion and Conclusions**

Overall, the results demonstrate good compliance of the RGH site with the AWDB recommendations. The results show that the recommended doses listed in the AWDB document for Docetaxel infusion bags were not suitable for the prescribing at the RGH. By revising the document to include infusion bags containing 20mg, 60mg, 70mg and 100mg respectively, compliance would have increased from 28% to 84% at the RGH site.

Vincristine is suitable for dose banding as only two different doses were prescribed during the data collection period, thus it should be considered for inclusion in a revised version of the AWDB document.

Consolidating the finding of this audit with that of other Welsh audit sites will help to identify common trends and recommendations, which will aid the Clinical Pharmaceutes and Technical Services group in their decisions regarding which key recommendations to action.

**References**

Background:
Constipation is a very common side effect of treatment with clozapine yet if not treated properly, it can result in fatal consequences as highlighted by a recent patient death in Wales. One such complication of clozapine-induced constipation can include gastrointestinal hypomotility. In April last year (2012), the Chief Pharmaceutical Officer (CPO) for Wales wrote a letter to remind healthcare professionals of the gastro-intestinal side effects of clozapine and offered general recommendations on how monitoring should be conducted.

Objectives:
A baseline clinical audit across two of the TEWV trust one-stop pharmacy-technician led clozapine-clinics was conducted in order to evaluate if staff are monitoring patients for clozapine-induced constipation when patients attend their one-stop appointment. The criteria for auditing was based upon the general recommendations made by the CPO for Wales as well as recommendations made by other organisations/research who have considered this area as identified during the literature search.

- Criteria: All patients were questioned if they had experienced side effects. Also specifically, all patients were asked if they had experienced constipation. Furthermore, all patients were questioned about their bowel habits/movements, if they have experienced any abdominal symptoms and for all patients reporting constipation, whether they were appropriately managed.*

*Where a referral is necessary/appropriate, referred to GP/prescriber. Where a referral is not necessary, advice should be tailored to the patient’s presenting need

Method:
- The standard for all criteria was set at 100% compliance.
- The lead facilitator’s consent was obtained for each auditing site to undertake a day of observational auditing at each clozapine-clinic. The lead facilitators were asked to specify days when the patients were not due to see their clozapine prescribers. This was in order to gain a true reflection of whether staff at the clozapine-clinics actually undertake this monitoring themselves and to remove any possibility of staff relying on the prescriber to perform this monitoring.
- The audit at each clinic was performed in November 2012.
- The information was collected by observation of staff using a designated audit tool.
- The data collected at each clinic was then analysed separately and independently from the data of the other clinic so that the two clinics could be compared.

Results:

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Clinic 1: The Goodall</th>
<th>Clinic 2: Ideal House</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>constipation</td>
<td>Freq: 2/16</td>
<td>Freq: 17/18</td>
</tr>
<tr>
<td></td>
<td>Compliance: 6.6%</td>
<td>Compliance: 94.4%</td>
</tr>
<tr>
<td>Bowel habits</td>
<td>Freq: 0/16</td>
<td>Freq: 16/18</td>
</tr>
<tr>
<td></td>
<td>Compliance: 0%</td>
<td>Compliance: 88.9%</td>
</tr>
<tr>
<td>Abdominal symptoms</td>
<td>Freq: 0/16</td>
<td>Freq: 2/18</td>
</tr>
<tr>
<td></td>
<td>Compliance: 0%</td>
<td>Compliance: 11.1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freq: 0/18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compliance: 0%</td>
</tr>
</tbody>
</table>

All patients reporting constipation, appropriately managed?
Clinic 1 - Goodall – NO reports therefore N/A
Clinic 2 - Ideal House – 5 reports, all 5 appropriately managed therefore 100% compliance

Conclusion:
Overall, this baseline audit indicated that no monitoring for clozapine-induced constipation was being undertaken at The Goodall clozapine-clinic neither by pharmacy staff nor other staff members. In comparison, most patients were monitored for clozapine-induced constipation at Ideal House clozapine-clinic by a Band 5 Pharmacy Technician but 100% compliance was not achieved. On a positive note, it was also found that of the five patients who reported constipation at Ideal House, all of them were appropriately managed resulting in 100% compliance with this particular standard. At this clinic, the areas of good practice observed included that all reports of constipation were taken seriously and the pharmacy staff member used their professional judgement to decide on the best course of action for patients on a case-by-case basis.

These baseline audit results therefore suggest that firstly, there is scope and reason to have expectation for clozapine-induced constipation monitoring to be conducted by competent Band 5/Band 6 pharmacy staff given the results obtained from Ideal House. Secondly, the actual process as well as the role of staff with respect to the monitoring role needs standardising due to not achieving 100% compliance for all set criteria. The wider role of Band 5/band 6 pharmacy staff as healthcare professionals with an understanding of medicine management issues regarding clozapine-induced constipation, should be utilised even at these clinics whilst being well contained within staff recognition of own competence and the point at which to refer to a senior colleague.

Recommendations:
In order to improve monitoring for clozapine-induced constipation at both trust sites, the following recommendations have been made:
- A reminder of the risks associated with clozapine-induced constipation in an upcoming trust Drug and Therapeutics Bulletin.
- Update the TEWV trust clozapine-monitoring sheet to include a column for constipation – to act as a prompt for monitoring of clozapine-induced constipation to be initiated during the appointment
- Pilot of a clozapine-monitoring guidance algorithm to assist Band 5/Band 6 pharmacy staff with monitoring of clozapine-induced constipation at both clozapine-clinics to assist in the appropriate assessment of clozapine-induced constipation including the appropriate action/advice to give depending on patient presentation. This may include counselling a patient on their specific presenting complaint. The algorithm is centred on the safe management of clozapine-induced constipation and as such where there is any doubt a patient should be referred to their GP/clozapine prescriber.
- A re-audit should be initiated to assess whether improvement to practice has been made.

