Electronic Health Records, and Electronic Prescribing and Medicines Management

Dr Simon Eccles
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The current national context

- Nov 2010 – The Information Revolution consultation
- September 2011 – DH announces an acceleration of the dismantling of the National Programme for IT
- Spring 2012 – Information Strategy to be published
- April 2013 – NHS Commissioning Board likely to assume responsibility for national IT
So where are we?

- Electronic Health Records in hospitals
- Electronic records across communities
- Electronic prescribing in primary care
- Electronic prescribing in hospitals
- Coordinated electronic prescribing for patients
2009: The National Patient Safety Agency reports that more than 200 patients every month need further treatment or die because of medication mistakes.
Baby dies after blundering doctors gave him TWELVE times the normal dose of epilepsy drugs

A seven-month-old baby boy died after doctors gave him 12 times the correct amount of anti-epileptic drugs he should have received in 24 hours, an inquest heard.

Lucas Holzschulze, pictured with parents Anna Holzschulze and Benjamin Stahlhut, died after doctors gave him 12 times the correct amount of anti-epileptic drugs.

The baby’s death, the senior registrar who was forced to take two prescribing weeks but failed both.

A senior registrar at the hospital claimed that a gap in the system meant a similar incident could occur again because a lack of assessment meant senior doctors might not be competent to prescribe.

A statement from Hamonton Hospital said: ‘The medical and nursing staff involved were advised of their responsibility for prescribing and administering drugs pending investigation.

DI Andreas Hey, coroner for St Pancras and Poplar, said in the inquest on Wednesday that doctors’ negligence was a contributory factor in his death.

Lucas’s parents, Anna and her partner Benjamin Stahlhut, have since returned.
How do we make a system that makes patients safer, not just one which makes it easier to count the errors?
Medication Errors

High Incidence of low risk prescription errors (Chart not signed/ prescription illegible/ time of admin not ticked/ drug not available/ out of date stock)

….background noise which ePrescribing Systems largely eliminate

Low incidence of High Risk errors (administration errors/incorrect prescription and drug still given/wrong route administration/ “picking” errors)
Drivers for Change

- Safety/Quality Agenda/commissioning (Never Events..including new expanded list)
- Patient expectations/medico-legal
- Potential shortfall in Nursing Numbers (especially senior nurses)
- Less experienced junior doctors (WTD)
- Secondary Care is becoming much more complex
- Financial/resource issues
- Population/demographic changes
What Does a Prescriber Want from an ePrescribing System?

- Safe (stop me doing something stupid without adding new risks)
- Intuitive and easy to use/ doesn’t require significant training
- Accessible
- No increase in time for prescribing
- UK based system supporting UK style clinical processes
- System needs to offer advantages over paper systems
- Key = useful decision support particularly for high risk patient groups and high risk areas (children are 3x as likely to suffer a drug error and the error is more likely to be significant)
High Risk Prescribing

- Critical Care
- Operating Theatres
- Neonates
- Renal/Hepatology/Transplantation
- Maternity
- Care of the Elderly
- Mental Health
- Paediatrics
- Oncology
What does someone administering medication want from an ePrescribing System?

- Safe (stop me doing something stupid without adding new risks)
- Intuitive and easy to use/ doesn’t require significant training
- No increase in time for drug administration
- Reliable Equipment (works every time)
- System needs to offer advantages over current systems (safer/doesn’t require second checker etc.)
**Current Situation**

- Most acute trusts not using any ePrescribing system
- Systems that are in use are relatively immature
- Niche systems and pharmacy systems more common
- Whole hospital systems tend to avoid the high risk areas
- Move away from large System Deployments (Cerner/Lorenzo) to local solutions
- Everybody wants this to work
Out of the 174 trusts in England, 43 have already identified an ePrescribing solution and of these:

- 10 have “fully implemented”.
- 5 have “partially rolled out”.
- 4 are at a piloting stage.
- The remainder are at earlier stages in the deployment cycle.

