

# A HOSPITAL-BASED INTEGRATED MEDICINES MANAGEMENT MODEL

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*This article outlines a model that was developed in Northern Ireland to provide a comprehensive, hospital-based medicines management service*

According to the National Audit Commission, medicines management in hospital “encompasses the entire way that medicines are selected, procured, delivered, prescribed, administered and reviewed to optimise the contribution that medicines make to providing informed and desired outcomes of patient care”.<sup>1</sup>

Medicines management has been defined by Keele University’s department of medicines management in more general terms as “a practice that seeks to maximise health through the optimal use of medicines. It encompasses all aspects of medicine use from the prescribing of medicines through the ways in which medicines are taken or not taken by patients.”<sup>2</sup>

Traditionally, projects that have examined the medicines management process have adopted a sector-based strategy with a focus on either primary or secondary care. This approach conflicts with the principle that patient care must be seamlessly integrated across the primary/secondary care interface. The present project, although hospital-based, pays particular attention to this latter issue and includes enhanced contact between hospital pharmacy staff and primary health care practitioners.

Central to an integrated medicines management approach are effective systems for identifying and addressing any medication issues arising at admission and at discharge. These are critical stages of the secondary care pathway. Admission data informs diagnostic and therapeutic decisions, and the discharge process must ensure effective communication of information to the patient, carer, GP and community pharmacist. The importance of an accurate medication history at admission has been shown by an earlier study (unpublished) carried out at Antrim Area Hospital. In that study, 95 medication-related problems were identified in 119 medication histories taken without input from clinical pharmacy staff. These subsequently required 225 interventions, 90 per cent of which were independently assessed as being at the serious risk end of a severity grading scale.<sup>3</sup> In addition, an accurate history can help to predict those individuals at risk from adverse drug events.<sup>4</sup> In this study approximately 16 per cent of the sample admitted to hospital (n=929) experienced a possible adverse drug event. Risk factors included prescribed antidepressants or digoxin and those with chronic obstructive airways disease.

It was against this background that a bid

was made to the Department of Health, Social Services and Public Safety (Northern Ireland), under its Executive Programme Fund scheme, to resource a project concerned with the development and implementation of a hospital-based medicines management model. This bid was successful and the recruitment of additional clinical pharmacists and pharmacy technicians began in May 2001.

This paper outlines the hospital-based medicines management model that was subsequently developed.

## THE MODEL

A project steering group was established to oversee the development of the medicines management model and the design of the evaluation project. The project implementation team members, comprising five pharmacists and five technicians, were appointed during the summer of 2001.

At the outset of the development of the model, the patient’s journey was divided into four stages where there was potential for clinical pharmacy input, namely: admission, inpatient monitoring, counselling and discharge. For each stage, standard operating procedures were developed. These were peer-reviewed in an open forum discussion and revised accordingly. Each patient is monitored daily by a pharmacist during these four stages.

On admission, an accurate drug history is constructed for all patients using drug histories taken from GPs’ records, admission prescription list (Kardex), patients’ own drugs (PODs) and the patient/carer drug history. The GP history is obtained by the project pharmacist by telephone or fax. In addition, if the patient reports using a community pharmacy on a regular basis (at least 75 per cent of the time) to have their prescription medicines dispensed, a history is obtained from the community pharmacist. This history is obtained by the project technician by telephone or by fax.

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Project technicians use an algorithm at the time of admission to assess the safety and suitability of PODs for return to the patient, if required, at discharge. Products judged suitable for return are stored on the ward; unsuitable products are destroyed with the patients’ signed consent.

The accurate drug history, compiled on admission, is used to construct a Kardex record. Relevant information is documented on a working pharmaceutical care plan. This procedure is based on a format previously developed in the trust.<sup>5</sup> Drug treatment is reviewed daily, taking into account therapeutic goals, clinical chemistry and haematology results and, where appropriate, therapeutic drug monitoring. As part of ongoing process control, all interventions made are graded according to significance (Panel 1).<sup>3</sup> This grading is independently audited and reviewed by a non-project clinical pharmacist.