References:
Introduction
Medication incidents can happen at any point during the medication process; prescribing, dispensing, administration and monitoring. The National Patient Safety Agency (NPSA) has carried out large amounts of work investigating medication safety incidents within the National Health Service (NHS). The report published by the NPSA in 2007; Safety in doses; Medication Safety Incidents in the NHS, outlined the medication safety incidents that have been reported in both primary and secondary care and recommendations were made on how to minimise these medication incidents.

Aims & Objectives
The aim of this audit was to quantify the nature and frequency of prescribing errors that occur within Milton Keynes Hospital Foundation Trust (MKHFT).

The objectives set to achieve this aim were:

- To determine the number (and % error rate) of prescribing errors which occur at MKHFT
- To determine the types of prescribing errors which occur at MKHFT
- To determine, where there was no harm caused to patients, what the potential for harm was from the prescribing errors
- To establish any trends in prescribing errors at MKHFT
- To make recommendations to reduce the level of prescribing errors which occur at MKHFT

The standards set for the audit were; drug charts should contain no prescribed errors 100% of the time and no harm should come to patients from prescribing errors 100% of the time.

Method
The data collection form was designed based on the data collection form used in a snap shot prescribing audit carried out previously. Similar error codes were used so that a comparison could be made.

A pilot was carried out over 2 half-day periods on surgical wards. Based on the findings, the data collection form was amended to include more error and harm codes and to include more information about the errors recorded. Data was collected over 5 full working days, with each ward being screened once during this period.

All wards at the foundation trust site were included in the audit unless specified in the exclusion criteria; Paediatric wards (ward 4, 5 and Neonatal Unit), A&E, Department of Critical Care and Day Surgery Unit were excluded from the audit due to their speciality.

Results
Two hundred and ninety-one drug charts were audited, with a total of 3348 prescribed items screened for prescribing errors. Of all the drug charts audited, 247 were found to have an error (84.9%) and of the 44 charts that had no error, seven charts had nothing prescribed (2.4%). From the 3248 items screened, 820 errors were detected (25.2%), these were categorised into the type of error according to the trust’s prescribing policy.

From the 820 errors detected during the audit, a total of 2 errors led to harm (0.24%). These were classed as low and moderate harm; however both had the potential to cause severe harm to the patients. Of the 818 errors that did not cause harm to patients, 663 (80.9%) had the potential to cause harm, as demonstrated in table 1.

Table 3: Potential for harm resulting from the errors detected

<table>
<thead>
<tr>
<th>Level of harm</th>
<th>Number of errors</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little harm/minimal effects</td>
<td>182 (27.5%)</td>
<td>Oramorph – Brand of Morphine sulphate 10mg/5ml liquid</td>
</tr>
<tr>
<td>Low harm – only minor treatment or observations</td>
<td>177 (26.7%)</td>
<td>Seretide 250micrograms - Inhaler device not mentioned</td>
</tr>
<tr>
<td>Moderate harm – increase in treatment which would cause significant but not permanent harm</td>
<td>297 (44.3%)</td>
<td>Warfarin on both regular and anticoagulation section</td>
</tr>
<tr>
<td>Severe harm – any incident that would result in permanent harm of death</td>
<td>12 (1.8%)</td>
<td>Digoxin 125mcg – inappropriate abbreviation</td>
</tr>
</tbody>
</table>

Conclusion
The audit revealed an overall error rate of 25.3% based on the number of items screened and the errors detected. However, it did also reveal that 84.9% of the drug charts screened had at least one error on them.

Of the errors detected, 157 (19.1%) were identified as harmless; where the potential for harm was negligible. This included inappropriate prescribing by brand where only the branded product is available currently and missing strength on medication that only came in one strength. However, this did mean that 80.9% (663) of the errors detected could have potentially led to harm, with 46.1% (306) of these errors potentially causing moderate to severe harm. None of the standards set were met.

Based on the results of this audit a number of recommendations were made;

- Further investigation into the perceptions of prescribing errors that different healthcare professionals have, the results of which can use the results to make recommendations to improve the error rate that the hospital has
- Further investigation into the impact of pharmacy interventions in the prevention of errors reaching patients
- Continue the education of Junior doctors and enforcing the trusts prescribing policy

References
H. An audit of the compliance of prescribing and review of biologic therapy for dermatology patients against NICE guidance

Khatri P, Ealing Hospital Integrated Care Organisation (ICO), Middlesex

Introduction
Under the Hackett Report (2011), home care providers are required to have clearly set out governance arrangements for clinical performance and outcome monitoring as therapies are becoming increasingly complex. Dermatology patients receiving biologic therapies such as adalimumab, etanercept and alitretinoin for severe plaque psoriasis (SPP) and severe chronic hand eczema (SHE) are High Cost Drugs (HCD)'s which are included under the homecare initiative. The National Institute of Clinical Excellence (NICE) has published guidance for prescribing and treatment review which the Trust has adopted to monitor clinical effectiveness. For patients which do not meet NICE criteria, individual funding request (IFR) forms are completed. These patients should meet the same review standards to ensure benefit from therapy is maintained.

Aim
To evaluate the level of compliance against NICE guidance for prescribing of biologic/ alitretinoin therapy and to assess the monitoring and treatment review for established dermatology patients at Ealing Hospital ICO.

Objectives
- To evaluate compliance of prescribing of biologic/ alitretinoin therapy against NICE guidance for established dermatology patients
- To assess the monitoring and review of therapy for established dermatology patients
- To identify any cost savings associated with inappropriate therapy

Method
The audit was conducted retrospectively from October 2012 - November 2012. Ethical approval was not required as the aim was to audit against current guidance. An audit tool was constructed and piloted using medical notes. All patients aged over 18 established on biologic/ alitretinoin therapy for SPP/ SCHE and eligible for review between April 2011 and October 2012, were included in the study. Data was collected using the dermatology nurse-led clinic notes and medical notes. Data was recorded on paper audit tool forms, coded to ensure patient confidentiality, and tabulated. Potential cost savings were calculated for patients prescribed medication outside NICE guidance using an in-house dermatology homecare patient tracker.

