Experience of electronic prescribing in UK hospitals: a perspective from pharmacy staff

By Reena Mehta and Raliat Onatade

Abstract

Aim
To describe the experiences of pharmacy staff with inpatient electronic prescribing (EP) systems.

Design
Telephone interview via a semi-structured questionnaire.

Subjects and settings
Pharmacy departments in UK NHS hospitals

Outcome measures
System features, changes to pharmacy services before and after introduction of EP, perceived advantages and disadvantages for staff and working practices and desired developments.

Results
Three different systems were in use in the seven hospitals contacted. Electronic prescribing was used in most inpatient wards, excluding high dependency wards. All systems had clinical decision support, usually maintained by pharmacy. Some interviewees said there had been changes to pharmacy services after implementation, such as the way medicines were ordered, methods of stock control and clinical roles and responsibilities. Overall, electronic prescribing was seen as a benefit. Many tasks were identified as easier and more advantages were seen than disadvantages. Desired future developments mentioned were to use full clinical decision support, to add a formulary and to make documentation of allergy status mandatory. All interviewees felt that adequate training was important.

Conclusion
EP affects how pharmacy services are delivered. It needs considerable change and a multidisciplinary approach. This study highlights issues that need to be considered for successful implementation of EP.
in the final analysis.

Identification of hospitals

Hospitals that had implemented EP were identified from the literature search and anecdotally. Only those using EP for all or most of their inpatient prescribing were included.

Interviews

Each pharmacy department was telephoned and asked to identify the appropriate person to contact. This person was then sent both a letter and an e-mail explaining the aims of the study and inviting them to participate. Some respondents asked to see the questionnaire. MS Excel 2000 was used to arrange the data. Data were collected and notes were taken contemporaneously.

Data analysis

Each recording was reviewed and missing information from interview notes added. All information was reported anonymously, with no identification of hospitals. Quantitative and qualitative data were analysed according to the themes in the questionnaire. MS Excel 2000 was used to arrange the data. Pilot data were not included in the final analysis.

Results

Seven UK hospitals in different trusts were identified. Two were teaching hospitals. All agreed to be involved. All the staff interviewed were pharmacists who worked as part of the clinical service or were involved in the support or design of the EP system in their hospital.

Three hospitals used the Meditech system, two used the TDS 7000 system and two used the JAC system. The number of years that EP was used ranged from three to 16 years. All systems were commercially available.

Implementation of electronic prescribing

EP was used mainly for inpatients. Inpatient areas where it was commonly not used were intensive care, the high dependency unit, accident and emergency, and paediatrics.

Three hospitals stated that EP was piloted before roll-out to other areas. In each case, piloting took place on one ward. The pilot wards used varied from surgical wards, where there was a high turnover of both uncomplicated and complex cases with different clinical conditions, to orthopaedic wards, where the turnover was low. This is important as the software can be assessed for safety and stability at different levels.

Four hospitals mentioned that if they were to repeat the implementation process they would give more staff training beforehand. In only one hospital was a change made to pharmacy practice before the roll-out of EP. This involved making the technicians’ roles more ward-based.

Prescribing systems and processes

Five hospitals electronically recorded medicines in real time and the other two hospitals recorded the administration on paper and then added the information to the electronic system retrospectively. H ospitals that recorded the administration on paper first did not find this a problem, but accepted that it was not ideal.

In all hospitals doctors entered the prescription orders on to the system. One hospital also had pharmacists regularly entering prescribers’ orders. This hospital also had plans to give pharmacists primary responsibility for entering medicines orders in the near future. All except one hospital allowed full access to pharmacists to alter the drug regimens. The hospital that gave pharmacists no prescribing access was in the process of reviewing this.

Allergy documentation before a doctor could prescribe was mandatory at only one hospital. Three hospital systems had the option to select the allergy from a list. Two hospitals could free-text the allergy and two hospitals had both these options. Some hospitals, although they had the same EP system, recorded allergies in different ways.

