

ELECTRONIC PRESCRIBING

— administration and pharmacy specification for NHS trusts

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There are less than four years to go before the implementation of electronic patient records. Where do the problems and pitfalls lie? This article gives timely advice on what hospital pharmacists can do now to ensure the smooth introduction of EPR

The Government White Paper, "Information for Health"¹ sets targets for the implementation of an electronic patient record (EPR) within the NHS. The paper sets targets of 35 per cent of all acute hospitals to have implemented Level 3 EPR by the end of 2002, and 100 per cent by 2005. Panel 1 shows what is included in level 3 EPR, and Table 1 (p103) summarises the six levels of EPR.

Experience of electronic prescribing within the hospital service is limited. This, together with the need to meet Government targets, has left many trusts considering what functionality they require from such a system, and how it would work within their own hospital environment. The first step in procuring any system is usually to write an appropriate specification. The lack of experience in this area serves to make this task more difficult. Additionally, this process is being repeated at many sites in England, Scotland and Wales. The specification outlined in this article was written as a response to these difficulties.² It draws on the experience and skills of numerous individuals across the UK who have had experience of, or an interest in electronic prescribing within NHS hospitals.

The aim of the specification is to provide a basic specification document, freely available to all trusts. It does not claim to be definitive but provides a basic outline document, based upon experience and the expertise of those who contributed. It is written in a modular format, allowing users to dip in and select whichever sections they feel are appropriate to their needs. The contributors recognised

that pharmacy, electronic prescribing and drug administration systems are closely linked, the drug file being central to each of these modules. The specification therefore covers each of these areas.

It is hoped that the pooling of skills, resources and experience to consolidate the work done in this area to date, by a few individuals, will be of great benefit to all trusts. All contributors to this document are listed in Panel 2 (p104). Their expertise and willingness to share their experience is gratefully acknowledged.

The specification begins by examining the current situation within hospital pharmacies. This is generally centred on a supply and demand cycle with clinical input occurring most frequently after the event, ie, intervention after the prescription is written. The advent of electronic prescribing should shift this balance with a substantial number of potential problems being dealt with at the point of prescribing via decision support tools and knowledge bases.

THE EPR

The role of the EPR is examined, as is its place within the overall electronic health record (EHR). The definitions of electronic patient records and electronic health records, taken from "Information for health: an information strategy for the modern NHS 1998–2005"³ are as follows: the EPR describes the record of periodic care provided mainly by one institution. Typically, this will relate to the health care provided to a patient by an acute hospital. Other health care providers, such as specialist units or mental health NHS trusts, may also hold EPRs.

The term electronic health record is used to describe the concept of a longitudinal record of patients' health and health care from cradle to grave. It combines both the information about patient contacts with primary health care as well as subsets of information associated with the outcomes of periodic care held in the EPRs. Put simply, a patient may attend hospital X and will have an EPR, held at that hospital, relating to

Panel 1: What is included in level 3 EPR

- 1 Patient identifiers and personal data (NHS number, weight, height, age and sex)
- 1 Electronic signatures
- 1 Electronic prescribing:
 - a computer-based system to support and influence the prescribing and administration of drugs and appliances by clinical staff, including nurses
- 1 Integrated care pathways:
 - "An Integrated Care Pathway determines locally agreed multidisciplinary practice based on guidelines and evidence where available for a specific patient/client group. It forms all or part of the clinical record, documents the care given and facilitates the evaluation of outcomes for continuous quality improvement" (National Pathways Association 1998)
- 1 Order communications:
 - computer systems that assist the ordering of investigations and services by clinicians
- 1 Results reporting:
 - electronic results reporting systems (RR) support the viewing of laboratory test results, imaging reports and other patient data from investigational and service departments

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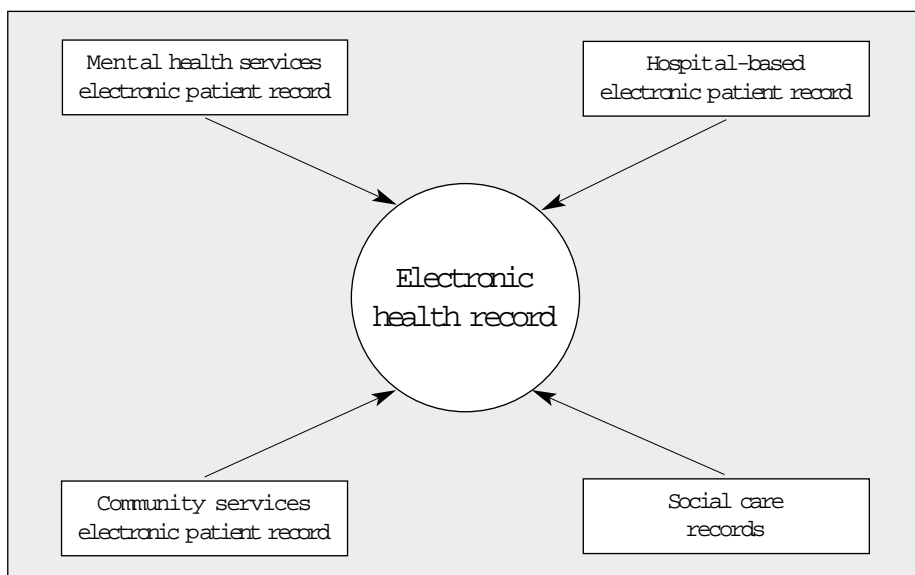


