Agenda

9:15  Registration opens, refreshments and networking

10:00 Welcome and introductions

Ann Slee, Digital Technology, NHS England
Gangotri Darji, Senior Solution Advisor, Cerner Limited

10:15 Opening plenary – are we working in isolation too much?

Bryony Dean Franklin, Professor of Medication Safety, UCL School of Pharmacy

10:30 An update on national/local collaboration to support medicines optimisation

Ann Slee, Digital Technology, NHS England
Neil Watson, Director of Pharmacy and Medicines Optimisation, The Newcastle upon Tyne Hospitals NHS Foundation Trust

11:05 Oral presentations


1. ‘Implementation of a Medication Safety Bundle for Intravenous Infusions in a Neonatal Intensive Care Unit’
   Brian Cleary, Chief Pharmacist, Rotunda Hospital, Dublin; Brian Kehoe, Senior Informatics Pharmacist, Rotunda Hospital, Dublin

2. ‘The potential role of closed-loop ePMA / smart pump systems in preventing infusion administration errors’
   Professor Bryony Dean Franklin, Professor of Medication Safety, UCL School of Pharmacy
11:50 Poster presentations

Chairperson: Bryony Dean Franklin, Professor of Medication Safety, UCL School of Pharmacy

1. ‘A systematic review of on-screen design factors for safe use of hospital electronic prescribing systems’ by Naresh Serou, Health Services Researcher, Imperial College Healthcare NHS Trust

2. ‘Audit of compliance with NICE CG 183 and Improvements in Drug Allergy Incidents after EPR implementation’ by Penny Daynes, EPR Lead Pharmacist, Calderdale & Huddersfield NHS Foundation Trust

3. ‘Improving safe and appropriate anticoagulant use through electronic health record integration: A proof of concept’ by Eavan Higgins, Informatics Pharmacist, Rotunda Hospital, Dublin

4. ‘Infusion Administration Workflows in a Neonatal Intensive Care Unit- A Simulation Study’ by Anu Garg, Clinical Nurse manager, Rotunda Hospital, Dublin

5. ‘Use of computerised prescriber order entry and clinical decision support alerts’ by Jamilah Alsaidan, PhD Student, UCL School of Pharmacy

6. ‘The impact of ePMA on work practices in secondary care: a narrative synthesis’ by Soomal Mohsin-Sheikh, PhD student, UCL School of Pharmacy

12:15 Poster viewing and networking lunch

13:05 Parallel discussion groups

Note: attendees can attend two groups

1. ‘Decision support’
   Rick Cooper, Lead Pharmacist for ePrescribing, University Hospitals Bristol NHS Foundation Trust; Andrew Heed, Deputy Chief Clinical Informatics Officer, Newcastle upon Tyne Hospital NHS Foundation Trust
2. ‘Transformation of working practices through closed loop supply - integration of ePMA with pharmacy stock control systems’  
Rob Elliot-Cooke, Lead Clinical Informatics Pharmacist, Royal Free London NHS Foundation Trust; David Chalkley, Deputy CCIO, Taunton and Somerset NHS Foundation Trust

3. ePRaSE – what should it test?  
Stephanie Kline, Project Manager, Newcastle University; Jude Heed, Lecturer in Pharmacy Practice, Newcastle University

4. What next for the ePrescribing toolkit?  
Lucy McCloughan, Scientific Development Manager, the University of Edinburgh

14:05 Refreshments and change of discussion group

14:20 Parallel discussion groups (as above)

15:20 Secondary use of data to drive medicines optimisation and public health interventions - an update on Pincer?  
Chairperson: Professor Bryony Dean Franklin, Professor of Medication Safety, UCL School of Pharmacy

Professor Darren Ashcroft, Professor of Pharmacoepidemiology, Head, Drug Usage and Pharmacy Practice Group. Faculty of Biology, Medicine and Health, The University of Manchester

15:45 Closing remarks  
Ann Slee, Digital Technology, NHS England

16:00 Departure
Aim: To implement a bundle of risk reduction strategies to reduce the incidence of adverse drug events associated with high risk continuous infusions (HRCIs) and to assess the pharmaceutical care issues involved with the prescribing and administration of HRCIs before and after implementation.

