The development of a mental health service patient information management system

TOM CALLALY, PETER FAULKNER, GRAEME HOLLIS, DAVID MCILROY AND PAUL HANTZ

Tom Callaly is Chief of Service, Division of Psychiatry, Barwon Health, Geelong Hospital. Peter Faulkner is the General Manager, Aged and Continuing Care Services, Barwon Health, Geelong Hospital. Graeme Hollis is the Assistant General Manager of the Division of Psychiatry. David McIlroy is a Team Manager with the Division. Paul Hantz is a Consultant Psychiatrist with the Division.

Abstract

In this paper we describe the development of the Mental Health-Patient Information Management System (MH-PIMS), which is an information management system designed for use in a modern, primarily community-based, mental health service. MH-PIMS is a computerised database which was designed by clinicians and is supported by a case management system and complementary patient record set – together called the Assessment and Care Evaluation (ACE) system. The paper also describes the ACE system. MH-PIMS can generate patient reports of use to case managers and teams in managing their caseloads and is of use to senior clinicians and service managers for audit and strategic planning purposes.

Introduction

All health delivery systems are under increasing pressure to establish which of their treatments are effective, to demonstrate that effective treatments are being delivered in a cost-effective way, to ensure continuity of care, and to implement outcome management and measurement systems. Mental health services are no exception. Changes within mental health services are occurring at an exponential rate. Australian federal, State and Territory initiatives towards continuous improvement and demands from consumers and funding agencies for evidence-based practice increase these pressures (Walters et al. 1996).

Central to the seven overriding issues identified by the Australian Council on Healthcare Standards (1997) is that care is coordinated and integrated with an interdisciplinary team approach, that there is effective communication with all involved, and that there is clear delineation of responsibilities and documentation of all aspects of care.

The National Mental Health Policy (Australian Health Ministers' Conference 1992) has identified priorities for reform, including the delivery of a seamless, integrated and balanced range of services. It has a major focus on outcome and outcome measurement. Many Australian public and private health care purchasers have signalled their intention to introduce casemix and outcome-based funding to psychiatric care (Boot, Hall & Andrews 1997).

Knowledge of health outcomes is seen by many as a way of making more informed decisions to help deliver improved care in a cost-effective way. Gale (1997) argues that, while knowledge of outcomes may lead to change in policy, most health systems find transforming change in policy into improved quality of care very difficult. She cites the example of policy and procedure manuals being inaccessible and containing conflicting information, often delivered in a verbose way, as one of the many factors preventing implementation of standards.

Despite rapid technological advances in other areas, system developments of value to clinical practice in mental health services have been piecemeal, at best. It is difficult to implement information systems which ensure that patient records are available during patient visits, that diagnosis is recorded, that laboratory tests do not have to be reordered because of lost test results, and that we know which patients we are currently managing and who are the responsible case managers (Song, Ho & Ho 1997).

In short, our current pencil and paper-based systems are failing under the strain of demands for improved quality of care and, on top of this, a whole set of new demands are going to be made which our current systems clearly won't be able to cope with. This is of critical importance in the case of introducing routine outcome measures. Clinicians will be reluctant to make outcome measurement an integral part of clinical practice unless convinced that management has the ability to put in place systems to provide rapid and accurate feedback about their patients' progress and the effect of the care they provide (Smith et al. 1997).

With the explosion in information technology that is occurring, it is expected that the development of computerised patient management information systems will allow us to move forward productively. The design of health information systems has revolved around providing information and solutions for administration departments as well as developing databases for pathology,

pharmacy and radiology departments. However, these developments have occurred in isolation from one another, and it has proved very difficult to collect data from clinicians in a form that can be entered into a computer database. Swart (1997) points out that in the United States most individual health care organisations have set up internal information systems that lack networking, data standards and data exchange capabilities – all critical features for maintaining continuity of patient care and accumulating reliable and valid data for research and policy development.

More recently, there has been a shift in the literature towards recommending that health information systems be developed which have as their focus patient clinical management as the generator of the core data for the system (Ferguson 1996; Pastor Urban & Whiddett 1997). It is therefore logical that clinicians be actively involved in developing these systems and that administrators and information technologists not be relied on to complete this task alone (Briscoe 1997). This is important not only to improve acceptability but also to ensure that clinical needs, and not just the data collection needs of hospital administration, can be addressed, and that potential errors, including unnecessary bureaucracy, can be avoided (Lelliott 1997).

In this paper we describe the theoretical framework and the development of MH-PIMS, an integrated computerised patient information management system for mental health services in Geelong, Victoria.

