

# INFORMATION TECHNOLOGY IN ACTION

*The inaugural meeting of the Guild of Healthcare Pharmacists Information Technology interest group, was held in Leicester recently. The meeting focused on the development of electronic prescribing systems. Christine Clark reports*

The two most important steps in introducing a computerised prescribing system are to get clinical "buy-in" and to customise the system before it goes live. So said DON HUGHES, chief pharmacist, Countess of Chester Hospital, Chester. "It is essential to get one or two of the consultants really driving the project from the clinical point of view," he said. Mr Hughes had previously worked at the Wirral Hospital, where a computerised prescribing system had been in operation for several years, and is now involved in the implementation of the Meditech system at the Countess of Chester Hospital.

The ideal electronic prescribing system would be fast, flexible and customised to match user requirements. Systems should guide rather than constrain, and should encourage process changes so that ongoing improvements can be made, Mr Hughes advised.

The electronic patient record (EPR) system at Wirral Hospital has been at level 3 since 1995. Level 3 has to do with electronic clinical orders, results reporting, prescribing and multidisciplinary care pathways. [Details can be found in Panel 1 on p102.] The system is based on the TDS 7000 system, which operates as a central mainframe, with other systems from individual departments linked to it, but not necessarily interfaced. For example, Telepath, the pathology system, is interfaced but the pharmacy system, JAC, is not. Although an interface between the prescribing system and JAC would be advantageous, automatic requisitions for inpatient orders and discharge prescriptions alone provides huge benefits, in terms of quality.

Avoidance of errors due to handwritten prescriptions is often cited as an advantage of computerised systems and this was clearly shown by the problems that arose at the Wirral hospital when prescriptions for intravenous doses were not included in the electronic prescribing system. On one occasion, a junior doctor was asked to rewrite the prescription for the next dose of a subcuta-

neous diamorphine infusion for a patient. The original dose of 5mg was erroneously rewritten as 50mg. Fortunately, the ward pharmacist identified the error before the infusion was reconnected. On another occasion, domperidone was prescribed but was misread as droperidol by the pharmacy and nursing staff. The patient received five doses of droperidol before the error was identified. In another incident, a serious dosing error had occurred because an abbreviation for "units" had been used instead of writing the word in full, as recommended. A prescription for insulin had been amended by crossing out the dose and writing the new dose as "4u". This was misinterpreted as 46 units because the "u" looked like a "six" and rewritten as such. This prompted the pharmacy department to change the insulin chart to include the word "units" on each line so that ambiguity is avoided.

There are numerous examples of substantial cost savings as a result of computerised prescribing, said Mr Hughes. At Wirral Hospital, when levofloxacin became the quinolone of choice, ciprofloxacin was left on the master index. However, a click on ciprofloxacin immediately leads the prescriber to the levofloxacin entry, containing some clear decision-support information.

"This obviates the need for ward-based pharmacists to nit-pick prescribing after the prescriptions are written and releases more time for proactive clinical services", said Mr Hughes. Decision-support systems can also help with dose reduction in renal impairment, he added.

Weekly methotrexate dosing is another area in which customised screens can improve patient safety. Within a six-month period, there were three instances where methotrexate was prescribed daily instead of weekly, and this error can be prevented if customised computerised prescribing, defaulting to a weekly schedule for oral methotrexate, is available for outpatient prescriptions. Another good example of the benefits of customised prescribing is seen with low molecular weight heparins. There is widespread confusion about the correct dosing for tinzaparin and enoxaparin. The customised routine leads the prescriber first to the heparin common drug pathway. Once an indication is selected, the correct dose is calculated, taking into account the patient's body weight (or the user is prompted for body weight). The full prescribing information is provided, and this also translates into information for nursing administration. A later audit of the dosing scheme showed close adherence to the recommended guidelines as a result of this scheme.

A stand-alone electronic prescribing system is better than a paper system and can liberate pharmacy time for clinical duties. Integrated systems with customised elements, interfacing with clinical laboratory data and decision-support programmes deliver real clinical benefits. "This is what we should be heading towards," proclaimed Mr Hughes.

When asked if mobile terminals are now used for prescribing at Wirral Hospital, Mr Hughes said that they had found that mobile terminals are not fast enough for the way that their consultants chose to work. Prescriptions are normally entered into fixed terminals by a junior doctor at the end of ward rounds. This means that discharge prescriptions are often entered later than was previously the case.

PAUL THOMPSON, from Royal Hampshire County Hospital, commented that in his hospital's computerised prescribing system

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(also based on TDS) pharmacists have a prescribing role and this helped considerably. Mr Hughes added that it is important that pharmacists are not used simply for order entry. Approximately 15 per cent of the inpatient orders in the Wirral system are entered by pharmacists, he said.