Methods: The bundle was implemented in a 39-bed level III Neonatal Intensive Care Unit (NICU). Insulin, morphine, dopamine and heparin were the initially selected medications. The bundle incorporated standard concentration infusions, medication monographs, smart pump technology and a bespoke electronic prescribing and label printing solution. Training was provided to medical and nursing staff and the implementation was supported by a clinical pharmacist. Pharmaceutical care issues (PCIs) involved with the prescribing and administration of the HRCIs were collected between 2nd July 2015 and 2nd July 2016.

Results: 509 HRCIs were reviewed for 191 patients over 122 days pre-implementation and 56 days post-implementation. The characteristics of the included patients pre and post-implementation did not differ with the exception of occupancy which was higher post implementation: 81.5% compared with 75.1% (p=0.01). The proportion of infusions with identified PCIs decreased after implementation of the bundle for each of the selected medications (see table 1). The majority of errors pre-implementation related to incomplete labelling, incomplete prescription and incorrect labelling information. The bespoke labelling solution was successfully integrated with Cerner Millennium. All SCIs now have associated labels including dosing, preparation and titration instructions. Staff feedback to date has been positive.

Conclusion: Implementation of a broad ranging medication safety bundle was feasible and resulted in a reduction in PCIs for selected high risk infusions. Integration of the labelling solution with Cerner Millennium was successful and well received by clinical staff.
2. The potential role of closed-loop ePMA / smart pump systems in preventing infusion administration errors' by Professor Bryony Dean Franklin, Professor of Medication Safety, UCL School of Pharmacy

Smart pumps, incorporating dose error reduction software, are widely advocated to prevent errors in the administration of intravenous infusions. We conducted analyses on two different sets of data to explore the potential role of smart pumps in preventing such errors. The first was data from a recent point prevalence study of infusion administration errors in 16 English hospital trusts (n=216 errors; 157 in infusions not given by a smart pump); the second was data on infusion administration errors of at least moderate severity reported to the National Reporting and Learning System (NRLS) for England and Wales (n=123 errors; 115 not via smart pump). In each case we assessed whether each error was likely to have been prevented by (1) a standalone smart pump, and (2) a smart pump integrated with an ePMA system such that details of the medication order are transferred electronically to the pump.

Of the 157 errors in infusions not given via smart pump from the point prevalence study, 2 (1%) were judged to be preventable with a standalone smart pump and a further 80 (51%) with a smart pump integrated with ePMA. Some infusions were given via gravity and 22 (14%) errors would have been prevented by any infusion pump. Of the 115 errors reported to the NRLS, 38 (30%) were judged to be preventable with a standalone smart pump and a further 9 (8%) with a smart pump integrated with ePMA. In a small number of those cases where smart pumps were used, use of the smart pump was judged to have contributed to the error.

While the hypothetical nature of this analysis is a limitation, it appears that there are potentially greater benefits to smart pumps when integrated with ePMA to create a closed loop system. However, many errors were considered unpreventable with either standalone or integrated smart pumps.

Poster presentation extracts

1. ‘Use of computerised prescriber order entry and clinical decision support alerts’ by Jamilah Alsaidan, UCL School of Pharmacy

Medication errors, which can occur at any stage of the medication use process, are recognised as a clinical burden, yet potentially preventable. Computerised prescriber order entry (CPOE) and clinical decision support (CDS) were implemented in King Saud University Medical City hospitals in 2015, but the potential impact on medication errors has not yet been evaluated. Our aims were to determine the rates of CDS alerts generated and the appropriateness of alert overrides.

Methods: This study comprised retrospective review and analysis of CPOE system reports from June 2015 to December 2017. All medication orders entered into the CPOE system (inpatient and outpatient) were eligible for inclusion, together with any CDS alerts generated. Numbers of alerts generated and numbers and percentages of alerts overridden were determined. Physician documentation for justification of overrides was also analysed.