Figure 1: Diagrammatic representation of the relationship between the EPR and EHR

that period of care. The same patient may move house and be treated at a subsequent time at a different hospital, where a different EPR relating to this new period of care will be held at the second hospital. The EPR records held at each hospital are distinct but details relating to each period of care will be fed in to the patients overall EHR. The relationship between the two is illustrated in Figure 1.

The EPR should be fully integrated into all modules of the system, which must allow electronic prescribing of drugs and products by clinical staff, wherever clinical staff are working. It must at all times provide the most recent information about a patient's condition and treatment. The specification recognises the need for a single common patient identifier across the system, with emergency provision for patients without an NHS number. It stresses the need for seamless access to patient details, allergies, sensitivities, pathology results and pharmaceutical care records. The link between prescribing and supply is emphasised to ensure that drugs may be dispensed, labels produced and stock adjusted without the need for re-entry of

data.

FUNCTIONALITY

Drug selection must be based upon a hospital formulary. The drug file must facilitate prescribing across the health care interfaces, where drug identification codes and naming conventions are not yet standardised. As such, the drug database should be based upon one which already exists, and which is standardised, reputable and regularly updated. As there is as yet no universally accepted comprehensive drug database, the specification suggests the incorporation of the United Kingdom standard clinical product reference source (UKCPRS) and systematical nomenclature of human and veterinary medicine (SNOMED) coding structures, linked to the British national formulary. The choice of coding structure is critical as it is this that will facilitate the incorporation of third party decision support software, the interpretation of data across internal local and national boundaries, and maximise the reporting capabilities of the system.

The specification incorporates both

FP(10)HP and one-stop dispensing functionality and also recognises the move towards patients' own administration and the re-use of patients' own medication during an inpatient stay.

Specialist functions are also included within the specification, eg, prescribing of cytotoxics, TPNs, CIVAS and for paediatric patients. These were recognised as areas of weakness within currently available systems resulting in trusts sometimes having to procure separate systems to fulfil these services. Often, these separate systems did not integrate/interface with the hospital information support system (HISS), losing clinical and reporting benefits, and resulting in an incomplete EPR.

Correct identification of the patient, before the recording of administration of medication is considered of paramount importance. Suppliers are invited to describe fully any innovative technology which they may use to achieve this. The use of bar-coded patient wrist bands and bar-coded medication labels are suggested as an example.

The specification includes the ability to function on different types of hardware via different solutions eg, radio frequency/infrared, hand-held devices, notebooks and desktop computers. The importance of data back-ups and the provision of a fall-back facility in the event of a disaster are included, as well as the provision of a secure service. The use of biometric identification (eg, finger print recognition) is encouraged.

IMPLEMENTATION

A companion document to the specification is available, currently in draft form, which examines the implementation process.³ Once the initial procurement phase has been completed, the implementation of electronic prescribing has far-reaching consequences throughout the entire hospital. This document is written to guard against those trusts about to embark on an implementation experiencing the same pitfalls encountered by the pioneering trusts which have already implemented such a system. Heavy emphasis is placed on the huge cultural change not only for ward staff but also within the pharmacy department itself. Full consultation with all staff who will either use it or be affected by it is essential. The requirements for a successful implementation are summed up in the following phrase:

"Implementation must progress at a reasonable pace in relation to the flow of resources and the scale and complexity of the technical, cultural and management challenges that will be found."

Initially, this document looks at the barriers to a successful implementation. Among these are the difficulties associated with the local customisation of US-based solutions and the lack of a unified drug code dictionary in the UK. US solutions have the

Table 1: The electronic patient record (EPR)

EPR level	Functionality	Detailed functionality
Level 1	Clinical administration	Patient administration and independent departmental systems
Level 2	Integrated clinical diagnosis and treatment support	Integrated master patient index, departmental systems
Level 3	Clinical activity support	Electronic, clinical orders, results reporting, prescribing, multi-professional care pathways
Level 4	Clinical knowledge and decision support	Electronic access to knowledge bases, embedded guidelines, rules, electronic alerts, expert system support
Level 5	Specialty specific support	Special clinical modules, document imaging
Level 6	Advanced multimedia and telematics	Telemedicine, other multimedia applications

advantage that they are tried and tested within the American hospital system environment. However, these systems historically have a high degree of local customisation, or have been written with a specific customer in mind.