CHRIS CAIRNS, from Lewisham University Hospital, asked how the common problem of late arrival of discharge medication prescriptions in the pharmacy (after 4pm) might be tackled. Mr Hughes replied that, at Countess of Chester Hospital, mobile terminals would be used to enable prescribing during the ward round (and avoid the late arrival of prescriptions), but at Wirral Hospital it had been one of the stimuli to extend opening hours.

### ■ EPR AND PRESCRIBING

At Hope Hospital, Salford, an EPR project was launched in October 1999 and

went live in August 2000. NEIL KIRBY, technical support pharmacist at the hospital, said that this resulted in a major cultural change.

The system is based on a system called Sunrise Clinical Manager, which provides a single piece of software or common front end that gives access to information in the separate clinical systems for many departments (See Figure 1 p112.) The EPR system is available to all clinicians (including nurses, physiotherapists and pharmacists), and can be accessed from all clinical areas. It is also available to some GPs.

At present, there is no electronic link between the EPR system and the pharmacy system, although this is envisaged for the future, according to Mr Kirby. Much of the basic information about patients is drawn from the patient administration system (PAS) and users can browse through items such as contact details, next of kin and admission history. Although the link is in real time, the PAS system itself is only operational during office hours.

The radiology system allows clinicians to order tests using an electronic order pad. The

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electronic version has been designed to mirror the previous paper version as much as possible, with mandatory fields marked with blue stars. When the result is published in the EPR system, a green flag appears next to the test name in the patient's file. Clicking on the flag takes the user to the full report. As soon as the full report is published, it is available on Sunrise Clinical Manager (SCM).

Electronic ordering has yet to be introduced for pathology, but pathology results are already published on the EPR system. In this case, results are indicated by green and red flags, for results inside and outside the normal ranges, respectively. During the transition period, the pathology department continued to send paper copies of the reports after the electronic version was published and this led to paper "congestion" in ward offices. In addition to viewing results individually, results can be selected and charted to show trends. In the early days, users were keen to print these charts, in spite

of the fact that up-to-date versions were available at the touch of a key.

Medisec is the subsystem that manages letters prepared by medical secretaries. All the letters are downloaded once a day into the EPR system. Diagnoses and procedures are more complex matters. Initially, these were recorded in free text but this was not amenable to coding. A system based on the identification of "health issues" or problems, which can be coded using a local coding scheme, has now been devised, and the facility for free text comments retained. More detailed customised clinical documentation programmes are now being developed for selected specialties. Up-to-date records of prescribed medicines are also kept in the EPR system, although at present, these are only available in the diabetic clinic. These are entered directly by the doctors in the clinic.

One of the most useful projects to grow out of the EPR initiative has been immediate discharge summaries, said Mr Kirby.

These were launched in June 2001 for elderly care and medical wards and was extended to the whole hospital in February 2002. "The discharge process is usually badly handled and gives rise to a lot of complaints," he said. If all the necessary information (eg, diagnoses) is entered into the EPR system in advance, it should be possible to generate a discharge summary quickly by working through a short checklist. Drug orders are generated using an order pad by typing in the first few letters of a drug name and selecting the appropriate one from the commonly-used items that come up. Many of the drug fields are customised to ensure that appropriate options are available. For some conditions, "order sets" could be established, for instance, an order set comprising aspirin, atenolol, pravastatin, glyceryl trinitrate and lisinopril for post-myocardial infarction patients. Once the list is complete, a discharge summary can be printed. This is now in use throughout the trust. It is not sent to