This leaves 130 organisations that have either yet to start the process, or who did not respond to the survey.
## Information on Trusts which have “Fully Implemented” ePrescribing

<table>
<thead>
<tr>
<th>Trust</th>
<th>System</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newcastle NHS Foundation Trust</td>
<td>Cerner</td>
<td>Excludes Paediatrics/Operating Theatres/Critical Care No interface with Pharmacy System (JAC)</td>
</tr>
<tr>
<td>Great Ormond Street</td>
<td>JAC</td>
<td>No decision support/excludes iv fluids and infusions/ not used in any of the 3 ICU’s as “not fit for purpose”/no link to pharmacy</td>
</tr>
<tr>
<td>Winchester (2 Trusts)</td>
<td>JAC</td>
<td>No comments, but JAC does not support paeds decision support</td>
</tr>
<tr>
<td>Birmingham Heartlands</td>
<td>JAC</td>
<td>Excludes Paediatrics/ Critical Care/Fluids and Infusions. Not fully rolled out in “out patients”</td>
</tr>
<tr>
<td>UHBirmingham</td>
<td>PICS “In House”</td>
<td>Excludes Paediatrics/ fluids and infusions/Chemotherapy/out patients</td>
</tr>
<tr>
<td>Sunderland Hospitals (2 Trusts)</td>
<td>Meditech</td>
<td></td>
</tr>
<tr>
<td>Burton NHS Trusts</td>
<td>Meditec</td>
<td>Looks very old fashioned</td>
</tr>
</tbody>
</table>
Implementing ePrescribing System should include:

- *Electronic Prescription Systems* (esp in high risk areas)
- *Knowledge Support*
- *Clinical Decision Support*
- *Advanced Decision Support*
- *Intra-operability with Other Clinical Systems* (esp Pathology)
- *Support for Drug Administration*
- *Networks and Hardware* (Wireless Network/Computers/Pyxis Cabinets/Barcode Readers/Intelligent Infusion Pumps)
Important Features of ePrescribing Systems

- Safety Critical
- Business Critical
- Like life support devices...they should have 24/7 backup and should not be allowed to fail
Mixed Results In The Safety Performance Of Computerized Physician Order Entry

**Abstract** Computerized physician order entry is a required feature for hospitals seeking to demonstrate meaningful use of electronic medical record systems and qualify for federal financial incentives. A national sample of sixty-two hospitals voluntarily used a simulation tool designed to assess how well safety decision support worked when applied to medication orders in computerized order entry. The simulation detected only 53 percent of the medication orders that would have resulted in fatalities and 10–82 percent of the test orders that would have caused serious adverse drug events. It is important to ascertain whether actual implementations of computerized physician order entry are achieving goals such as improved patient safety.
• Current systems have extremely poor “Usability”
• There isn’t a really good system out there…if there was everyone would buy it!
• There are significant issues with Hardware and WiFi Networks
• Deployment is extremely difficult (Building Order Sets etc)
• Trusts are not really deploying into high risk areas (esp. Paeds)
• It is difficult to collect evidence showing improved safety or lowered costs
• Poor working relationships with suppliers (Changes to systems take years to implement)
• Data is not transferrable between systems (esp. other ePrescribing systems such as critical care)
• Integration with other clinical systems (pathology etc) may be impossible
• Decision support is difficult (level of alerting is problematic)
• Maintenance of Systems post deployment is expensive and difficult
• Training is a huge issue
• Need the development of Clinical Informatics Team
Newcastle upon Tyne Hospitals

Project initiation April 2008
- Full Time personnel from August 2008
- Build complete August 2009 (12 months)
- Roll out began 30 November 2009
- Initial 3 wards (1 per week & review)
- Accelerated roll out (3 wards per week from January 2010) – 2/3 team approach
- 29 wards live

Full-time personnel
- Lead Pharmacist
- Support Pharmacy Technician
- Project Nurse
- Project Manager
- ePrescribing lead (highly experienced)
- Programme IT support (not project specific)
- Training Staff

Ad hoc project team (weekly meetings)
Two consultants
One Specialist Registrar
Two ward sisters
Three Assistant Directors of Pharmacy
What Doctors, Nurses, Pharmacists from early adopter Trusts say about their E-prescribing Systems?

“Nobody gave me any training….I had to learn on the job” (junior doctor A and E)

“The wifi Network is useless, we end up wandering around the ward, miles from the patient, trying to find a signal” (ward Nurse)

“It takes years to get the supplier to make changes to the system” (IM and T E-prescribing Lead)

“We didn’t get any change out of 2 million pounds…just for a basic E-prescribing system on the Intensive Care Unit” (ICU Consultant)

“I make more prescribing mistakes now than I did before the system was introduced” (junior doctor)

“Its not exactly user friendly (just about everyone at every site visited!)” (Pharmacist)

“We spend several days each month re-mapping the decision support from First Data Bank” (Pharmacist)

“We had to turn the decision support alerts off, they were irritating everyone” (E-prescribing lead)

“Would I do it again?...NO!” (E-prescribing leads)

