12

Primary and secondary care systems

Introduction

The use of IT in both the primary and the secondary care sectors of pharmacy has until recently centred on the supply function of pharmacists, and as such is not clinically based. Although both hospital and community pharmacy systems have the facility to record information on the patient's medication record, this is only a byproduct of the dispensing process, i.e. the supply function. In hospitals, the supply of drugs is very different from that in the community. Many drugs in hospital are supplied in bulk to the ward rather than on an individual basis, as is the case in community pharmacy. This difference is reflected in the fact that the IT systems used in hospitals are generally not the same as those used in community pharmacies. The role of pharmacists in both primary and secondary care is changing and becoming more clinically oriented and focused. To carry out this role pharmacists require access to a patient's medical history and laboratory results. Much of this information is available in the paper notes or in many disparate computer systems, but can be time-consuming to obtain and requires access to GP systems and notes. One of the government's key programmes is the National Programme for Information Technology (NPfIT) (www.npfit.nhs.uk), which consists of many separate projects and will enable new ways of working by utilising the benefits of IT. The programme has been rebranded as Connecting for Health (www.connectingforhealth.nhs.uk). Some of the projects that are significant to pharmacy are the new National Network, the electronic transmission of prescriptions (ETP) and the NHS Care Records Service. The National Network, which is also referred to as N3, is a technical infrastructure project and will provide fast broadband network services that will be required by many of the other projects of NPfIT. The ETP project will be a new service that will transfer prescriptions electronically from GP systems to community pharmacy systems and on to the PPA for payment, and can be seen as an extension of the supply function of the pharmacist. The NHS Care Records Service, in contrast, is a project that will give healthcare professionals access to patient information where and when it is needed. A summary of care and clinical history will be held on

a national database known as the 'spine', so that important patient information is always accessible and available. In view of the fact that the role of pharmacists is changing and becoming clinically focused it is essential that they have access to the information on the spine. It is important that pharmacists are aware of how and when they will access this information, and the implications for their current and future practices. The computer systems of the future need to be designed around the new working practices and business processes pharmacists will provide in their changing role.

Another important enabling technology is the Dictionary of Medicines and Devices (dm+d). The computer systems currently in use use different coding systems to describe and identify medicines and drugs. These different systems have been created to fulfil a specific requirement for the different functions carried out. For example, hospital and community pharmacies use the PIP code system (among others, such as LINK and PROSPER) to order drugs, while using other codes and descriptions to dispense the drugs. Clinical information systems use still different codes and descriptions, such as Read codes. This is significant when trying to integrate disparate computer systems, especially when exchange of data is required. Although it is possible to produce maps from one coding system to another there is the potential for mapping errors. Improving patient safety is at the heart of all the NHS IT initiatives, and the National Patient Safety Agency (NPSA) (www.npsa.nhs.uk) has emphasised the importance of designing systems that prevent harm. With all these issues in mind the NHS Information Authority commissioned a programme called the United Kingdom Clinical Products Reference System (UKCPRS) to create a coding system for medical products and devices which would address all the above issues and be used by all computer systems used in the NHS. The coding system has had various names throughout its development and is now known as the Dictionary of Medicines and Devices (dm+d). Essentially, the dm+d provides a database of unique codes for each medicine and device along with an unambiguous textual description. Both the ETP and the NHCRS projects, which are part of the NPfIT (Connecting for Health) programme, mandate that the dm+d will be used as the method of coding drugs. In hospitals the pharmacy computer systems and the electronic prescribing systems being developed will also need to ensure that they use the dm+d as the method for displaying and coding drugs, so that they will be compatible with the NHS systems being developed. It can be seen from the above that the dm+d is a key enabling technology for many future IT computer projects.

Hospital and community systems

Although some of the requirements of hospital and community IT systems are the same, e.g. the labelling of dispensed medicines, the majority of the requirements are totally different. This is reflected in the fact that the business processes operating in hospital and community are completely different. Whereas community pharmacies for the most part have only one dispensary and one pharmacist, in contrast, hospitals have multiple dispensaries, a main pharmacy store and many pharmacists and technicians. This means that the systems developed and used in community pharmacies are very rarely used in hospitals, and vice versa. In hospitals, the systems need to be able to cope with the variable number of dispensaries and stores and the movement of stock between them. Whereas at present community pharmacy is fundamentally about dispensing drugs to individuals, hospitals dispense drugs to individual patients and also issue a substantial amount to wards to top up the ward drugs cupboard. In the past many hospitals have tried to implement pharmacy software developed for the American market, with little success. In America the business processes used in hospitals are totally different from those used in the UK. This highlights the fundamental requirement that computer systems must be designed to work with the business processes and not the other way round.