Results
Table 1. Audit Results

<table>
<thead>
<tr>
<th>Condition</th>
<th>Drug</th>
<th>No. of patients</th>
<th>Eligibility Criteria Met: N,%</th>
<th>Patients reviewed at 12 months: N,%</th>
<th>Adequate response at review: N,%</th>
<th>Potential cost saving, £ (approx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPP</td>
<td>Etanercept</td>
<td>7</td>
<td>7, 100%</td>
<td>7, 100%</td>
<td>7, 100%</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Adalimumab (NICE)</td>
<td>3</td>
<td>3, 100%</td>
<td>3, 100%</td>
<td>3, 100%</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Adalimumab (IFR)</td>
<td>14</td>
<td>14, 100%</td>
<td>13, 92.9%</td>
<td>4,137</td>
<td></td>
</tr>
<tr>
<td>SHE</td>
<td>Alitretinoin (NICE)</td>
<td>5</td>
<td>5, 60%</td>
<td>5, 100%</td>
<td>8, 80%</td>
<td>£12,354</td>
</tr>
</tbody>
</table>

See Table 1. 100% (n=7) and 100% (n=3) of patients prescribed etanercept and adalimumab respectively for SPP, met the NICE eligibility criteria and were reviewed appropriately at 12 months with an adequate response to treatment. Of the IFR patients prescribed adalimumab, 100% (n=14) were reviewed appropriately at 12 months. One patient did not exhibit an adequate response upon review, however an improvement was seen in the patient’s condition. The potential cost saving calculated if treatment was terminated at 16 weeks (period for which an adequate response should been according to NICE) was approximately £4,137.

Of the five patients prescribed alitretinoin for SCHE, 60% (n=3) met the eligibility criteria. All patients, 100% (n=5), were suitably reviewed at 12 weeks. 80% (n=4) of patients were reviewed at 24 weeks (max duration of treatment) and treatment was stopped appropriately for 40% (n=2) of patients. The potential cost savings were calculated to be approximately £12,354. Reasons for continued therapy beyond 24 weeks fell outside NICE guidance.

Discussion/ Conclusion
All standards were met for established patients prescribed adalimumab and etanercept for SPP. Although one IFR patient prescribed adalimumab did not show an adequate response at review according to NICE criteria, in practice, it is appropriate for clinicians and healthcare professionals to continue therapy based on clinical judgement where benefit from treatment is maintained. The audit has highlighted that the nurse led dermatology team is efficient in ensuring that SPP patients are reviewed regularly and monitored appropriately.

It was found that prescribing and review of alitretinoin for SCHE did not meet the required standards and substantial savings could have been made. The results indicate a lack of understanding of the NICE guidance for prescribing of alitretinoin. Entries made in patient medical notes support this suggestion as on numerous occasions prescribers were unaware of the need to discontinue therapy. Education and training on the NICE guidance for SCHE is required for all healthcare professionals involved in the care of these patients. The high cost nature of alitretinoin (and other biologic therapies) should be highlighted to all members of staff to improve adherence to guidelines.

There were a number of discrepancies between scores recorded on the disease monitoring forms (e.g. DLQI form) and those transcribed in patient notes. Dermatology nurses should improve their documentation processes in the future. Training on the NICE guidance was implemented in numerous occasions prescribers were unaware of the need to discontinue therapy. Education and training on the NICE guidance for SCHE is required for all healthcare professionals involved in the care of these patients. The high cost nature of alitretinoin (and other biologic therapies) should be highlighted to all members of staff to improve adherence to guidelines.

References
2. NICE. Etanercept and efalizumab for the treatment of adults with psoriasis. NICE technology appraisal guidance 103, July 2006
3. NICE. Adalimumab for the treatment of adults with psoriasis. NICE technology appraisal guidance 146, June 2008
4. NICE. Alitretinoin for the treatment of severe chronic hand eczema. NICE technology appraisal guidance 177, August 2009
Background
There is a need for the NHS to deliver cost effective care and reinvest any savings made to improve patient care and services. To reduce costs, Salford Royal NHS Foundation Trust (SRFT), has set out a programme with the aim of identifying and implementing changes to reduce costs within the Trust by 15% over 3 years.  
Solid dosage forms are the most commonly prescribed formulations and can be seen as the safest and most accurate method of administering medicines. However, patients can be unable to tolerate tablets for many reasons including dysphagia, nausea and being nil by mouth. This gives rise to the need for alternative dosage forms, the most common being liquid formulations, many of which are unlicensed preparations. The MHRA states that medicines should be used within the limits of their product licenses wherever possible. However for some patients, this can be the only option.
SRFT offers specialist services where patients may be unable to tolerate solid dosage forms including stroke rehabilitation, bariatric surgery and neurosurgery. The prescribing of liquid formulations is often a necessity for these patients but can lead to errors in prescribing when solid dosage forms are converted to liquids and liquid “specials” can prove to be more expensive. Furthermore, in most instances where a liquid is used, the tablet or capsule form can be administered by crushing and dispersing in water.

Objectives
Identify the most commonly used liquid preparations within SRFT, investigate the possibility of using the tablet/capsule form and calculate potential cost savings in the reduced usage of liquids.
Gain an insight into the prescribing of liquids by surveying pharmacists and devise a scheme to implement any changes in line with the Trust’s programme of safely reducing costs.

Methods
The annual usage of liquids within the Trust was analysed and preparations with a high cost and annual usage were identified. A search of standard resources and literature confirmed which tablets and capsules were appropriate for use in patients requiring liquid dosage forms. The cost for a single dose of the liquid formulations based on a standard dose was calculated and the annual liquid doses determined. This was done using data from the AScribe programme which illustrated annual cost for inpatients from April 2012 to February 2013 which was divided by the cost of one dose. The cost of one tablet dose equivalent to the standard liquid dose was then multiplied by the annual liquid doses. The difference between the cost of liquid doses and potential cost of tablet doses used annually was calculated to give a total potential cost saving.