Only one hospital prescribed all medicines on the system. Six hospitals still required the use of paper charts for prescribing care, such as insulin sliding scales, intravenous fluids, blood products, anticoagulants and medicines administered by continuous infusion. In four out of six hospitals it was possible to enter the drug and time of administration on the system, but still use paper charts for documenting doses prescribed and administered. In four hospitals, total parenteral nutrition (TPN) and parenteral chemotherapy were also prescribed on paper.

Two hospitals used a system with the option to restrict the choice of drugs that could be selected by the prescriber. The availability of products for prescribing was managed by pharmacy and introduced a level of formulary control. This was helped by the EP system being linked to the pharmacy stock system. The type of clinical decision support (CDS) available to prescribers varied (see Table 1).

In six of the hospitals the CDS was maintained by pharmacy. Two hospitals had an advanced prescribing system, which integrated treatment protocols and order sets.

Three hospitals used the EP system for pharmacists to communicate with other staff and document their contributions to the care of the patient. Two of these hospitals also used their systems to monitor clinical pharmacy activity by reviewing recorded information.

The pharmacy service

Since the implementation of EP, five sites had changed pharmacy service delivery. For example, more prescription screening was done from pharmacy. Pharmacists identified the need for stock and dispensed items at ward level, and pharmacists had more clinical input on the wards, by attending more ward rounds.

Five hospitals stated that the time pharmacists spent on the ward had not changed. At three of the hospitals the pharmacy staff were able to carry out more clinical activities without increasing the amount of time spent at ward level. In one of the two hospitals where time spent had changed, staff spent less time on wards and in the other the interviewee said that changes had varied with individuals.

Pharmacists at four hospitals visited all the patients daily whether they had a wireless or a fixed device system. At one hospital the charts were printed off and pharmacists carried these as they reviewed patients at the bedside. At the other three hospitals pharmacists only saw patients if queries about their prescriptions had been previously identified. Hospitals where pharmacists did not see their patients daily did not see this as a problem, as it allowed pharmacists to extend their clinical role by, for example, attending ward rounds if pharmacists were short staffed. Medicines prescribed could be reviewed from computer screens based in the dispensary. However, it was highlighted that remote screening of prescriptions reduced the contact time with patients, denying them the opportunity to ask questions or to be given expert advice on their medicines.

One of the EP systems needed pharmacy staff to endorse the drugs for supply. In four of the systems the computer was programmed to identify stock drugs. All the systems enabled pharmacy staff to indicate to the nurse whether the patient had their own medicines (patients’ own drugs — PODs) with them.

In six hospitals orders for non-stock medicines were sent direct to the pharmacy electronically, in some cases at the point of prescribing. In four hospitals, a label was generated automatically, which would be used for dispensing in pharmacy. One hospital mentioned that technicians’ roles in the dispensary may become “devalued” if they are only dispensing against electronically generated labels.
Six hospitals found that EP had an impact on the dispensary. All found that prescriptions for discharge medication (to take away—TTAs) and inpatient items had quicker turnaround times as they were sent to the pharmacy electronically. Three hospitals indicated that the pharmacy workload had increased. The number of staff had generally not changed in hospitals after implementation of EP. In most cases only one extra staff member (pharmacist, technician or system manager) was needed to help implement and support the system.

### Perceived advantages and disadvantages

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<th>Advantages</th>
<th>Disadvantages</th>
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<td>Legible and complete prescriptions</td>
<td>Doctors become less knowledgeable of drug doses if default doses in place</td>
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<td>Ability to identify prescriber easily</td>
<td>Some tasks take longer, such as editing orders, tracking additional paper charts</td>
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<td>Easy to see and amend prescriptions, eg, in the dispensary, another ward, another hospital, another ward, another hospital within the trust</td>
<td>Expectation from doctors that pharmacy will amend orders if prescribed incorrectly</td>
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<td>Formulary control</td>
<td>Patients do not have access to their drug chart, so do not know what they are taking, making it harder to counsel on discharge</td>
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<td>Electronic systems can ensure this information is always present on the prescription at the point of drug prescribing and administration. Where allergy completion is mandatory and CDS exists, the allergy alert feature will alert the prescriber if the patient is allergic to any of the drugs prescribed, allowing them to reconsider their choice. However, organisations should also remember that using CDS in this way may not be reliable if free text is allowed, because drug entries may be misspelt or not recognised by the system.</td>
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Recalling pharmacists’ communications and contributions is not easily done with paper records. EP was found to facilitate this through the use of electronic audit trails. Audit trails are portrayed in the literature as a significant benefit of EP as they ensure that everyone involved in the medicines process can be identified, from the doctor who prescribed, the pharmacist who clinically checked the prescription right up to the nurse who administered it.24,25