In hospitals, pharmacy is only one aspect of the overall service provided to patients. There are many other departments which have IT systems to assist in the management of patients, such as medical records, pathology and radiology, to name but a few. The business processes of all these departments overlap at some point, making a hospital one of the most complex organisations that exist. This means the hospital computer systems must be designed to meet the specific requirements of each department, but also to satisfy the overall objectives of the hospital in the treatment of patients. There have been many initiatives in hospitals attempting to produce computer systems that cover the majority of departments, with varying degrees of success. These systems have had various names, depending on the thinking at the time, such as resource management, hospital information support system (HISS) and electronic patient record system. The requirements specification for a complete hospital information system can run into many hundreds of pages and the cost many millions of pounds, reflecting the functionality that needs to be provided if the majority of disciplines are to be covered. These types of system tend to be provided by a single supplier, where the applications to support each department are tightly integrated and work with

a central database. At the heart of these systems is the electronic patient record (EPR), which seeks to cover a patient's treatment by any department in the hospital. Many hospitals have chosen to try to create an EPR by interfacing the existing (sometimes referred to as legacy) departmental systems. This approach requires interfaces to be built which transfer the relevant information from one system to another. Many hospital pharmacy systems are interfaced to the hospital patient administration system, which provides the basic demographic information about a patient, such as hospital record number, name and address. The majority of hospital departmental systems require access to the patient's demographic information. Usually the departmental systems are provided by different suppliers, and each will store the demographic data in its own database, meaning that there are multiple copies of the same or similar information. This not only results in duplicated effort in collecting and recording this information, but also goes against the fundamental principle of holding data once wherever possible; otherwise, when this information changes, it will have to be changed in every system and becomes very difficult to manage. This highlights the difference between systems that are integrated as opposed to those that are interfaced. Integrated systems will actually store the data only once, and it can be used by all departmental systems. When the information is changed as a result of contact with one department all departments accessing the integrated record will be using the current, up-to-date information. Interfaced systems, on the other hand, will store the same information on their separate databases. Any updates will need to be sent through an electronic interface to all the other systems, which is not always practical, bearing in mind the complexity and cost of an interface between two systems. It is therefore usual to nominate one of the systems as a 'master' (usually the patient administration system) and build interfaces to this system.

The electronic patient record is one of the most important developments to affect both the hospital and the community pharmacy sectors in the future and is encompassed in the National Program for Information Technology (NPfIT; www.npfit.nhs.uk). Also known as Connecting for Health (www.connectingforhealth.nhs.uk) this program has many different projects and the government has set aside £2.3 billion over the next 3 years to fund it. One of the key projects is the NHS Care Records Service, whose main aim is to provide a central electronic record of a patient's medical care that can be accessed by healthcare professionals. An individual is likely to be treated by a variety of care professionals in a range of locations throughout their life. The

NHS Care Record is a means of ensuring that the details of their care and treatment are held in a single, easily accessible electronic record. Initially this will hold patient demographic information based on a single unique number allocated to the patient, i.e. their NHS number, and eventually their health and care history. This project has many implications with regard to the way information is recorded, and there are many smaller projects that will address these issues. One of the most important aspects is the confidentiality of the patient record and the control of access to specific parts of the record. Each healthcare professional will need to be accredited with the service before they will be allowed to access a patient's record. These projects will have significant impact on pharmacy and the way in which IT systems are developed and used in the future.

One of the most important projects as far as pharmacy is concerned is the Dictionary of Medicines and Devices (dm+d; www.dmd.nhs.uk). The objective of this project is to provide a unique unambiguous identifier and associated textual description for medicines and medical devices, and it was instigated to address the problem of many different coding systems for identifying drugs. Electronic systems need to use codes rather than textual descriptions to reference drugs, and the dm+d will do this. This is one of the prime reasons why the NPfIT has mandated that the dm+d will be used as the prime reference to drugs recorded in the NHS Care Records service. The dm+d will also be used in the Electronic Transmission of Prescriptions project, which is one of the key projects in the NPfIT. This project will allow GPs to transmit prescriptions to community pharmacies electronically.

It is clear that many of the initiatives and projects of the NPfIT are interrelated and will have a big impact on the future of pharmacy.

Enabling technologies for NPfIT (Connecting for Health)

As mentioned in the introduction, in order to produce a coherent system there must be enabling work allowing data to be shared in a consistent and coherent way. Two projects that will enable the data to be exchanged and shared efficiently are the N3 and the dm+d. N3 is essentially a secure network of connections between the different computers with the capacity to cope with the volumes of data that will be transferred.

Dictionary of Medicines and Devices (dm+d)

The dm+d (www.dm+d.nhs.uk) is a dictionary containing unique identifiers and associated textual descriptions for medicines and medical

devices. It has been developed for use throughout the NHS (in hospitals, primary care and the community) as a means of uniquely identifying the specific medicines or devices used in the diagnosis or treatment of patients.