The Barwon Health Division of Psychiatry is an integrated component of the Geelong Hospital, serving Geelong and surrounding districts, which have a total catchment population of approximately 220 000. The service comprises five adult community mental health teams and an aged care psychiatric team, each providing crisis, mobile support and continuing care. The service also manages a 24-bed inpatient unit located at the Geelong Hospital, a 24-bed residential rehabilitation facility located in the community, and a child and adolescent service. At any one time there will be about 1200 patients being actively case-managed by the service. Each of the community mental health teams is based at a site which is geographically distant from the hospital medical records department and from other teams.

The groundwork: the case management system and patient record system

Getting the basics of patient management in place, along with a complementary patient record system, is a prerequisite to developing a patient information management system if patient care is to be at the core of the system.

In Victoria, a model of case management has been introduced to provide the framework for individualised care (Victorian Government Department of Health and Community Services 1994).

In Geelong, we adopted a case management system based on the Victorian Government model with an agreed set of guidelines in 1994. The service has one point of entry at which triage occurs which facilitates ease of access. The community mental health teams use a formal intake process, which involves recording a response to all referrals and contacts. A case manager is appointed for each person whom the team has decided will receive further assessment or treatment for any period of time.

A formal team review occurs for each new patient within one month of team intake and annually thereafter as long as the team continues to provide case management and treatment to the patient. An Individual Service Plan is developed for each patient within three months of intake and annually thereafter while they receive treatment. This process involves patient, carers or family and family physician if possible. Finally, when the team discharges a patient, a formal case closure process occurs and is documented.

It is important to note that this case management model, as well as the use of well-defined patient records, is widely aspired to throughout Australian services. The adoption of these is strongly promoted in such documents as the National Standards for Mental Health Services (Commonwealth Department of Health and Family Services 1997) and the Australian Council on Healthcare Standards referred to above. A similar model with formal intake, review, service planning and case closure has been legislated for in the British National Health Service and is called the Care Programme Approach (Kingdom 1994).

To facilitate the introduction of this case management model, we designed a new series of structured patient record documents, each of which corresponded to a process in the case management system. These documents are a Contact Record and Team Intake Record (both on the same document), Psychiatric Assessment and Service Plan, Team Review/Case Closure (one document serves both these functions), Individual Service Plan, Physical Assessment, Admission Management Plan and In-patient Discharge Summary and Service Plan. We spent three years designing these in consultation with all staff and have described the process elsewhere (Callaly, Hollis & McIllroy 1997). We call this combined case management and complementary paper patient record system the Assessment and Care Evaluation (ACE) system. The ACE system had been in use for a year before we attempted to develop MH-PIMS.
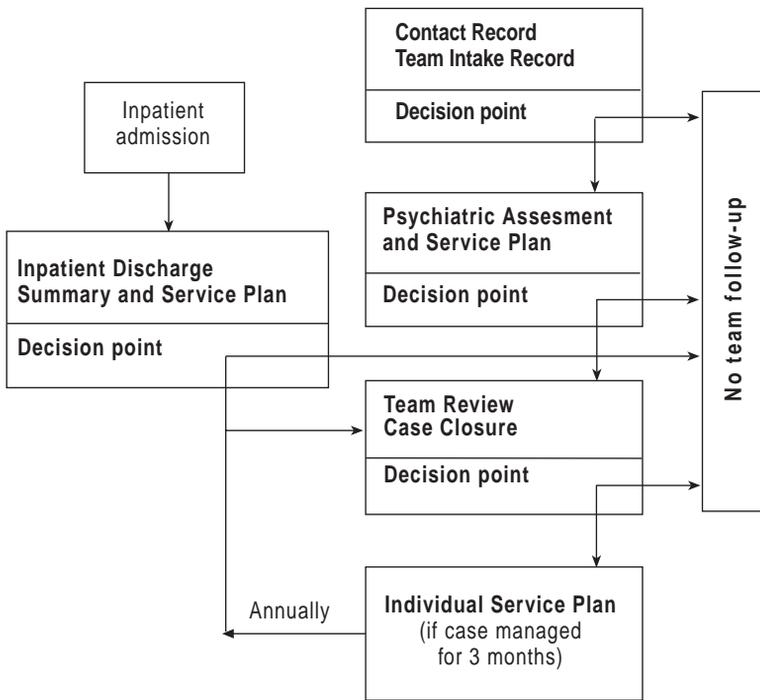
Figure 1: Overview of case management model

Moving from patient records to MH-PIMS

The critical design challenge was to move from the ACE paper clinical records to a database which could 'track' patient information and events during the period of case management, and generate data of use to the clinician, team manager and service management. The solution was the introduction of the concept of 'decision points' into the paperwork.