“The wifi Network is useless, we end up wandering around the ward, miles from the patient, trying to find a signal” (ward Nurse)

“We didn’t get any change out of 2 million pounds…just for a basic E-prescribing system on the Intensive Care Unit” (ICU Consultant)

“Please take the system out” (ward Sisters)

“Every month the system goes down for 45 mins and no-one in the Trust can prescribe anything” (Pharmacist)

“All the Consultants want is an electronic version of the paper drug charts” (Pharmacist)
Challenge of ePrescribing for Secondary Care Trusts

- E-Prescribing Systems are complex, safety critical, expensive and extremely difficult to deploy
- Very few people (Clinicians/ IM and T Staff/ Pharmacists/ Suppliers) have the necessary experience in deploying these systems
- Resources are becoming more and more limited
- Large Number of Trusts (@180) wanting to deploy systems simultaneously over a short period of time
The top ten pitfalls

[From Prof David Bates at Harvard]

Preparation:
1. Don’t recognize how big a change this truly is
   • Expensive
   • Huge process change!
2. Failure to sufficiently engage both administrative and clinical leadership
3. Failure to do necessary preparation with key stakeholders
   • Often takes 2 years to have all the key groups meet
The top ten pitfalls

Implementation:
4. Going too fast early on—e.g. turning on whole hospital at once
5. Trying to fix previously existing policy problems at the time you implement
   • Easy to get stuck
6. Turning on too much decision support early on
   • Much better to phase in
The top ten pitfalls

Implementation:
7. Failure to provide users an easy mechanism for reporting ongoing problems
8. Failure to make sufficient changes to application
9. Failure to devote sufficient resources to making changes to the application
   • Won’t get value
10. Insufficient support for the underlying system
    • Keeping network up to speed
    • Having enough terminals
What has NHS CFH been doing?

• Draft design specification for safety features required by NHS electronic prescribing systems
  • Systematic reviews
  • Expert panel
  • Delphi consensus process
  • National consultation
• ePrescribing functional specification for NHS trusts, 2007
• Electronic Prescribing Systems Evaluation, 2009
• Strategy to support successful implementation of decision support for ePrescribing systems
• Assessment of lessons learnt from implementation of ePrescribing systems in the UK, 2009
• Dose Range Checking Guidance, 2009
• Hazard Framework for ePrescribing Decision Support, Feb 10
Central E-Prescribing Team (CfH) publications

- Electronic prescribing in Hospitals-the lessons learned (2009)
- Electronic Prescribing- briefing for the implementation team (2008)
- An Outline Approach for Identifying the Local Minimum Requirements for an ePrescribing System (2009)
- Allergy Checking in Secondary Care (2009)
Electronic prescribing in hospitals
Challenges and lessons learned

Introduction
Electronic prescribing (ePrescribing) systems can help improve the safety and efficiency of healthcare by aiding the choice, prescribing, administration and supply of medicines.

The safety and effectiveness of ePrescribing systems depends on all staff groups being actively engaged in their development and use.

Benefits of ePrescribing include:
- Prescribers accurately and clearly enter complete medication orders.
- As they do this the system can provide relevant patient information, for example on allergies, as well as details about drugs. ePrescribing systems can also offer advice or warnings as prescribing takes place.
- Prescription data can be stored securely and communicated to other members of the healthcare team without the risk of paper records being lost.
- Pharmacists can access drug orders remotely using the computer, and check and amend as required.
- Nurses who administer medicines have clear and legible medication orders. The system may help them to prepare for drug rounds, confirm the identity of patients, and record administration.
- Medication records can be accessed remotely by healthcare professionals.

Not all ePrescribing systems fully support all these aspects of medicines use, but most do to some degree.

ePrescribing systems provide a full audit trail and the data they hold allow many innovative uses that can help in medicines management and support a culture of reflective practice.

ePrescribing is a powerful and important innovation for the whole care team. When ePrescribing projects are being planned it is important that all healthcare professional groups are involved and that they remain involved as the system comes into use.

A successful initial implementation is the start, not the end, of running a successful system.
### Table One – Overall Results Summary

The scores outlined below do not in themselves represent a level of compliance for a particular area and should be used as relative comparators only.