The dm+d is part of the United Kingdom Clinical Products Reference Source (UKCPRS) project instigated by the NHS Information Authority (NHSIA) in 1999. The objective of the project was to bring together the initiatives associated with the coding of drugs in electronic systems. Initially there was an urgent need for a primary care drug dictionary (PCDD) to support the GP primary care prescribing system Prodigy (an NHS-sponsored knowledge management system). Later it was used to re-engineer the Prescription Pricing Authority's (PPA) in-house systems and will be used to underpin the electronic transmission of prescriptions (ETP). Although the PCDD meets the requirements of primary care it does not meet those for secondary care and medical devices. Phase 2 of the UKCPRS project was to develop dictionaries for secondary care (Secondary Care Drug Dictionary; SCDD) and medical devices (Medical Devices Dictionary; MDD). The PCDD model was assessed for its applicability to these two dictionaries and found to be acceptable with relatively minor modifications. A reconciliation process resulted in a harmonised model that meets the need of all sectors of pharmacy and resulted in the complete UKCPRS dictionary. The complete dictionary was renamed the Dictionary of Medicines and Devices (dm+d).

The dm+d will be used in the NHS Care Records service as the NHS standard for naming and coding medicines and medical devices. It will enable interoperability between diverse clinical systems by ensuring the safe and reliable exchange of information on medicines and devices, and allow effective decision support. It is anticipated that the dm+d will play a major part in improving patient safety, which will be achieved by the use of consistent textual descriptors and codes for prescribing and dispensing, leading to safer systems (i.e. fewer errors).

The population of the dm+d is nearly complete. The next challenge is to ensure that computer system suppliers adopt the dm+d and incorporate it into their systems. The fact that the NHS Care Records Service and the Electronic Transmission of Prescriptions project have mandated that the dm+d be used should ensure its adoption. The distribution and update of the dm+d is a key issue for all system suppliers, and must be robust and timely if suppliers are to invest in the considerable expense of changing their systems to use it. New drugs will have to be added to the dm+d and distributed to suppliers and then on to end-user systems

well before a drug becomes available for prescribing and dispensing. The maintenance and distribution of the dm+d is no small task, bearing in mind the number of systems that will need to be updated.

N3 – the National Network

One of the core projects of the NPfIT (Connecting for Health) is the replacement of the existing NHSnet. This will be known as N3, the National Network (www.n3.nhs.uk), and will provide sufficient connectivity and broadband capacity to meet the current and future demands of the NHS. The National Network is part of the technical infrastructure which is required to enable other projects, such as the NHS Care Records service and electronic transmission of prescriptions. N3 is a secure wide-area network developed exclusively for the NHS. Only authorised users will be able to access it, to ensure that information, particularly patient records, is secure. Approximately 18 000 NHS locations will be connected to N3. In addition, 12 000 community pharmacists will need to be connected as part of the Electronic Transmission of Prescription project, as N3 will be part of the infrastructure required. The mechanism by which this is achieved has yet to be determined, as no system connected to N3 can also be connected to other networks. Community pharmacies, being businesses, need to connect to other networks in order to carry out their normal business, such as ordering drugs from wholesalers. Pharmacies will also need access to the National Care Records service to view patient records, which will be delivered over N3. The N3 network provides many other services, such as email, access to NHSweb, and access to the internet.

Electronic transmission of prescriptions

Electronic transmission of prescriptions (ETP) (www.npfit.nhs.uk/programmes/etp/) is a term used to describe the process of sending prescriptions electronically from a doctor to a pharmacy. In the UK the ETP project enables prescriptions to be sent electronically to community pharmacies directly from the GP. These prescriptions can then be sent electronically to the Prescription Pricing Authority (PPA), which reimburses the pharmacist for the drugs dispensed.