Results: From outpatient medication orders, 1,652,417 alerts were generated, of which 98% were overridden. From inpatient orders, 2,794,295 alerts were generated and 94% overridden.
The highest frequency alert was ‘drug duplication’ (80% of all alerts), followed by ‘dose range’ (11%), ‘drug-drug interaction,’ (7%), then ‘drug-allergy’ (1%). Medications triggering the most dose range alerts were insulin, warfarin, and pantoprazole. Egg allergy alerts were overridden two thirds of the time. Documentation by physicians justifying overriding of alerts was poor, often ‘no overridden reason selected’ or ‘clinical judgement’ being chosen from the drop down menu with no other information provided 96% of the time.

Conclusions: More than 90% of generated CDSS alerts were overridden by prescribers, with only a small percentage documenting justification of their choice. Frequent triggering of drug duplication alerts could lead to alert fatigue, and cause clinicians to override other more relevant alerts.

2. ‘The impact of ePMA on work practices in secondary care: a narrative synthesis' by Soomal Mohsin-Shaikh, UCL School of Pharmacy

Electronic prescribing and medication administration (ePMA) systems have increasingly been implemented in clinical settings in an attempt to reduce medication-related risks and enhance patient safety (Mozaffar, 2017). These systems impact healthcare professionals’ (HCP) work and the way in which they perform their roles. While many safety benefits potentially exist, studies show that the adoption of new hospital health information technology also involves many sociotechnical challenges that can limit these benefits (Mozaffar, 2017). A systematic review was conducted to summarise the literature on assessing the effect of ePMA systems on the working practices of HCPs in the inpatient setting and to make recommendations for future work in this field. For the purpose of this review, working practice was defined as HCPs conducting clinical work, diagnostics, monitoring, providing direct and indirect patient care, interacting and communicating with other HCPs and engaging in activities to provide patient care. We conducted a systematic search within five databases and included original research studies that focused on the effect of ePMA systems on the working practices of doctors, pharmacists and nurses working in an inpatient setting. Twenty-four papers were obtained that met our inclusion criteria. The literature suggested there were four areas of working practices impacted by ePMA systems: communication, time taken to complete tasks, clinical workflow and workarounds. There is a gap to further explore communication in the UK setting. Important issues to explore include the purpose, channel and how HCPs use to communicate considering implementation of new ePMA systems. Specifically, little of the literature identified in this review related to the work of pharmacists. Their workflows, communication patterns and multidisciplinary teamwork should be a focus of future research.

3. 'Improving safe and appropriate anticoagulant use through electronic health record integration: A proof of concept' by Eavan Higgins, Maternal and Newborn Clinical Management System

Aim: Our aim was to determine the feasibility of integrating a novel venous thromboembolism risk assessment (VTE-RA) tool into a national Electronic Health Record (EHR) to promote safe anticoagulant use in maternity units throughout Ireland.
Methods: A collaborative team from the Rotunda Hospital, MN-CMS, eHealth Ireland, Cerner Ireland and CommonTime was established to undertake this proof of concept (PoC). SMART on FHIR (Substitutable Medical Apps, Reusable Technology and Fast Healthcare Interoperability Resource) was identified as a means of integrating the VTE-RA tool with MN-CMS (1). SMART on FHIR is an emerging standard framework that allows the development of interchangeable healthcare applications which can be deployed across EHR platforms, healthcare systems and care settings.

A Microsoft Excel based VTE-RA tool developed in the Rotunda Hospital was used as a template (2). Relevant clinical information which could be extracted from the EHR environment and pre-populated into the VTE-RA tool was identified, defined and agreed (Table 1). Using this information, CommonTime software developers progressed towards the development of a prototype tool.

Results: A prototype electronic VTE-RA tool was developed and successfully interfaced with the EHR in a virtual testing environment. Using SMART on FHIR capabilities, specific clinical information is retrieved from the individual patient’s EHR and automatically populated into the appropriate field in the VTE-RA tool. End-users complete the risk assessment and details are saved back to the individual patient’s EHR to support clinical decision making.