Results
The total potential cost savings based on the cost of a standard liquid dose compared to the equivalent dose of a tablet/capsule are outlined below.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose (mg)</th>
<th>Cost per liquid dose (£)</th>
<th>Yearly Liquid doses (£)</th>
<th>Cost of equivalent tablet dose (£)</th>
<th>Potential annual tablet cost (£)</th>
<th>Potential Cost Saving (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciprofl oxacin</td>
<td>500</td>
<td>1.98</td>
<td>768</td>
<td>0.02</td>
<td>15.36</td>
<td>1,505.28</td>
</tr>
<tr>
<td>Gabapentin</td>
<td>300</td>
<td>1.12</td>
<td>34079.04</td>
<td>0.27</td>
<td>9.201.34</td>
<td>28,967.18</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>2</td>
<td>0.71</td>
<td>6893.66</td>
<td>0.31</td>
<td>2,137.04</td>
<td>2,757.46</td>
</tr>
<tr>
<td>Levothyroxine</td>
<td>0.1</td>
<td>3.62</td>
<td>1922.27</td>
<td>0.03</td>
<td>57.67</td>
<td>6,900.94</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>400</td>
<td>1.17</td>
<td>1937.5</td>
<td>0.01</td>
<td>19.38</td>
<td>2,247.50</td>
</tr>
<tr>
<td>Thiamine</td>
<td>50</td>
<td>2.03</td>
<td>10237.9</td>
<td>0.02</td>
<td>204.76</td>
<td>20,578.18</td>
</tr>
<tr>
<td>Amiodarone</td>
<td>200</td>
<td>10.86</td>
<td>1652.59</td>
<td>0.02</td>
<td>33.05</td>
<td>8,940.49</td>
</tr>
<tr>
<td>Fluconazole</td>
<td>50</td>
<td>2.37</td>
<td>1555.87</td>
<td>0.02</td>
<td>31.12</td>
<td>3,656.30</td>
</tr>
<tr>
<td>Folic Acid</td>
<td>5</td>
<td>0.53</td>
<td>2251.62</td>
<td>0.01</td>
<td>22.52</td>
<td>1,170.84</td>
</tr>
<tr>
<td>Simvastatin</td>
<td>40</td>
<td>4.66</td>
<td>2017.35</td>
<td>0.33</td>
<td>665.73</td>
<td>6,735.13</td>
</tr>
<tr>
<td>Spironolactone</td>
<td>25</td>
<td>3.10</td>
<td>1089</td>
<td>0.05</td>
<td>54.00</td>
<td>1,998.00</td>
</tr>
</tbody>
</table>

| Total               |           |                        |                        |                                 |                                 | 87,457.32               |

Discussion
The table illustrates the cost effectiveness of using solid dosage forms. However, it is important to take other factors into account. Firstly, nurses may be reluctant to administer the doses as this is cumbersome compared to giving a liquid dose. Furthermore, administering medicines in this way is associated with a margin of error and there is no way to distinguish how much has been administered. Although the MHRA states that medicines should always be used in accordance with their license, many of the liquids identified are unlicensed. Tablets/capsules become unlicensed once they are crushed or opened, however there is more evidence to support their use in this way relative to unlicensed liquid preparations. The tablets/capsules identified are all crushable, can be opened and given via a nasogastric tube. Guidelines in the literature on preventing tube blockage and stability data would have to be included in new policies to provide guidance for medical staff. There may be unexpected risks associated with this system, for example, administration of modified release preparations in this way could lead to overdose. Since SRFT’s cost improvement programme stresses the importance of safely reducing costs, methods of preventing and recording errors should be implemented. Therefore, any adverse incidents would need to be recorded during a pilot scheme to identify if any changes in policy would be safe to carry out. Future work in this area will see the piloting of the substitution of liquid formulations for tablets or capsules which will allow the safety and suitability of this system to be assessed. Comparing the time taken to administer liquid doses to the time taken to crush and disperse tablets would be another area of interest for future work as the cost savings could be outweighed by the extra cost of nursing time taken during the drug round. Based on the outcome of this, these findings will then be presented to the medicines management team in order to implement any formulation and prescribing guideline changes.

Conclusion
The substitution of tablets/capsules in place of the liquid formulations identified would be of benefit to SRFT as this could reduce costs and reduce the usage of unlicensed liquids. The risks would have to be assessed before implementing any changes in order to reduce costs in a safer manner.

3. Lowey, A. & Jackson, M. How to ensure the quality and safety of unlicensed oral medicines; The Pharmaceutical Journal 2008;281:240
5. Handbook of Drug Administration via Enteral Feeding Tubes Available at URL: www.medicinescomplete.com (accessed 01/03/2013)
Introduction
Meditation is the most common form of intervention made within healthcare system. Patients are prescribed multiple, long term medications and it is therefore a major challenge to ensure that these patients obtain maximum benefit from all their medicines. The cost of NHS medicines and appliances supplied in primary care is in excess of £8 billion every year, these drugs are wasted because patients do not use their medication properly or do not use them at all. It is estimated that up to 50% of patients do not take their medications correctly. In primary care there is a large focus on initiation of therapy to treat patient’s medical conditions rather than identifying and stopping unnecessary medication. This may lead to a situation where patients are suffering side effects from medication they do not derive any benefit from. Regular medication reviews are purposed to tackle this area. There is published evidence which confirms that medication reviews help to optimise drug therapy, improve patient health outcomes, and reduce the likelihood of medicine-related problems.

The GMS contract mandates that, a medication review is conducted for all patients and recorded in the notes in the preceding 15 months for all patients being prescribed four or more repeat medicines. However it is thought that medication reviews are recorded but are not being conducted thoroughly.

Aim
To investigate the appropriateness of medicines being prescribed within two Cambridgeshire GP practices by conducting medication reviews.

Objectives

- Investigate the appropriateness of GP prescribing by auditing against the standards below;
  - 100% of medications reviewed are prescribed appropriately for patient’s indication.
  - 80% of medications are a cost effective choice according to local formularies.
  - 100% of all required monitoring is being carried out.
  - 80% of patients have had a medication review in the last 12 months.
- Review audit results and carry out interventions.