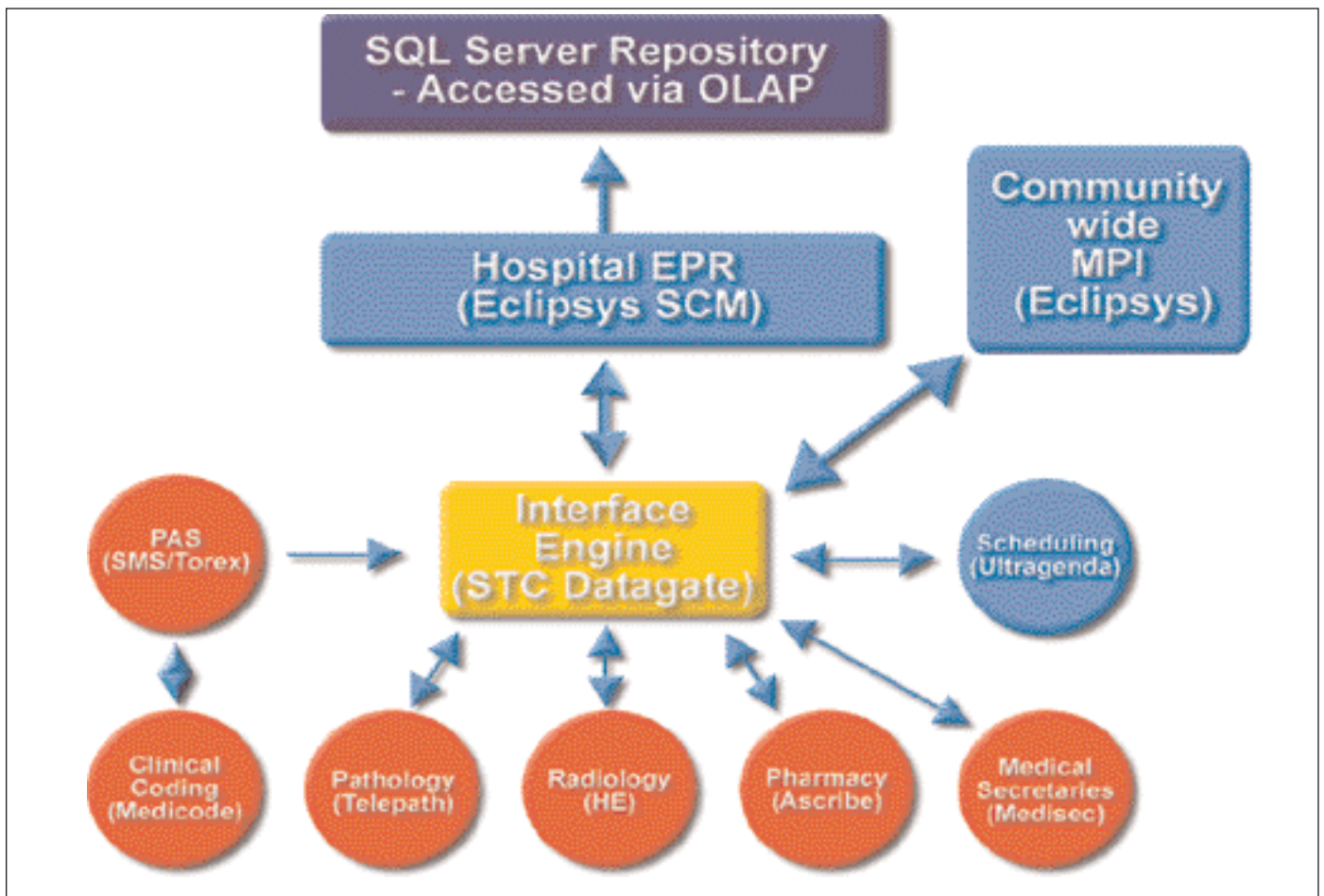


Figure 1: Schematic representation of the EPR system at Hope Hospital, Salford. The names in brackets are those of the suppliers of the systems  
 Key: EPR = electronic patient record; HE = Hospital Engineering; MPI = master patient index; OLAP = on-line analytical processing; PAS = patient administration system; SCM = Sunrise Clinical Manager; SQL = structured query language; STC = Scientific Technologies Corporation

the pharmacy, but is processed by pharmacists at ward level, often using the supplies of medicines in the patients' individual cupboards.

A member of the audience asked about electronic prescribing for inpatients and Mr Kirby replied that this would be started as soon as the electronic recording of drug administration becomes possible. This is already available in the system but is yet to be configured, he added.

DAVID SANDERSON, from Southmead Hospital, Bristol, commented that the SCM system is in use in his hospital but has not yet been expanded because junior doctors have so far not been able to select the correct drugs. Often, pharmacists have to make up to five interventions on a single prescription to correct this. This seems to occur because junior doctors do not attend for training. Mr Kirby said that at Hope Hospital, he works together with the undergraduate centre to co-ordinate training for junior doctors. This is followed by active support at ward level. "You have got to make that commitment to give people the right support," he said. He admitted that, by default, pharmacists are entering many of the medicines into the EPR system.

Asked about hardware access on the wards, Mr Kirby replied that most wards have two or three fixed terminals but that discussions are now ongoing about "bed-

head services" that could, in the future, provide computer, telephone and internet access at each bed. EPR should then be accessible through this route. A member of the audience with a similar system pointed out that radio link technology is not expensive and sometimes becomes necessary as more items are entered into the EPR and more staff required access. There may be

insufficient fixed terminals to meet the need and radio-linked portable terminals can help to ease congestion.

DAVID MILLER, from Sunderland Royal Hospital, said that GPs often require a more detailed discharge summary that includes the reasons for changes to drug treatment. Mr Kirby said that he had so far received no formal feedback about this, although he believes that this should be looked into. At present, this can be done using the free text comment facility.

## — MEDICATION ERRORS

Bar-coding would be very useful for reducing medication errors, said GILLIAN CAVELL, associate director of pharmacy, King's College Hospital, London. Although there is little published evidence for its effectiveness, bar-coding makes it possible to verify that the drug in hand is the one that is intended, she said. Potentially, bar-code technology can also be used to identify the patient and the nurse giving the drug. In one hospital where it is in use, there has been an 80 per cent reduction in the incidence of medication errors, said Ms Cavell. The major barrier to successful implementation of bar-coding is that drug manufacturers have so far not been able to agree on a common approach.