Conclusion: Through interdisciplinary collaboration and use of innovative technologies we demonstrated the potential to deliver seamless access to accurate clinical information in real time, at the point of care. The principles demonstrated in this PoC could be applied to a spectrum of initiatives within the Irish health services to enhance safe and effective use of medicines across various platforms, healthcare systems and healthcare settings.

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<th>VTE Risk factor</th>
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4. ‘A systematic review of on-screen design factors for safe use of hospital electronic prescribing systems’ by Naresh Serou, Imperial College Healthcare NHS Trust

Background and Rationale: Research in marketing psychology or behavioural science has shown that user interface design features have an impact on facilitating navigation through complex (online) systems (Kushniruk, Triola et al. 2005). Little has been done and thus less is known of the value and use of these features for electronic prescribing (EP) systems in healthcare. Their usability problems have previously been found to be associated with medication errors (Reckmann, Westbrook et al. 2009).

Aim/Objectives: To identify and explore key on-screen design factors or features that influence safe and effective use of hospital EP systems.

Methods: This review followed the PRISMA-P reporting guidelines and was registered with the PROSPERO database (CRD42018089561). Studies were eligible for inclusion if they were primary research or reviews that focused on the user interface design features in hospital EP systems. Literature that focused on other aspects of EP systems or used in primary care was excluded. Research articles focusing on electronic systems used for purposes other than prescribing and grey literature were also excluded.

We generated a list of MeSH terms and text words and searched in MEDLINE, EMBASE, CINAHL, and PsycINFO in March 2018. A customised data extraction form will be used to capture pertinent information from included studies and the Critical Appraisal Skills Programme tool to appraise their quality (CASP, 2014).

Results: A total of 100 articles were identified, with 15 duplicate articles removed, 71 excluded at the title (49), abstract (20) and full text (2) stages, thus leaving a total of 14 articles (11 full text articles, 3 review articles). The developing themes so far include glitches around the user interface, the on-screen content, navigation and workflow while using the EP systems. We anticipate extracting and analysing potential emerging themes in due course to address our aim of the review.

5. ‘Infusion Administration Workflows in a Neonatal Intensive Care Unit- A Simulation Study’ by Anu Garg, Rotunda Hospital

Aims: This study was conducted to evaluate the administration phase of the medication use process for infusions in a neonatal intensive care unit using an electronic health record (EHR).

Methods: Thirty-one NICU nurses participated in simulation sessions between March-April 2017. Each participant was asked to simulate the labelling and administration of five infusions. Each simulation involved the review of the prescription on the screen, crosschecking against medication protocols, preparing syringe labels and programming the infusion pump. Quantitative data were gathered on identified errors. Qualitative data were collected via a post-simulation survey to explore participants’ perceptions of the administration process. Errors were classified using the NCC-MERP classification system.
Results: Out of 155 prescription orders, 31 had either a programming error (n=11, 7%) or wrong labelling parameters (n=12, 7.7%) or both (n=8, 5.2%). All the syringe labels had one or more missing labelling parameters. 89% of programming errors belonged to NCC-MERP category C, or D. More than half (52.6%, n=10) of the infusion orders with programming errors led to a 10% or greater deviation from the prescribed dose and 70% (n=7) of these deviations were due to programming the wrong concentration. Logistic regression analysis showed that labelling errors were associated with subsequent programming errors.

Conclusion: Transcribing labels from onscreen information is an error-prone process. Printing infusion labels generated from the EHR prescription would be an effective strategy to reduce this risk. EHR infusion prescriptions should provide sufficient information to guide nursing staff through the preparation and administration process. Integration of the EHR with infusion pumps could remove the risk of pump programming errors. Simulation is a useful technique to examine medication use processes and identify potential risk prior to implementation of health information technology.

6. ‘Audit of compliance with NICE CG 183 and Improvements in Drug Allergy Incidents after EPR implementation’ by Penny Daynes, Calderdale and Huddersfield NHS Trust

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