There are four points within the ACE case management process where a decision is made as to whether to continue to offer or provide further service by the team or to discharge elsewhere. We redesigned the originals of each of these four documents (Team Intake Record, Psychiatric Assessment and Service Plan, Team Review/Case Closure and In-patient Discharge Summary and Service Plan) so as to conclude with a uniform decision point (Figure 2).

Decision point	
☐ **Team follow-up**	Arrangements above
☐ **No team follow-up**	☐ Refer elsewhere (above)
	☐ Advice and no further follow-up

Signature - - - - - - - - - - - - -   Designation - - - - - - - - - - - - -

Name (print) - - - - - - - - - - -   Date - - - - - - - - - - - - - - -

Figure 2: Decision point

Key principles in designing MH-PIMS

A working party comprising a senior nurse, a psychiatrist and a senior member of management commenced work in 1995 on what was to become MH-PIMS. We agreed that the primary objective of MH-PIMS should be to support clinical care. Although important, collecting data to support management planning and decision-making was considered secondary to providing support to clinical care and having a patient-centred system.

As much as possible, we designed the system so that data are recorded by clinicians as part of their normal clinical activities. We reasoned that the quality of data entered directly into clinical records is superior to that which clinicians would enter onto traditional administrative data collection documents and that a new system should recognise this. We considered it important that the design of the database should be such that it has the flexibility to allow the integration of new and changing systems, such as pharmacy and pathology databases, and outcomes management and patient contact databases. We have recently designed and had developed a computerised version of the Health of the Nation Outcome Scales (HoNOS), which is an outcome measurement instrument (Wing 1994). The computerised HoNOS can be interfaced with MH-PIMS to provide immediate feedback to the clinician of HoNOS ratings and compare with previous ratings. Attention to the practical aspects of implementing an outcome measure is as important as the choice of the instrument itself if outcome measures are to be successfully integrated into clinical practice (Morris-Yates & Andrews 1997; Stedman et al. 1997).

We aimed to provide clinicians with online and real-time access to essential patient information at sites distant from the medical records department, and the ability to enter and update data from those sites. It was also vital to establish

confidentiality and security procedures and protocols. Finally, it was important that the system be user-friendly, self-guiding and require minimum training so that all clinicians would use it.

Practical aspects of MH-PIMS design

One member of the ACE development team who was concurrently pursing a tertiary qualification in information technology undertook initial programming of the system. It was developed using Microsoft Access 2.0 and the Microsoft Access Developers Toolkit. Microsoft Access 2.0 is used throughout the Geelong Hospital as part of the Microsoft Office suite of software applications and provides a number of features that make it very suitable for application development.

Microsoft Access 2.0 supports rapid application development and enabled the speedy development of a user interface, which served as a prototype to enable users to see the system and gain some first-hand experience in using it. This gave the developers a better understanding of the needs of users and assisted in validating the product. The use of Microsoft Access 2.0 also enabled the use of the incremental software process model involving the development of small but essential stages of the project based on the functionality of the solution.

Following the formulation of a requirements specification, a design specification was established and a plan of the system to be built was outlined and verified by management and senior clinicians. The result was a system that is easily accessed and navigated by clerical support staff and clinicians. This locally developed version of MH-PIMS was used initially for about one year. Having implemented the system across the service and gained operational experience, the feedback from clinicians, clinical managers and clerical users was resoundingly positive. On the strength of the high degree of acceptance of the system and positive value attached to it by clinicians, the decision was taken to engage a professional software house to further enhance and develop the system.

MH-PIMS in practice

Demographic data about each patient provided with service, the name of the team and case manager and data from the four decision points are entered into MH-PIMS by the team clerical staff member as documents are filed (Figure 3). Subsequently, the case manager enters the due dates of team reviews and Individual Service Plans. It is the case manager's responsibility to ensure that this information, as well as changes in demographic information, is continuously

updated as reviews occur and service plans are completed (this is monitored in individual supervision).

Figure 3: Patient data

This is sufficient data to enable MH-PIMS to produce a history of documents completed for each patient and patient reports, which are useful for team meetings and caseload management (Figure 4). Team members can view a 'to do list' of tasks due in the coming weeks or months. This saves unreliable 'paper and pencil' record-keeping and helps ensure that reviews and service plans are not forgotten. It is also possible for managers to instantly graphically visualise data about team members' caseloads, number of referrals, case closures, and so on over any specified period.

Other useful features include a capacity to generate ACE documents electronically. This feature enables users to generate the relevant ACE document from within the database system, with the additional feature of automatic importation of the relevant client demographics, thus eliminating multiple entry of such information. This document generation facility gives clinicians the choice of either printing hard copy ACE documents with client demographics already

included or using the document as a template to enter information manually. The documents can be produced as hard copies or can be stored electronically and retrieved at a later date. We currently ensure that hard copies are always filed in the relevant records.