**The pharmacy service** It is widely believed that clinical pharmacists in hospitals that have EP spend more of their time on clinical duties and less time on stock control and record keeping, compared to other UK hospitals.26 Franklin et al.26 report on the introduction of EP on one ward supports this.24 Although this has not been fully borne out by our study, the facility to view prescriptions from any terminal has enabled pharmacists to target patients who may need more pharmacy input, without having to visit the ward first. This may save time and can be especially useful when there are staffing shortages. However, there may be an issue of reduced patient contact. By not reviewing drugs still prescribed on paper charts or not checking patients’ vital signs daily there is the potential for important clinical information to be overlooked. In one of the hospitals surveyed, all patient observations were recorded on the electronic patient record, so this was less of an issue. However, the value of pharmacists speaking to patients should not be ignored. For example, a patient may have questions to ask, information about prescribed or unprescribed medication or adherence issues.

Endorsing drug charts for safety and supply is a key role for pharmacy staff. In some cases, the systems could differentiate stock from non-stock items, and an order electronically generated. However, Foot and Taylor encountered problems with their system not recognising that stock medicines were not sent with the patient when they were transferred to another ward. This could result in patients missing doses of important medicines.27 Electronic transmission of orders may have unexpected consequences. Dispensing may be quicker, especially if a label is generated automatically. However, pharmacists may have to spend more time on the ward when carrying out the clinical screen because, during that process, they ensure that the wording on the label that will be generated once the prescription is confirmed is accurate and unambiguous.

**Advantages and disadvantages** Most of the advantages described by respondents were similar to those mentioned in published work in the UK (14–20) and in the U.S.24 All interviewees cited legible prescriptions as an advantage. A number of studies have indicated that the ability to read handwritten inpatient prescriptions in the UK hospitals is poor. One study found that 4–10 per cent of U.K. hospital prescriptions were illegible or ambiguous and 11–26 per cent had incorrectly written doses.28 Many of the reported disadvantages of EP seem to be associated with the way people work as opposed to the system.

**Conclusion** In the opinion of the interviewees, EP has had a positive impact on their pharmacies. The system and processes present challenges and opportunities to staff. The way pharmacists carry out their tasks of reviewing medication has required them to adapt to the system and roles may need to be redefined to ensure optimal medicines management. EP can also result in re-evaluation of technician roles to a more patient-oriented focus.

To make the change from a manual system to EP, hospitals should share good practice to develop safe systems. For EP to be successful, a multi-disciplinary approach needs to be taken and pharmacists should be part of that structure. It is important to address possible barriers such as training for hospital staff to accept the system and maximise benefit.

A C K N O W L E D G E M E N T S T h a n k s t o T o n y D i l k s, p r e v i o u s l y e l e c t r o n i c p r e s c r i b i n g p h a r m a c i s t a n d G i l l i a n C a v e l l, d e p u t y d i r e c t o r o f p h a r m a c y, m e d i c a t i o n s a f e t y, K i n g ’ s C o l l e g e H o s p i t a l, f o r t h e i r v a l u a b l e i n p u t. W e a r e a l s o g r a t e f u l t o t h e h o s p i t a l s t h a t p a r t i c i p a t e d. N o s p o n s o r s h i p w a s r e q u i r e d f o r t h i s s t u d y.

**Limitations** Ours was a small survey, because the method only identified hospitals that had published information, or were high-profile EP users. N.H.S hospitals with a low profile will not have been identified. Bias may also have been introduced by not including hospitals that had tried EP, but had been unsuccessful at implementing it, and by including the views of only one person from each hospital. However, since many of the themes were common across all hospitals, it is unlikely that these limitations have affected the relevance of the findings for other trusts.

**References**