Counselling, tailored to suit the needs of the individual patient, is provided by the project team. This counselling focuses on drugs that have been started or discontinued, high risk drugs, use of devices, and other situations where pharmaceutical advice is deemed necessary. Project pharmacy technicians have been trained to provide a counselling service on inhaler technique. The training consists of practical and theoretical components studied under the supervision of a clinical pharmacist and culminates in a comprehensive accreditation assessment.<sup>6</sup>

A further extended role for technicians is enhanced management of stock on the wards which includes maintenance of stock levels, daily Kardex and drug trolley reviews to manage non-routine stock, and transfer of medicines for patients moving between wards. It is expected that this will lead to a decreased number of missed doses and a reduction in drug returns to the pharmacy. In addition, the technician highlights Kardex queries to the project pharmacist.<sup>7</sup>

At discharge, the project pharmacist generates and authorises a discharge prescription. This is carried out following a protocol agreed by the trust’s drug and therapeutics committee and the Northern Area Prescribing Forum. After discussion with the patient, the project technician assesses which drugs need to be dispensed, taking into account any PODs that were stored on admission.

A medicines record sheet, outlining all medicines and dosage instructions is prepared by the pharmacist for each patient. This is used with other relevant informa-

## Panel 1: Intervention grading

Intervention	Score
Intervention which is detrimental to the patient's wellbeing	1
Intervention is of no significance to patient care	2
Intervention is significant but does not lead to an improvement in patient care	3
Intervention is significant and results in an improvement in the standard of care	4
Intervention is very significant and prevents major organ failure or adverse reaction of similar importance	5
Intervention is potentially lifesaving	6

tion, including steroid cards, anticoagulation booklets and patient information leaflets during a final patient consultation and counselling session with the pharmacist. The patient is also advised of any hospital review appointments and recommended GP follow-ups.

The GP letter is also drawn up by a project pharmacist. In addition to medication details, this outlines relevant information such as changes to the patient's medicines and laboratory findings while in hospital. This is faxed to the GP and to the community pharmacist using fax machines specifically installed on study wards for this purpose. In order to protect patient confidentiality, the information is faxed anonymously and a follow-up phone call is made to the recipient to confirm the patient's identity.

We expect that the project team input will significantly reduce dispensary queries and speed up patient discharge.

### EXPECTED BENEFITS

Although medicines can cure or palliate, they may also be unnecessary, ineffective, impractical, harmful and costly. The appropriate use of medicines is paramount to effective patient care. We expect that use of this model will increase the appropriateness of medicines used. During the testing of this model, this aspect is being assessed using the medication appropriateness index, a validat-

ed measure of the appropriateness of a medication for a given patient.<sup>8-10</sup>

We envisage that appropriate pharmaceutical care will result in reduced duration of hospital stay due to the following factors:

- More rapid identification and treatment of patients whose admissions are due to an adverse drug event
- More accurate and timely attainment of medication history, leading to more rapid achievement of therapeutic goals
- Improved medicines management during inpatient stay
- More rapid discharge by the pharmacy team

As previously documented,<sup>11,12</sup> there is the potential to increase the time to readmission by use of appropriate care models. We predict that this will occur with the use of this model because, after drug rationalisation and counselling, patients will be using the most appropriate medicine correctly.

The model will produce significant opportunity cost-savings with respect to nursing and medical staff time. In addition, the model will optimise use of pharmacy expertise (and time) via improved use of skill mix between pharmacists and technicians and reductions in dispensary queries.

By the introduction of the use of PODs, rationalised ward stock, improved stock turnover and Kardex monitoring, we expect that improvements with respect to risk man-

agement as endorsed by the Audit Commission<sup>1</sup> will be achieved. In addition, we expect that these initiatives will lead to a reduction in drug costs.

We hope that users, including patients, primary/secondary care doctors and pharmacists will find the model of benefit to them.

### TESTING OF THE MODEL

The model is currently being tested using a randomised controlled study by the project implementation team. The project team works within the three general hospital sites of the United Hospitals Trust, namely Antrim Area Hospital (426 beds), Mid-Ulster Hospital (194 beds) and Whiteabbey Hospital (176 beds). Four pharmacist/technician pairs are based in medical wards throughout the trust and one pair is based in the surgical unit at Antrim Area Hospital. The main project began, following a short pilot, in March 2002. A target population of 1,200 patients is being sought before full statistical analysis and reporting of the results.

Overall, we intend this project to represent a comprehensive assessment of all facets of medicines management, building on previous work at both local and national levels. This will lead to a completely re-engineered process, including maximisation of the skills and training of pharmaceutical staff. The results of the project will provide further evidence to support the recommendations of the National Audit Commission report<sup>1</sup> and the Review of Clinical Pharmacy Services in Northern Ireland.<sup>13</sup>

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