Crisis Management Plans have been incorporated and are completed and stored electronically for access by other clinicians accessing the system. Our triage team particularly values this feature for obvious reasons.

An 'Administration Control' section has been included. This allows easy maintenance of reference table information and administration of local user passwords for data protection and confidentiality purposes.
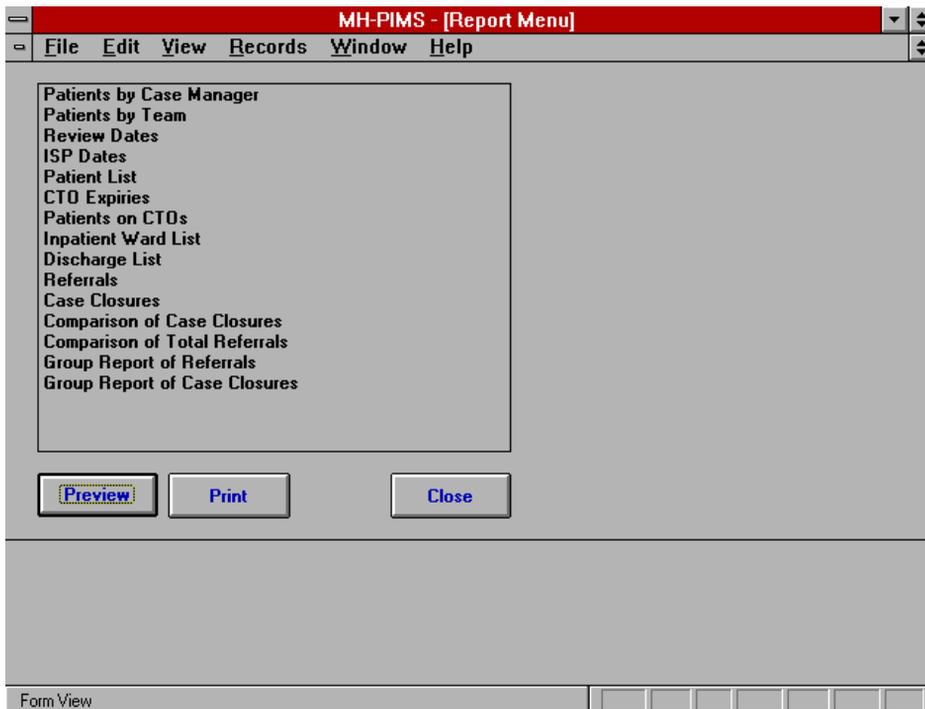
Figure 4: Patient documents and reports

Future developments

Future developments are planned in stages. The first stage will be to ensure that we can use MH-PIMS to deliver the new minimum data set which the Victorian Government will require from next year. Currently, data have to be entered

separately into the MH-PIMS system and the Psychiatric Records Information System Manager (PRISM), which is the current Victorian data capture system. The Victorian Department of Human Services is going to introduce a new minimum data set capture system and statewide Patient Master Index for mental health services. This system, which will be known as the Redevelopment of Acute and Psychiatric Information Directions (RAPID), is currently under development. As the technical specifications of this new system are promulgated, MH-PIMS will be re-compiled in a 32-bit data language (offering greater robustness than is available in Access 2) and will provide the 'front-end' to the Department of Human Service's RAPID system. It will then be capable of delivering the minimum data set required.

The next stage will involve the electronic storage and retrieval of ACE documentation to replace the use of the paper file. This will involve developing progress notes capacity and the use of interfacing systems to capture pathology, pharmacy and radiology data, as well as the capacity to order these items directly from the electronic file. In this phase of the development of MH-PIMS, we favour a model in which the core system interfaces with other databases (for example, pharmacy or outcome measure analysis databases) rather than a system where all data elements are entered into a central database (Hannan 1997). The technology for all of this is now well established. This is planned for the coming 12 months.

The final stage will enable clinicians to access clinical educational information via the Internet, supply patients with written information about medications and illnesses, enter and analyse patient data and conduct computerised assessments such as CIDI-Auto directly within the patient's electronic file. All of these are now possible electronically but require the use of separate systems.

Summary

MH-PIMS is an information system that provides a powerful aid to the case management function in psychiatry, facilitating appropriate follow-up of clients, strong clinical accountability, management decision support and quality auditing support. The 'ground up' developmental history of the software has ensured high acceptability and use by busy clinical staff. The next development will ensure minimum data set reporting to funding authorities without forcing clinicians to adopt yet another system. MH-PIMS will allow us to adopt outcome measurement throughout the service without requiring clinicians to utilise parallel systems, and will allow us to take early advantage of the rapid developments that are occurring in the world of the Internet and multimedia.

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