Method
This study was an audit project set by the NHS Cambridgeshire PCT; therefore ethics approval was not required. Two surgeries were selected for the audit and consent was obtained in writing from both surgery practices. Before commencing data collection, therapeutic training was given to primary investigators (Olufolake and Sharada) by the lead pharmacist at the PCT. A data collection form was then piloted with the lead PCT pharmacist for validation purposes. Information was extracted from practice computer system for 50 patients meeting the inclusion criteria in each surgery.

Patients repeat medication was analysed and potential interventions were identified. Interventions were then reviewed with a supervising pharmacist. Lastly, the primary investigators met with prescribing leads of both surgeries to discuss and implement changes found from medication reviews.

Results
A total of 100 patients prescribed ten or more medicines across two general practice surgeries were reviewed. Paediatric patients and patients on insulin were excluded from this study. Of these patients, 66% had a medication review conducted within the past 12 months, this was below the expected standard of 80%. Of the medicines prescribed, 95% were appropriate to the patient’s indication, and 85% were a cost-effective choice. All medication prescribed were being monitored in accordance with local and national guidelines. Potential interventions found by researchers are described in table 1 below. The total number of interventions found for patients reviewed was 191. Of these interventions, 80% were accepted by the respective GP practices.

Discussion and Conclusion

GP’s are required to perform a medication review on at least 80% of patients every 15 months. The results of this audit indicate that not all patients are being reviewed and that the reviews being conducted; may not be done so thoroughly. This is because a number of significant interventions were identified amongst patients who were recorded to have medication reviews. Most interventions highlighted to the GPs, regarded long-term use of proton-pump inhibitors. Although widely regarded as a safe class of drugs, evidence suggests they are associated with increased risk of fractures, development of C. difficile, as well as hypomagnesaemia. Recommendations were made for affected patients to be reviewed to discuss step-down if possible.

Other interventions required review of medication due to known interactions, safety or treatment optimization required. Examples include; patients prescribed simvastatin 40mg with amlodipine and regular prescribing of opioids without first prescribing regular paracetamol. These issues were flagged for the GP to review. Generally there was good adherence to the standards set, however other prescribing issues were discovered. Outcomes of the audit have pinpointed areas which should be carefully reviewed by GPs for all patients. Prescribers seem to be more focused on ticking a medication review as completed, rather than utilising the opportunity to identify problems and enhance patient understanding and compliance with their medicines. Going forward, GPs should be independently reviewed on how they are conducting patient medication reviews. These reviews could look at recorded evidence of the content of their medication reviews. This evidence can be in the form of a checklist which can be completed by both the patient and practitioner, showing areas which have been covered. This could ensure that medication reviews being carried out to achieve the original benefits of improving patient care and prescribing practices.

References

K. An audit of Pharmacy-led Medicines Reconciliation (MR) completed throughout a Hospital Trust
Dhanji, S, Northwick Park Hospital, North West London Hospitals (NWLH) NHS Trust

Introduction:
In December 2007, the National Patient Safety Agency (NPSA) reported that several medication errors at the point of transfer of care had led to severe harm and even fatality1. In light of this, the National Institute of Clinical Excellence (NICE)2 in collaboration with the NPSA released a safety solution stating that all Trusts should have an MR policy in place and pharmacists should be involved in the MR process as soon as possible after admission2. A pharmacy-led or level 2 MR was defined in National Prescribing Centre (NPC) guidance as a three stage process; collecting an accurate medication history, checking the patient’s charted medicines against their medication history and finally communicating any discrepancies. This process is key in reducing medication errors and thereby the potential of harm to patients. The completion of pharmacy-led MRs needs to be assessed against standards set by the local MR Policy3 to ensure that a timely and high-quality service is being delivered.

Objectives:
To audit a representative sample of MRs completed through the Trust against the following standards:

1. 100% of adult patients admitted between 12pm on Sunday and 12pm on Friday (i.e. ‘weekdays’) will have a pharmacy-led MR within 24 hours of admission.
2. 100% of adult patients admitted between 12pm on Friday and 12pm on Sunday (i.e. ‘weekend’) will have a pharmacy-led MR within 72 hours of admission.
3. 100% of pharmacy-led MRs will include information regarding medicines management (e.g. self or family help).
4. 100% of pharmacy-led MRs will have documented relevant information to aid the patient’s discharge (e.g. further supply of medicines at home).
5. 100% of documented discrepancies will either have a reason documented for the change in therapy since admission or, where no reason is found and the discrepancy deemed unintentional, will be highlighted on the drug chart with documentation of steps to resolve the discrepancy (e.g. ‘discussed with medical team’).

Method:
A data collection form was designed and piloted over three wards, amendments were identified and made to the final audit form. A total of 34 wards were audited, with a random sample of 10 patients being assessed on 32 wards and all patients being assessed on two admissions wards. All data was collected over four days (19th to 22nd November 2012) by the auditor, to eliminate any bias. Any patients for whom the timeframe had not yet passed were followed up. A computer programme (Patient Administration System) was utilised to identify the date and time of admission of patients to a ward to define them into weekday and weekend categories. Collected data was then inputted on to an Excel spreadsheet for further analysis. Ethics approval was not obtained for this study as it was an audit. Wards excluded from audit were Intensive Trauma Unit (ITU) & Elective High Dependency Unit (EHDU) (information on the MR was not readily available), Maternity (MRs are not routinely completed in this directorate) & Paediatrics (MR policy is for adults).

Results:
69% (n=328) of all patients assessed across the Trust received MRs within the timeframe specified by the MR policy (Table 1). Weekend MRs performed better than weekday MRs, achieving 83% adherence to their timeframe standard (Table 1), further analysis showed that 69% of weekend MRs were completed by Monday post-admission.