The lack of a unified drug code dictionary has been mentioned previously. For implementation purposes, a means of achieving real-time clinical decision support must be demonstrated, allowing appropriate clinical data to be updated from a reputable source at regular intervals.

Readers are cautioned about underestimating the time needed to undergo a full procurement and implementation process. A diagrammatic hypothetical six-year project plan is included following the process from procurement to achieving EPR Level 6 (including EPR and shared EHR available across the community, and EPR integration with video and speech, clinical images, document images and monitoring devices, eg, ECGs).

A further factor singled out as particularly important to a successful implementation is training. This is linked with a possible lack of resources. However, inadequate or inappropriate training will have a serious impact on the progress of the project.

The document suggests a minimum of one device for every five patients and one for each clinic. A device may be, for example, a computer, notebook or hand-held device. Devices may access the system via a combination of different access points, eg, nurses' station or mobile terminals. It is crucial that the hospital infrastructure is capable of supporting these requirements.

PROJECT MANAGEMENT

Successful implementation of electronic prescribing requires good project management skills. It is suggested that a project methodology such as the Prince2 is used to achieve this aim. Key ingredients to successful project management of this kind are the division of the process into manageable stages, the identification of risks, regular reviews, control of any deviation from the project plan, the right resources being available at the right time and place, and good communication throughout the whole organisation. It is essential that the correct individuals be assembled as part of the project team to both manage and implement the project.

A sample project team would include:-

- 1 Project manager
- 1 Deputy project manager
- 1 Project administrator
- 1 Project clinician

Panel 2: List of contributors

Name	Position	Address
David Anderson	Chief pharmacist	St Peter's Hospital, Chertsey
Joyce Bould	Pharmacy IT systems manager	Royal Hampshire County Hospital Winchester
Janice Cameron	Principal pharmacist	Warrington Hospital
David Cousins	Chief pharmacist	Derbyshire Royal Infirmary, Derby
Dave Evans	Technical adviser	Liverpool Health Authority
John Farrell	Principal pharmacist	Department of Health, London
Jane Fender	Prescribing pharmacist	Royal Free Hospital, London
Nick Ford	Principal pharmacist	Queen's Hospital, Burton-on-Trent
Peter Fox	Deputy chief pharmacist	Derbyshire Royal Infirmary, Derby
Dr Peter Gorman	Consultant	Derbyshire Royal Infirmary, Derby
Christine Gowers	Information facilitator	Royal Free Hospital, London
Tom Gray	Principal pharmacist, clinical services	Derbyshire Royal Infirmary, Derby
Steve May	Senior clinical pharmacist for medicines information	Queen's Medical Centre, Nottingham
Duane McLean	Electronic prescribing pharmacist	Derbyshire Royal Infirmary, Derby
Peter Minty	EPR project manager	Derbyshire Royal Infirmary, Derby
Graham Moule	Marketing manager	JAC Computer Services Ltd, Basildon
Malcolm Partridge	Chief pharmacist	Queen's Medical Centre, Nottingham
Chandar Prashar	Direct care policy manager	Department of Health, Leeds
Steve Reggione	Customer services administrator	JAC Computer Services Ltd, Basildon
Ann Slee	Principal pharmacist	Wirral Hospital
James Snell	Principal pharmacist (EPA)	Ayr Hospital
Martin Spotswood	Senior EPR business analyst	Lancaster Royal Infirmary
Vic Standing	Regional pharmaceutical adviser	Liverpool Health Authority/NHS(E)NW
Heather Swanson	Clinical systems manager	Derbyshire Royal Infirmary, Derby
Paul Thompson	Formulary pharmacist	Royal Hampshire County Hospital, Winchester
Julian Tysoe	Pharmacy systems development manager	University College London Hospitals NHS Trust
Debra Walker	Pharmacy computer services manager	Liverpool Health Authority
Will Wilson	Principal pharmacist, information and supply	Addenbrooke's Hospital, Cambridge

- 1 Pharmacy representative
- 1 Trainer(s)
- 1 Contractor
- 1 Two members of staff from each department/clinical area:
 - Clerical officer, eg, ward receptionist
 - Doctor — one senior and one more junior
 - Information technology
 - Nurse
 - Pharmacy
 - Therapies
 - Finance/NHS supplies

It is essential that proper planning is undertaken before embarking on such a major project. There is a danger of people falling over themselves to achieve targets set by the project management. Unrealistic targets will affect both quality and turnover.

CONCLUSION

The two documents described in this article together provide a valuable resource for trusts wishing to move towards

the Government EPR and EHR targets. They do not provide all the answers but rather inform readers of potential pitfalls, and provide guidance on an area, which is still lacking in experience within the UK.

REFERENCES

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