An ETP pilot was set up and closed at the end of June 2003, having served its intended purpose of proving the feasibility of transmitting prescriptions electronically. It has been demonstrated that ETP is technically viable and could provide a range of benefits, including improved
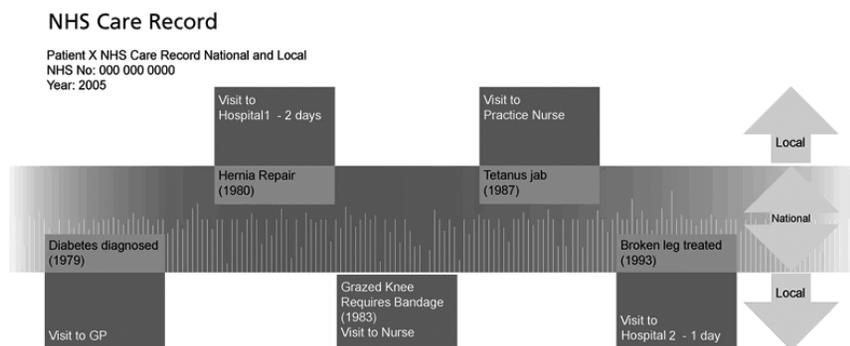
patient choice and safety. ETP is one of the core projects of the NPfIT (Connecting for Health) and will be introduced from the beginning of 2005. The new community pharmacy contract includes money to fund the connection of all community pharmacies to the National Network (N3). The electronic prescription will be sent from the prescribing system, such as a GP practice system, to a central ETP service, which is part of the NHS Care Records Service, and is then available for dispensing. If the patient has nominated a particular pharmacy from which to receive their medication a copy of the prescription is also sent straight to the pharmacy, so that the medicine can be dispensed. If the patient does not nominate a specific pharmacy they will be given an ePrescription token to present at the pharmacy of their choice. It is anticipated that this will look like a normal prescription but with a barcode printed on it containing a unique number. This will then enable the pharmacist to obtain the details of the prescription from the central ETP service so that it can be dispensed. The implementation of ETP by community pharmacies has many implications: for example, the systems will have to be timely, robust, and always available during business hours, otherwise patients may be inconvenienced. In addition, the processes to rectify errors and mistakes will need to be clearly defined if incorrect information is not to be transmitted to other systems, such as the PPA and the NHS Care Records Service. Additional services such as repeat dispensing and electronic reimbursement will be incorporated into the service as it evolves. As can be seen, there is a considerable amount of work to be done before ETP becomes routine in the primary care environment.

NHS Care Records Service

The National Care Records Service (www.npfit.nhs.uk/programmes/nhscrs) is intended to address the current deficiencies related to the sharing of health records which are at present held on a mixture of computer and paper records. At the centre of the system will be a national database of patient records known as the 'spine', which will allow information to be safely shared across the NHS by healthcare professionals. An individual is treated by a variety of healthcare professionals throughout their life and in many different locations. The NHS Care Record is intended to keep the details of care and treatment in a central, easily accessible electronic record. This will store the individual's unique identifier, their NHS number, and demographic details such as address and date of birth. As the patient receives treatment, the record will be updated with that treatment. It will include information that

might affect a patient's future treatment, such as allergies and medical conditions, e.g. diabetes. As the pharmacist's role becomes more clinically oriented they will need access to the patient information held on the 'spine' if they are to carry out their role efficiently. In addition, they will also contribute to the information held on the 'spine', for example medication reviews. The clinical role will mean that the processes related to patient contact will change and result in modifications to the computer systems currently used. It is essential that these changes take into account the bigger picture of the NHS and the pharmacist's evolving role.

The National Care Records Service has been developed because of the complexity in the way that healthcare is delivered. A patient will be seen by many different healthcare professionals in many different locations, but primarily by their GP. They may also be seen by specialists in hospital, and may have other medical events, such as visits to an A&E department, all of whom need access to the patient's medical record in order to give appropriate treatment. In addition, diagnosis and treatment of a patient's conditions is becoming increasingly specialised and can involve organisations and healthcare professionals working in cooperation. For example, medication reviews by pharmacists will require cooperation between them and the GPs. All these organisations and individuals will use computer systems that can access the information on the 'spine'. The GP's computer system, for example, will update the 'spine' with the summary details of any encounters. More in-depth details will be held on the local systems where the care is delivered. This will include detailed personal health information, such as a record of conditions, medications, operations, tests, X-rays, scans and other results. Links to local information will be available from the summary record of the spine (Figure 12.1).

NHS Care Record

Patient X NHS Care Record National and Local
NHS No: 000 000 0000
Year: 2005

Visit to Hospital1 - 2 days

Visit to Practice Nurse

Local

Hernia Repair (1980)

Tetanus jab (1987)

National

Diabetes diagnosed (1979)

Broken leg treated (1993)

Local

Grazed Knee Requires Bandage (1983) Visit to Nurse

Visit to GP

Visit to Hospital 2 - 1 day

Figure 12.1   NHS Care Record (reproduced with the permission of NpfIT).

All computer systems that access the 'spine' will need to be modified so that they are compliant with the NPfIT requirements and standards. GP system suppliers who have been awarded contracts by NPfIT have already begun the process of modifying their systems. There is a considerable amount of development, implementation and training to be done before the NHS Care Records Service will be fully available. The implementation is to split into four phases: phase 1 is due to be completed by the summer of 2005, with phase 4 due for completion in 2010. Implementation plans and details are available on the NPfIT website (www.npfit.nhs.uk) or Connecting for Health (www.connecting forhealth.nhs.uk).