Table 1: The percentage adherence to each standard throughout the Trust

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Standard (%)</th>
<th>Number of patients audited</th>
<th>Compliance to criteria (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday MRs completed within 24 hours of admission</td>
<td>100</td>
<td>263</td>
<td>66</td>
</tr>
<tr>
<td>Weekend MRs completed within 72 hours of admission</td>
<td>100</td>
<td>65</td>
<td>83</td>
</tr>
<tr>
<td>Medicines management information</td>
<td>100</td>
<td>302</td>
<td>49</td>
</tr>
<tr>
<td>Discharge information</td>
<td>100</td>
<td>302</td>
<td>47</td>
</tr>
<tr>
<td>Discrepancies documented appropriately</td>
<td>100</td>
<td>210</td>
<td>60</td>
</tr>
</tbody>
</table>

Discussion/Conclusion
Timeframe standards set by the MR policy are not being achieved for both weekend and weekday admissions. For weekday admissions, current staffing levels are inadequate for 100% MR completion within 24 hours; The Acute Assessment Unit (AAU) does not receive an MR service on two days. An increase in funding for a full service would aid MR completion within the set timeframe. An increase in MR accredited medicines management technicians would also aid in enabling the timeframe standards to be met, whilst allowing pharmacists more time to focus on high risk patients and clinical screening. Moreover, the introduction of Smartcards & Summary Care Records would increase the efficiency of the MR process. The current level of service for weekend admissions does not allow for the same 24 hour standard as the weekday service due to shorter opening hours and reduced staffing. However, the current 72-hour timeframe standard in the policy could be adjusted to drive MR completion by Monday post-admission given that this is currently being achieved for 69% of weekend admissions.

Standards for MR documentation were also not achieved. Recommendations include the introduction of a yearly training session, recapping on MR policy standards and addressing the importance of clear documentation, as well as the introduction of MR accreditation for all pharmacists. A limitation of this audit was the inability to assess 10 patients on every ward (small ward size or empty beds meaning 10 patients were not available on the ward). All wards routinely completing MRs were included to ensure valid and generalisable results across the Trust.

Overall, recommendations were made with regards to training, policy adjustment and staff resources as none of the standards were achieved. A monthly snapshot audit to assess whether MR timeframes are achieved was implemented.

References
Introduction
Antibiotic resistance is a major problem which is driven by over use and inappropriate prescribing of antibiotics. Infection caused by resistant bacteria such as methicillin-resistant Staphylococcus aureus (MRSA) and Clostridium difficile can cause complications in patients leading to extended length of stay in hospital and even death. It is important that antibiotic use is monitored closely to avoid an increase in resistant bacteria, particularly as fewer new antibiotics are currently being developed.

Piperacillin and tazobactam is a broad spectrum antibiotic which is used for the treatment of a range of infections. According to the South Warwickshire Foundation Trust (SWFT) antibiotic guidelines, the therapeutic indications for IV piperacillin and tazobactam (4.5g three times a day) include: hospital-acquired pneumonia (if the patient has received any other antibiotics since their admission); acute cholecystitis; cholangitis; acute hospital acquired intra-abdominal infections (e.g. post-op infections) and neutropenic sepsis. An audit was conducted across the Trust for piperacillin and tazobactam prescribing as it was thought that prescribers were not adhering to antibiotic guidelines.

Aim
To investigate if piperacillin and tazobactam is prescribed appropriately throughout the Trust according to the hospital antimicrobial guidelines.

Objectives
- To ensure that piperacillin and tazobactam was prescribed according to the hospital antimicrobial guidelines and that any deviation from the antibiotic guidelines was be micro-approved.
- To ensure that piperacillin and tazobactam was prescribed appropriately on the drug chart.
- To check that all prescriptions were prescribed correctly according to allergy status on the drug chart.

Method
Data was collected for the audit over 2 weeks across all medical wards at Warwick Hospital. Surgical and paediatric wards were excluded as these wards have their own antibiotic policies. A total of 40 patients were audited and prescriptions that had piperacillin and tazobactam either brand prescribed (as Tazocin®) or generically prescribed (as piperacillin and tazobactam) were included. All patients who were currently receiving piperacillin and tazobactam were included within the audit. Details regarding the indication, length of treatment, allergy status, appropriateness of antibiotic and prescription completeness were recorded.

Patient initials and hospital numbers were collected to ensure that the same data was not collected twice. Patient confidentiality was maintained by entering this data anonymously onto a spreadsheet and destroying the original proformas as soon as possible. The results were then analysed and discussed with recommendations to improve future practice.

Results
32 patients (80%) were prescribed piperacillin and tazobactam according to the antibiotic guidelines however 8 patients (20%) did not. Of these 8 patients, 6 patients had microbiology approval to use the antibiotic however 2 patients did not. One of these patients was in the admissions unit and they were waiting for test results to come back from the microbiology lab. The other patient had been initiated on piperacillin and tazobactam for the treatment of spontaneous bacterial peritonitis (SBP) which is currently not included in the SWFT guidelines and is therefore not appropriate according to the audit.

47% of drug charts (19/40 patients) for piperacillin and tazobactam were filled in correctly with the date, name of drug, dose, route of administration, signature of the doctor, review date and indication. However 52% of drug charts (21/40 patients) had missing information. The most commonly missed information from drug charts were the indication for use and review date. 52% of drug charts (11/21 charts) were missing the review date and 38% (8/21 charts) were missing both the review date and indication.

100% of drug charts had the allergy status of the patient or no known drug allergies (NKDA) recorded. 31 patients who were audited had NKDA whereas only 9 patients had drug allergies stated on their drug chart. Of these 9 patients, only 2 patients (22%) had the nature of their drug allergy recorded.

Discussion and Recommendations
Adherence to the antibiotic guidelines for piperacillin and tazobactam prescribing was generally good, as the majority of deviations from the guidelines were micro-approved. Completion of drug charts for piperacillin and tazobactam prescriptions is a cause for concern, as more than half of the drug charts were incomplete.

Refresher training for the completion of drug charts for antibiotics is required for all medical prescribers. Guidelines should be available with each notes trolley on every ward so that doctors can review this during their daily ward rounds. The introduction of E-prescribing would help to improve adherence but may take a while to set up across the hospital, therefore in the interim drug charts need to be updated so that the indication and date for review are highlighted.