<table>
<thead>
<tr>
<th>Supplier</th>
<th>System Version</th>
<th>Weight</th>
<th>Alert</th>
<th>Ascribe</th>
<th>Atkoso</th>
<th>Cambio</th>
<th>CIS</th>
<th>EPIC</th>
<th>Filetek/Meditech</th>
<th>JAC</th>
<th>Orion</th>
<th>UHB</th>
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<td><strong>Front Line Clinical Review</strong></td>
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<td>1.41</td>
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<td>1.41</td>
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<tr>
<td>Retrieve Medication History</td>
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<td>5.22</td>
<td>3.51</td>
<td>2.91</td>
<td>4.40</td>
<td>4.98</td>
<td>5.03</td>
<td>4.98</td>
<td>6.03</td>
<td>5.98</td>
<td>4.98</td>
<td>6.03</td>
<td>4.98</td>
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<td>Prescribe Inpatient Medicines</td>
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<td>4.21</td>
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<td>4.60</td>
<td>2.80</td>
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<td>Decision Support</td>
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<td>3.21</td>
<td>1.45</td>
<td>2.57</td>
<td>2.06</td>
<td>3.33</td>
<td>3.69</td>
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<td>3.37</td>
<td>2.07</td>
<td>3.11</td>
<td>2.66</td>
<td>3.11</td>
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<tr>
<td>Prescribing Off Formulary &amp; Predefined Prescriptions</td>
<td>2.71</td>
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<td>1.79</td>
<td>1.99</td>
<td>2.49</td>
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<td>3.11</td>
<td>2.66</td>
<td>3.11</td>
<td>2.66</td>
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<td>Pharmacy Verification</td>
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<td>1.12</td>
<td>1.83</td>
<td>2.25</td>
<td>1.80</td>
<td>1.57</td>
<td>0.91</td>
<td>2.00</td>
<td>1.20</td>
<td>2.00</td>
<td>1.20</td>
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<tr>
<td>Additional Prescribing Functionality</td>
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<td>4.28</td>
<td>2.88</td>
<td>4.28</td>
<td>2.88</td>
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<tr>
<td>Administration</td>
<td>4.22</td>
<td>4.44</td>
<td>2.53</td>
<td>2.78</td>
<td>3.77</td>
<td>5.18</td>
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<td>4.74</td>
<td>2.12</td>
<td>4.74</td>
<td>2.12</td>
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<tr>
<td>Discharge Prescribing</td>
<td>3.35</td>
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<td>2.26</td>
<td>4.45</td>
<td>1.30</td>
<td>4.45</td>
<td>1.30</td>
</tr>
</tbody>
</table>

2. **Front Line Clinical Impressions**
   - Overall Impressions | 2.87 | 8.88 | 1.32 | 0.49 | 1.82 | 6.68 | 4.62 | 6.28 | 9.50 | 5.90 | 0.72 |

3. **Functionality**
   - Functional Spec Conformance | 3.28 | 5.32 | 4.63 | 1.88 | 4.62 | 5.57 | 5.98 | 4.64 | 4.24 | 4.64 |

4. **User Interface Review**
   - User Interface Review | 14.10 | 11.52 | 9.05 | 8.41 | 10.94 | 11.16 | 11.62 | 11.49 | 11.29 | 8.14 |

5. **System Technical Specifications**
   - Conformance to CSH standards | 3.65 | 3.65 | 2.29 | 2.26 | 1.57 | 5.36 | 2.26 | 2.17 | 2.96 | 4.04 |
   - Use of 3rd Party Information | 2.61 | 0.39 | 1.70 | 2.86 | 2.81 | 4.61 | 1.70 | 3.00 | 3.00 | 2.80 |
   - System Platform | 1.76 | 2.28 | 2.50 | 2.29 | 2.33 | 2.33 | 2.16 | 1.60 | 2.47 |

Sub Total = 100 52.53 62.16 37.38 32.81 50.11 60.08 56.97 58.82 22.61 60.88 41.78

6. **Long Term Partnership**
   - Support and Development | 2.50 | 3.12 | 2.70 | 2.74 | 3.20 | 10.29 | 9.04 | 8.39 | 1.72 | 3.60 |
   - Live Site Reference Visits | 11.30 | 7.65 | 3.80 | 6.15 | 8.00 | 1.72 | 3.60 |

**KEY:** * Scored by NHS staff; ** Score by suppliers; *** Filetek / MEDITECH live site reference visit took place at a site with a version 5.4 system, # US Site
National standards

EPS 2  Electronic prescriptions service 2
DM&D  Dictionary of medicines and devices
CUI   Common User Interface

Why?
Safety
But, perfection v. good enough
For more information:

http://www.connectingforhealth.nhs.uk/systemsandservices/eprescribing