Brightly coloured ‘review antibiotic’ stickers could also be introduced to attach to incomplete drug charts. These could also be put in the patient’s notes for the next consultant ward round to remind medical prescribers to complete the drug chart.

References
3. Electronic Medicines Compendium. Summary of Product Characteristics: Tazocin 2g/0.25g and 4g/0.5g Powder for Solution for Infusion. http://www.medicines.org.uk/emc/medicine/2239/SPC/Tazocin+2g+0.25g+and+4g+0.5g+Powder+for+Solution+for+Infusion/#PHARMACOLOGICAL_PROPS (accessed 6th April 2013)
Medical Exhibition Floor Plan - Edward 1 Suite

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Exhibitor Information

Aguettant Ltd
Aguettant Limited is a supplier of essential, easy to administer, innovative, high quality Generic Medicines that improve the health of patients. We are a subsidiary of Laboratoire Aguettant, a Family owned Pharmaceutical Company based in Lyon. Our products include UK licensed injections in glass and a new generation of plastic pre-filled syringe for anaesthesia. We also supply CE marked sterile irrigations in plastic containers and flexible bags.
We are a small, friendly & responsive team focused on providing solutions for our Customers and developing and maintaining strong working relationships with Healthcare Professionals.

We distribute through logistic networks that reach all parts of the UK as well as through National, Regional and local NHS contracts.
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The Barn, 41a High Street, Cleeve, Bristol BS49 4NZ
Tel: +44 (0)1934 835 694
Fax: +44 (0)844 3650050
Email: info@aguettant.co.uk
www.aguettant.co.uk

Astellas Pharma Ltd
Astellas is a global pharmaceutical company dedicated to improving the health of people around the world. Committed to research in anti-infective care, Astellas is focusing on saving the lives of critically ill patients with systemic fungal infections, as well as patients with Clostridium difficile infection.

Astellas key contacts:
Kiran Amliwala – Anti Infectives Portfolio Manager
Email: kiran.amliwala@astellas.com
Karen Callaway – Anti Infectives, Senior Brand Manager
Email: karen.callaway@astellas.com
James Holah – Anti Infectives, Senior Brand Manager
Email: james.holah@astellas.com

Astellas Pharma Ltd, 2000 Hillswood Drive, Chertsey, Surrey KT16 0RS

AstraZeneca UK Ltd
About the Bristol-Myers Squibb and AstraZeneca alliance
Bristol-Myers Squibb and AstraZeneca entered into an alliance in January 2007 to enable the companies to research, develop and market a portfolio of different treatment options for type 2 diabetes.
The Bristol-Myers Squibb-AstraZeneca diabetes alliance is dedicated to helping health care professionals to improve the treatment outcomes for patients with type 2 diabetes.

AstraZeneca UK Ltd, Horizon Place, 600 Capability Green, Luton, Bedfordshire LU1 3LU.
Tel: +44 (0)1582 836000. Fax: +44 (0)1582 838000

Centre for Pharmacy Postgraduate Education
The Centre for Pharmacy Postgraduate Education is funded through the NHS Multi-professional Education and Training Fund from Health Education England and offers CPD opportunities for all pharmacists and pharmacy technicians providing NHS services in England.

Our learning@lunch modules are developed to enable hospital pharmacy teams and other healthcare professionals to learn together about clinical and pharmacy practice topics. Programmes for 2013 include: antibacterials, Parkinson’s disease, COPD and heart failure.
Website: www.cppe.ac.uk

College of Mental Health Pharmacy
The College of Mental Health Pharmacy (CMHP) is a charity with the overall objective of advancing education and research in the practice of mental health pharmacy. Although mainly aimed at pharmacists and pharmacy technicians, anybody can register to be an associate member of the CMHP, enjoying access to education and networking opportunities such as e-groups, bulletins and the annual conference.
The College of Mental Health Pharmacy aims to ensure the best treatment with medicines for people with mental health needs.

Pharmaceutical care for people with mental health problems is improved by providing the pharmacy team members with high quality education and support about mental health conditions and their management.

More information about educational resources and how to join can be found on our website www.cmhp.org.uk.
CMHP can be contacted via Email: info@cmhp.org.uk

The Alliance of Daiichi-Sankyo and Eli Lilly & Co Ltd
Company details unavailable at time of print.
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hameln pharmaceuticals Ltd is a leading supplier of high quality sterile generic injectables to the UK secondary healthcare sector. Supplying to the NHS for many years, hameln pharmaceuticals Ltd is committed to delivering quality, consistency and reliability throughout its operations. Patient safety is at the forefront of every element of the hameln service from intelligent packaging design and ready-to-use products focused on reducing medication errors, to in-group development, production and logistics facilities that ensure quality and supply reliability. For further information on our products, service or packaging design, please visit our website or contact us by phone fax or email.

hameln pharmaceuticals Ltd
Nexus
Gloucester Business Park
Gloucester
Tel. 01452 621661
Fax. 01452 632732
Web. www.hameln.co.uk
Email. enquiries@hameln.co.uk

About Leo Pharma

LEO Pharma helps people achieve healthy skin. By offering care solutions to patients in more than 100 countries globally, LEO Pharma supports people in managing their skin conditions. Founded in 1908 and owned by the LEO Foundation, the healthcare company has devoted decades of research and development to delivering products and solutions to people with skin conditions.

LEO Pharma is headquartered in Denmark and employs around 4,800 people worldwide.

For more information, visit www.leo-pharma.com.

Norgine Pharmaceuticals Ltd

Founded in 1906, Norgine is a speciality pharmaceutical company with an extensive pan-European presence. Throughout our long history, we have sought to develop and market high quality, innovative products for the benefit of both patient and physicians. We are committed to developing products not only to treat life-threatening conditions but, importantly, to improve the quality of life for patients with a range of acute and chronic illnesses. We have a long standing tradition of building relationships, based on the highest standards, with patients, physicians, employees, partners and other key stakeholders.

Norgine Pharmaceuticals Limited,
Norgine House,
Widewater Place,
Moorhall Road,
Uxbridge,
Middlesex,
UB8 6NS
Norginepharmaceuticals.co.uk
Telephone (during office hours): 01895 826600
Facsimile: 01895 825865

Orion Pharma UK Ltd

Orion is a Finnish born innovative European R&D based pharmaceuticals and diagnostics company with an emphasis on developing medicinal treatments and diagnostic tests for global markets. Orion develops, manufactures and markets human and veterinary pharmaceuticals and active pharmaceutical ingredients as well as diagnostic tests.

Orion carries out extensive research with a goal of introducing new products and research strategy are central nervous system, oncology, critical care and respiratory medicines.

Pharmacy Manufacturing Unit, Portsmouth Hospitals Trust

The aseptic ‘specials’ unit at Portsmouth provides an essential support to the delivery of clinical care to patients within the NHS. It was established as part of the South Central Strategy for Modernising Hospital Pharmacy Manufacturing to be a key strategic support for the Isle of Wight, Hampshire, Sussex, Surrey and beyond.

The unit is licensed by the MHRA and forms part of a network of similar units across the NHS, making essential aseptically prepared unlicensed medicines “specials” to support NHS service & R&D functions.

The unit fills the gap between the wholly commericial pharmaceutical industry and clinical staff undertaking near patient preparation and extemporaneous dispensing. The products manufactured are often not available commercially and can be tailored to the exact requirements of individual patients. Product lines are mainly pre-filled syringes of injectable products in response to NPSA alert 20, analgesics, adjuvants, civas, and cytotoxic products.

Rosemont Pharmaceuticals Ltd

Rosemont are the leading specialists in oral liquid medicines for people who have swallowing difficulties. We are dedicated to the development, manufacturing and marketing of oral liquid medicines and through significant R&D, we have a product range of more than 150 different drugs. We have over 40 years experience in supplying both licensed medicines and ‘Specials’ where our customers see us as ‘The Source of Liquid Solutions’.

Rosemont is dedicated to the promotion of best practice, when administering medication; and provides training meetings and an array of educational materials to healthcare professionals.

Rosemont Pharmaceuticals Ltd
Rosemont House
Yorkdale Industrial Park
Braithwaite Street
Leeds
LS11 9XE
Tel: 0113 244 1400
Fax: 0113 245 3567
Email. marketing@rosemontpharma.com
Website. www.rosemontpharma.com
Royal Pharmaceutical Society

The Royal Pharmaceutical Society is the dedicated professional body for pharmacists and pharmacy in England, Scotland and Wales providing leadership, support and development to its members. We ensure the voice of the profession is heard and actively promoted in the development and delivery of healthcare policy and work to raise the profile of the profession. We are the only body which represents all sectors of pharmacy in Great Britain. Our mission is to promote and represent the professional interests of our members, supporting the profession to achieve our shared vision for the future. We are committed to supporting and empowering our members to make a real difference to improving health outcomes for patients.

We are committed to collaborating and co-operating with partners from across the profession to advance pharmacy. We believe that when we work together we are stronger as a profession and are proud to have the UKCPA as one of our partners.

Royal Pharmaceutical Society
1 Lambeth High Street
London
SE1 7JN
www.rpharms.com
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membership@rpharms.com

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United Kingdom Clinical Pharmacy Association

The UK Clinical Pharmacy Association (UKCPA) is a member association for clinical pharmacy practitioners. We encourage, support and promote advanced practice in pharmacy. The UKCPA actively develops clinical pharmacy practice as well as developing individual practitioners, and we are frequently at the forefront of initiatives such as establishing professional curricula, developing professional recognition (credentialing) processes, and developing professional tools and frameworks for practitioners. The Association was established in 1981 with the aim of bringing together like-minded pharmacists from different practice areas to share knowledge, research and experiences. This remains our core aim today. We provide networking and educational opportunities for our members to discuss and resolve current clinical issues and share best practice.

In April 2011 the UKCPA became an official partner of the pharmacy professional body, the Royal Pharmaceutical Society and we work closely with other specialist pharmacy organisations, professional bodies and representatives of healthcare professions.

Website: www.ukcpa.org, Email: admin@ukcpa.com,
Telephone: 0116 2889889
Address: UKCPA, 1st Floor, Publicity House, 59 Long Street, Wigston, Leicester. LE18 2AJ

Wockhardt UK Ltd

Wockhardt UK continue to be one of the largest suppliers of generic medicines to the NHS. We have just launched the only Sodium Valproate 400mg in 4ml solution (100mg/ml) in the UK and have added a generic Oxycodone 50mg/ml injection to bolster our existing Oxycodone injection and oral solutions range. We recently introduced Levomepromazine 25mg in 1ml injection as well as Nevirapine 200mg tablets, adding to an already extensive range of products (such as Piperacillin-Tazobactam, Co-Amoxiclav, Adenosine and Remifentanil).

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Tel: +44 (0) 1978 661261, Fax: +44 (0) 1978 660130, enquiries@wockhardt.co.uk
www.wockhardt.co.uk
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**Orion Pharma UK Ltd** for supporting the Saturday morning work session entitled Surviving Sedation in Ventilation.

**Napp Pharmaceuticals Limited** for organising the UKCPA Pain Management Group Fringe Meeting.

Napp Pharmaceuticals Limited is part of a worldwide association of independent pharmaceutical companies that have been developing innovative products for over half a century. Over the years, Napp have become a world leader in the field of pain control, and continue to be passionately committed to the fight against chronic pain, constantly striving to improve its treatment and supporting education of healthcare professionals for the benefit of patients.

**The Royal Pharmaceutical Society** for supporting the conference badges and lanyards.

The United Kingdom Clinical Pharmacy Association would like to thank all delegates, speakers, presenters, sponsors and exhibitors for supporting the UKCPA Autumn Symposium 2013.

Notes